

U.S Army Corps of Engineers

New York District

FINAL REMEDIAL ACTION REPORT FOR DECONTAMINATION AND DECOMMISIONING

ST. ALBANS VETRANS ADMINISTRATION EXTENDED CARE FACILITY QUEENS, NEW YORK

Prepared Under:

CONTRACT NO. DACW33-97-D-0002 DELIVERY ORDER NO. 0009

January 2003



[™] Stone & Webster, Inc. Shaw Environmental & Infrastructure, Inc.

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ACP Access Control Point

ACM Asbestos Containing Material
ALARA As Low As Reasonably Achievable
DCGLs Derived Concentration Guideline Levels
DERP Defense Environmental Restoration Program
United States Department of Transportation

D&D Demolition and Decontamination FUDS Formerly Used Defense Site

FSS Final Status Survey

IDW Investigation -Derived Waste

MARSSIM Multi-Agency Radiation Survey and Site Investigation Manual

NED New England District

NRC Nuclear Regulatory Commission

NYC New York City

PCM Phased Light Microscopy
RMA Radioactive Material Area
RSO Radiological Safety Officer
SAP Sampling and Analysis Plan

SOW Scope Of Work

SSHP Site Safety and Health Plan

SU Survey Unit

S&W Stone & Webster, Inc.

TEM Transmission Electron Microscope
TSDF Treatment Storage and Disposal Facility
USACE United States Army Corps of Engineers

USACE NAE United States Army Corps of Engineers New England District

VA United States Veteran's Administration

VAT Vinyl Asbestos Tile

VAECC Veteran's Administration Extended Care Center

WESTON Roy F. Weston Company, Inc.

WP Work Plan

WMP Waste Management Plan

Y-90 Yttrium

EXECUTIVE SUMMARY

In compliance with USACE Contract DACW33-97-D-0002, Delivery Order 009, Stone & Webster provided decontamination, sampling and analysis, waste transportation and disposal, final status survey, and final restoration services at the St. Albans Veterans Administration Extended Care Center Facility (VAECC), located in Queens, New York.

Stone & Webster utilized a small disadvantaged business enterprise, Cabrerra Enterprises to provide daily radiological support services during the field remediation phase of the project. Additionally, Cabrerra provided the Final Status Survey (FSS) in accordance with guidance as outlined in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and Stone and Webster documents "Work Plan for Decontamination and Decommissioning" and "Sampling and Analysis Plan for Decontamination and Decommissioning."

Stone & Webster utilized a small business, Franklin Environmental, to provide radiological decontamination, asbestos abatement, and waste transportation during the field remediation phase of the project. Additionally, Taylor Environmental performed asbestos air monitoring and related professional services.

This project included the following activities:

- 1. Decontamination and decommissioning (D&D) of three survey units (SU001, 002, 004) and piping beneath one survey unit (SU005) within 90 of the St. Albans VA Center.
- 2. Characterization and disposal of Class A and Class B radioactive waste generated from the D&D activities within Building 90.
- 3. Removal and disposal of asbestos containing materials generated from activities within the SUs in Building 90.
- 4. Collection and analysis of asbestos compliance samples for site clearance, personnel monitoring, and area monitoring.
- 5. Performance of a Final Status Survey (FSS) for SU001, 002, 004, a portion of 005, and 008 within Building 90.
- 6. Preparation of a Remedial Action Report.

The five survey units (SU) included in the project, SU 001, 002, 004, 005 and 008 were located in Building 90. D&D activities were conducted in SU 001, 002, and 004. The original scope of work included the removal of a drainpipe from SU001 to SU002 that was present beneath SU005. The pipe was to be removed without disturbing the floor of SU005 by pulling the pipe into SU002. Stone & Webster discovered that this was not possible due to the unanticipated presence of tees connected to the drainpipe. In order to access the pipe, the floor for SU005 required removal. The floor tiles along the pipe chase were determined to contain asbestos. The drainpipe and soil beneath the floor of SU005 was removed.

As detailed in Section 4, SU005 and 008 were divided into smaller SU designated as SU005A and 005A and SU008A and 008B for purposes of the FSS. A FSS was

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performed within all five SU, clearing the areas for future use. An underground pipe that allowed the transfer of waste liquid from the ejector pit in SU002 to an outside manhole was surveyed and the results are contained in the Draft FSS Report included as Appendix B of this document.

The waste disposed as radioactive waste was classified as Class A or Class B waste. The initial scope of work has assumed that all waste would be Class A waste and waste profiles and acceptance was premised on this assumption. Upon completion of the D&D activities USACE determined that, based on the best available data and several iterative calculations with various assumptions, four drums of waste were disposed as Class B waste. The Class A waste (307 drums) were transported directly to Envirocare in Utah. The four drums of Class B waste were transported to GTS/Duratek, a treatment, storage, and disposal facility (TSDF) that accepts small quantities of waste for bulking prior to shipment to a permanent TSDF. The drums of Class B waste were shipped to Barnwell Waste Management Facility from GTS/Duratek on October 31, 2002.

The Draft Final Status Survey (FSS) was prepared and submitted to USACE for submission to the NRC in December of 2000. The FSS is required by the NRC to document that all radiological waste materials were removed in accordance with MRSSIM guidance.

1 INTRODUCTION

1.1 Background

The St. Albans Veteran's Extended Care Center (VAECC) operated as a Naval Hospital prior to its acquisition by the Veteran's Administration (VA). The Naval Hospital provided nuclear medicine services under several Nuclear Regulatory Commission (NRC) licenses. NRC licensed activities ended with the termination of NRC license # 31-00076-06 on December 31,1973. In 1976, the St. Albans facility was transferred from the Navy to the VA. The VA did not hold a radioactive materials license at St. Albans but did hold a NRC "Possession Only" Byproduct Materials License No. 31-02892-06.

In order to terminate the NRC license, a decontamination and decommissioning (D&D) approach was developed. The D&D methodology was derived in accordance with the Final Decommissioning Plan (Weston, 2000) and the requirements of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). The Final Status Survey (FSS) element of the Work Plan (WP) was developed using the guidance found in the Decommission Plan (Weston 2000), Draft Final Work Plan for the Radiological Characterization (S&W, 1998), and other applicable regulatory guidance documents including MARSSIM.

The objective for activities at the VAECC was to ensure that all cleanup criteria or derived concentration guideline levels (DCGLs), established in the Final Decommissioning Plan were achieved and that exposures to occupational workers and the public were maintained as low as reasonably achievable (ALARA). Upon NRC approval of the Final Status Survey (FSS), the areas will be restored to a condition that will allow for a safe work area for future activities. Currently, the future use of the areas within Building 90 of the VAECC is uncertain.

1.2 Purpose

This Remedial Action Report documents the (D&D) tasks performed at the VAECC. This report has been prepared in accordance with the USACE/NAE Contract Number DACW33-97-D-0002 Statement of Work for Delivery Order Number 0009, Radiological Contamination Removal Action, St. Albans Veterans Administration Extended Care Center, Queens, New York, and the approved WP and Decommissioning Plan.

1.3 Document Organization

Section 1.0 discusses background information about the Site, the purpose of the D&D action and organization of the Remedial Action Report. Section 2.0 presents a detailed history of the Site along with a summary of previous field investigations. Section 3.0 summarizes the asbestos abatement aspects of the D&D action in addition to documentation of air monitoring activities for this project. Section 4.0 outlines the rationale and methods used during the decontamination and removal activities. Section 5.0 summarizes how the waste material was handled and stored onsite and the factors for determining the appropriate off-site disposal location for each type of waste. Section 6.0

describes planned site restoration activities. Section 7.0 provides the list of reference documents for this report.

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2 SITE INFORMATION

2.1 Site Description

The Veteran's Administration Extended Care Center (VAECC) is located on an approximately 55-acre site at 179th Street and Linden Boulevard in Queens, New York and includes 15 buildings. As defined by the scope of work (SOW), this project site includes survey units 001, 002, 004, 008, and a portion of 005 within Building 90 and Corridor 45 for D&D activities. See Figure 2-1 for the location of the facility and Building 90 and Figures 2-2 and 2-3 for the specific survey unit within Building 90 included in this project.

2.2 Site History

The Navy operated the St. Albans facility as a Naval Hospital prior to its acquisition by the VA. While operating as a Naval Hospital, nuclear medicine services, including radiological therapy, were executed under several NRC licenses beginning in 1950. The original license allowed the use of Yttrium-90 (Y-90) for tumor treatments and an amendment to the license allowed the use of liquid Y-90 for leukemia treatment. In December 1959, the radiological laboratory submitted an application for Strontium-90/Yttrium-90 in order to produce the necessary Y-90. The request was approved and liquid Sr-90 was introduced to the site.

According to site personnel in late 1962, a spill of liquid Sr-90/Y-90 occurred inside the exhaust hood in the "hot" laboratory. The spill was not reported and sampling was not conducted to determine the extent of the spill. The standard operating procedure utilizing Radiacwash 2-3 times a week was used to remove the contaminants. In 1964, results of a smear test reported contaminants within background levels. This spill was the only recorded spill at the facility in the area of the project site.

The NRC licensed activities ended with the termination of NRC license # 31-00076-06 on December 31,1973. In 1976, the St. Albans facility was transferred from the Navy to the VA. The VA did not hold a radioactive materials license at St. Albans.

2.3 Summary of Previous Investigations

In May of 1992 the USACE, while performing a review of former Department of Defense sites, visited St. Albans and conducted a visual survey of the radiological laboratories. During the visual survey, the Corps identified areas with the potential for elevated levels of radiological contaminants. After this visual survey, the VA radiological safety officer (RSO) submitted smear samples to a laboratory for analysis for radiological contaminants. Analytical results confirmed the presence of radiological contaminants in the samples.

In July of 1992, Teledyne Isotopes performed an initial survey for radiological contaminants. Sample results indicated the presence of radiological contaminants in samples from the floors, drain lines, and equipment in the "hot" laboratories. Teledyne identified the contamination to be Sr-90. Teledyne Isotopes issued a report titled

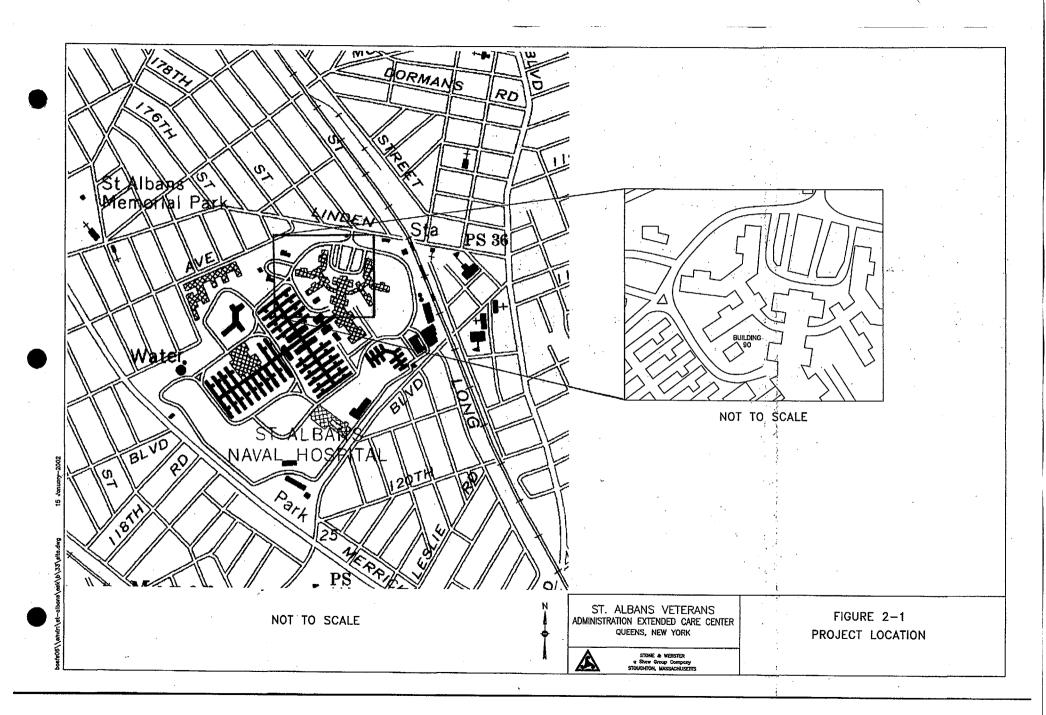
"Radiation Safety Survey for VA Medical Center Queens, NY, July 1992" to the VA summarizing the survey results and data.

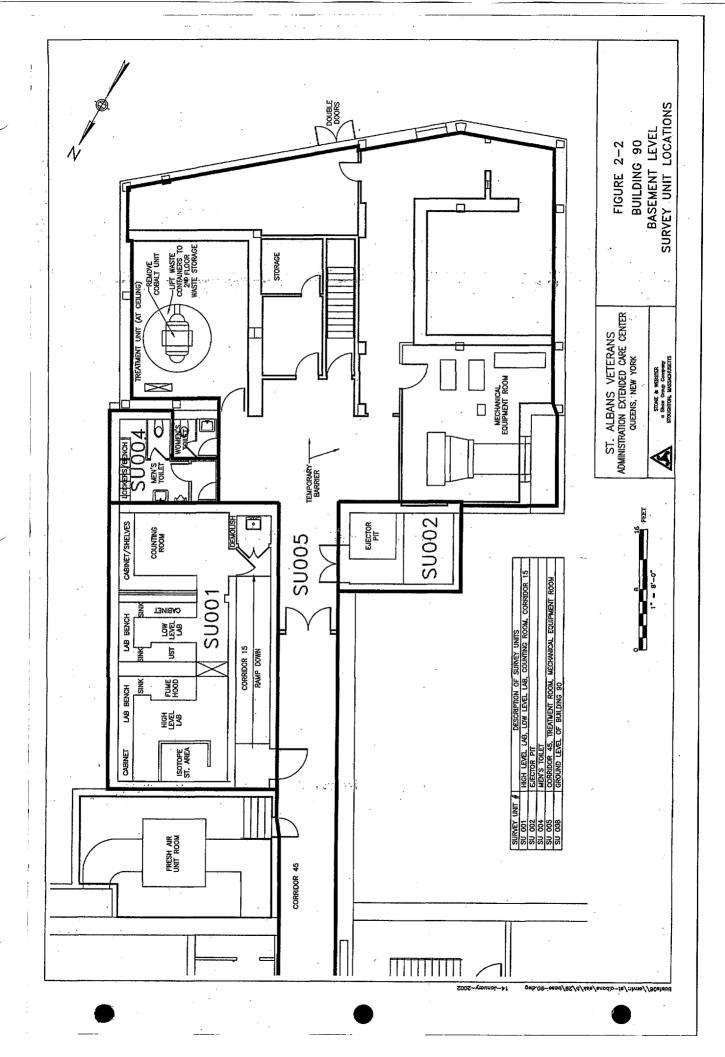
In August 1992, Teledyne removed the floor drains, exhaust hoods, floor tiles, bench tops, and numerous other items identified in their report from the laboratories. In October of 1992, Teledyne used jackhammers to remove the concrete floor surrounding the main floor drain for the emergency shower in the High Level laboratory. The drain to the first 90-degree elbow was removed. The drain line was traced to the Ejector Pit room. Contamination was detected in the Ejector Pit room and Teledyne recommended an expanded survey and decontamination of other rooms.

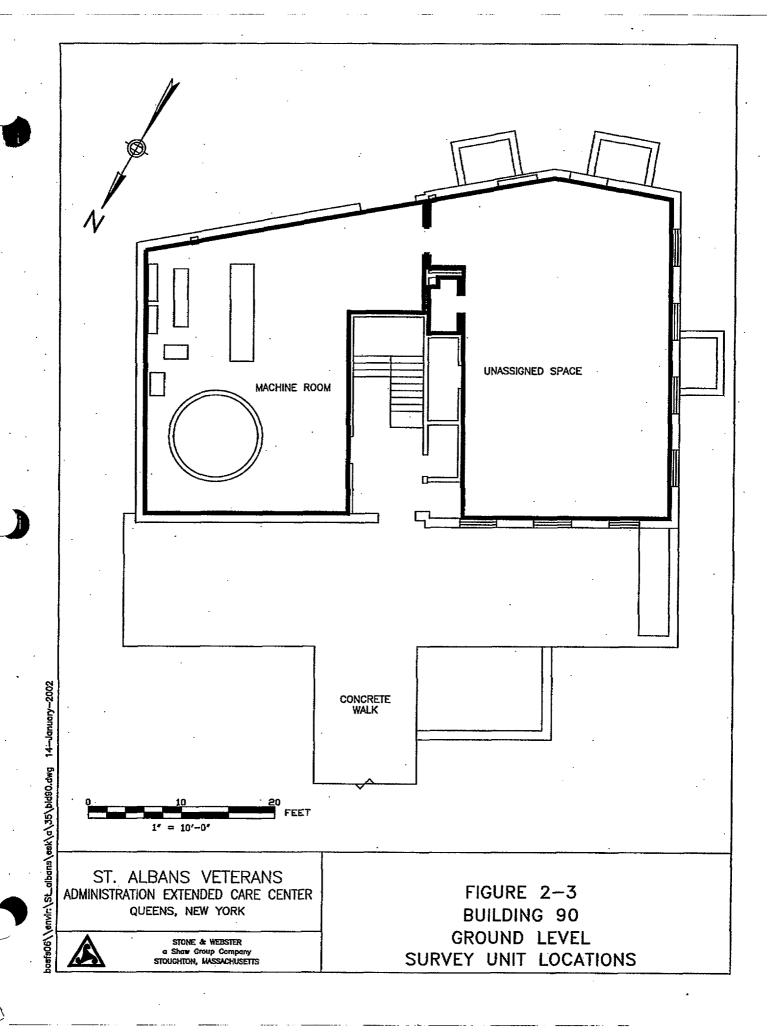
In September 1997, Ogden surveyed the nuclear labs and the ejector pit located adjacent to Corridor 45. They identified radioactive materials in excess of NRC release criteria (Northern Ecological Associates, Inc. Report titled "Data Collected at DERP-FUDS Saint Albans Extended Care Center Queens, NY," prepared by Ogden Environmental and Energy Services Co., Inc.). The Ogden report recommended expansion of the scope of the survey.

Stone & Webster prepared a records review report ("Historical Site Assessment – Records Review Report for the St. Albans VAECC", April, 1998) for the USACE, chronicling the use of radioactive materials at the St. Albans facility. The Stone & Webster report identified areas in Buildings 64, 90 and 91, requiring characterization and remediation to support unrestricted release of the St. Albans facility.

In 1999, Roy F. Weston Company, Inc. (Weston), conducted characterization surveys of buildings 64, 90 and 91 (Weston 1999a). Data generated from previous characterization efforts, supplemental tritium surveys and small-scale decontamination activities, demonstrate that Survey Units (SU) 003, 006, 007, 008 and 009 meet the DCGLs for St. Albans and requirements for FSS (Weston, 1999b). Survey Units 001, 002 and 004 and the pipe beneath SU005 (located in the Building 90 basement) contained radiological materials that required remediation and a comprehensive FSS for SU 001, 002, 004, and the revised area of 005 (See figures 2-2 2-3, and 4-1 for locations of these SUs).







Chronology of Events

Table 2.1 Chronology of Events

| Date | Event | | | |
|-------------------------|---|--|--|--|
| Jul.1992 | DOD identifies site as requiring decontamination | | | |
| Apr. 1998 | Stone & Webster performs Historical Site Assessment | | | |
| Apr.1999 | Roy F. Weston Company conducts characterization survey of | | | |
| | Bldgs. 64, 90, 91 | | | |
| Apr. 1999 | Weston Decommissioning Plan accepted by NRC | | | |
| Aug. 2000 | Stone & Webster Work Plan Approved | | | |
| 18 Sep. 2000 | Stone & Webster mobilization to site. | | | |
| 18 Sep 22 Dec. 2000 | D&D activities conducted for SU001, 002, 004 and 005 | | | |
| 19 Sep 23 Oct. 2000 | Asbestos sampling and abatement conducted | | | |
| 11 Jan. 2001 | Shipment of 307 drums of Class A Waste to Envirocare | | | |
| 4 Dec. 2000–13 Jan.2001 | FSS is conducted for D&D areas | | | |
| 16–17 Jul. 2001 | Pipe chase surveyed and FSS completed | | | |
| 18 Jul. 2001 | Shipment of four drums of Class B waste to GTS/Duratek | | | |
| 19 Jul. 2001 | Site Demobilization | | | |
| 18 Dec. 2001 | Submission of Draft FSS to USACE | | | |
| 21 Jun. 2002 | Complete Restoration of concrete floors | | | |
| 31 Oct. 2002 | Shipment of four drums of Class B waste from GTS/Duratek to | | | |
| | Barnwell Waste Management Facility | | | |

3 ASBESTOS ABATEMENT

In accordance with the Scope of Work, asbestos abatement procedures were used for the remediation of the areas of floor tile containing asbestos with radiological materials. The abatement was performed in strict accordance with New York City Department of Environmental Protection (NYC DEP) Title 15 Regulations and NYC DEP Attachment IV "Procedures for use of Foam or Similar Viscous Liquid in Removal of Potentially Friable Vinyl Asbestos Tile (VAT)". The scope of work limited abatement activities to radiologically contaminated asbestos containing material (ACM).

The Asbestos Abatement Plan for this project outlined the requirements of NYC DEP Regulations (Title 15). Taylor Environmental maintained an Asbestos Handling License with the State of New York Department of Labor. An asbestos variance application was submitted to and approved by the NYC DEP for removal of 175 square feet of radiological waste containing ACM from the lab area floor of Building 90. The variance was issued due to the more stringent decontamination procedures required for removal of radiological waste associated with the ACM. Work procedures specific to asbestos abatement activities included:

- The application of viscous foam to the tiles prior to removal;
- The implementation of an asbestos air monitoring program; and
- The application of an encapsulant to the floor subsequent to removal of the asbestos and prior to removal of the radiologically impacted concrete.

3.1 Objectives

The objective of the abatement program was to identify and remove radiologically impacted ACM and remove the existing drums of ACM without jeopardizing the health and safety of the workers and general public.

3.1.1 Scope of Work

The initial scope of work for the abatement program was limited to the following:

- Removing approximately 60 square feet of vinyl asbestos floor tile and associated mastic located on the ramp in Corridor 15.
- Remove approximately 115 square feet of asbestos containing floor tile mastic located in the High Level Laboratory, Low Level Laboratory and Counting Room.
- Double bag and dispose of approximately 115 square feet of loose VAT located in drums contained in the High Level Lab.

The floor mastic was confirmed to be ACM, therefore the removal action was included as part of the abatement.

3.1.2 Alterations to the Scope of Work

During the removal of the contents of SU001, Stone & Webster discovered evidence indicating that the hood in the High Level Lab was constructed of ACM transite board and that a membrane layer discovered in mid-layer level of the concrete floor may contain asbestos. To verify whether ACM was present in these materials a bulk sample

from the hood in the High Level Laboratory and a sample of the mid-layer membrane found in the concrete were collected for ACM analysis. The analytical results confirmed the hood was 65% asbestos. The membrane sample analytical results indicated asbestos was not present above the analytical method detection limits. Based on the positive ACM results the hood was incorporated into the abatement activity.

Concurrent with the discovery of the ACM from the hood, it was determined that ACM containing floor tiles in Corridor 45 (SU005) required removal to allow access to a drainpipe from SU001 to SU002.

Taylor Environmental filed an additional asbestos abatement variance application related to the lab hood and floor tiles. The variance application to the NYC DEP included additional 725 square feet of mastic and tile and 100 square feet of transite. Abatement work was suspended for 8 days during NYC DEP review of the second variance application. After submission of clarification to the application, the NYC DEP approved the variance.

3.2 Sample Locations and Collection Methodology

3.2.1 Bulk Asbestos Sampling

Asbestos sampling was conducted in accordance with the requirements of the Asbestos Abatement Plan and applicable regulations, including NYC Title 15. Three samples of the suspected ACM were obtained by using a putty knife. Smear samples were collected on the outside of the jar to confirm that ACM was not present on the jar surface. The sample jars were sealed, labeled and packed as described in the Sample Analysis Plan (SAP).

3.2.2 Air Sampling

Ambient and remediation worker personal air samples were collected before, during and immediately following completion of the asbestos abatement work in order to confirm that the containment structure(s) could be removed without contaminating the non-ACM work areas. Personal air samples for health and safety compliance monitoring were collected in accordance with the requirements of the Site Safety and Health Plan (SSHP) and the Asbestos Abatement Plan.

3.3 Laboratory Analysis Methods and Result

3.3.1 Bulk Sample Analysis

The samples were analyzed using Polarized Light Microscopy (PLM) performed in accordance with USEPA Method 600/R-93/116 with a 24 hour turnaround time.

3.3.2 Clearance Air Samples

Air samples were analyzed by an off-site asbestos laboratory using Method 7400 [phase contrast microscopy (PCM)]. Twelve air samples did not pass the PCM analysis and in accordance with the SAP, were resubmitted for transmission electron microscope (TEM)

analysis. Based on the PCM analysis, remediation area SU001 failed final air clearance. Samples from this area were re-analyzed using TEM. All samples re-analyzed using TEM passed clearance standards. Ten percent of these samples were analyzed using Method 7402 as QC verification on the air samples. Tablé 3-1 summarizes the results of compliance samples collected for the asbestos abatement.

3.3.3 Asbestos Analytical Results

Summary tables and laboratory asbestos analytical results for all asbestos samples are contained in Appendix A. Table 3-2 summarizes the performance standards and abatement goals for the asbestos abatement.

Table 3-2
Asbestos Abatement Goals and Performance Results

| Asbestos Abatement Goals | Performance Results |
|--|---|
| Remove the radiologically contaminated | Sampled, identified, and removed ACM |
| ACM within the guidelines dictated in | contained in the High Level Laboratory, |
| NYC Title 15. | Low Level Lab and Counting Room. |
| Ensure removal of previously unidentified | Sampled, identified, and removed ACM |
| radiologically contaminated ACM. | contained in the High Level Laboratory. |
| Dispose (off-site) of the drums of pre- | Repackaged and disposed of the pre- |
| existing ACM contained in the laboratory. | existing ACM in accordance with the |
| | Waste Management Plan. |
| Prevent contamination of surrounding area. | Confirmatory and air sampling verified |
| | containment of the abatement area was |
| | achieved. |

3.4 Asbestos Waste Management

All ACM removed during this action contained radiological materials above the DCGLs. The waste was bagged, placed in drums, stored in the radioactive material area (RMA) and transported for disposal at Envirocare. Radiologically impacted ACM waste that existed prior to Stone & Webster's remediation activities were repackaged into appropriate containers, drummed and staged in the RMA for transportation and disposal at Envirocare. The volume of waste removed from VAECC is detailed in Section 5 Waste Management. Waste characterization forms and manifests for shipment of this waste material can be found in Appendix C – Waste Characterization Forms and Manifests.

4 DECONTAMINATION AND REMOVAL PROCEDURES

4.1 Objectives

The project objectives consisted of the decontamination of SUs that contained radiological contaminants above the NRC approved DGCLs. These objectives were achieved using D&D methodologies that ensured exposures to occupational workers and the public were within ALARA guidelines.

Radiation work permits and radiation surveys were completed in accordance with the Work Plan. Copies of the permits and surveys are in Appendices D and E respectively.

Details of the radiological clearance activities are detailed in the Final Status Survey (FSS) prepared for the NRC. The FSS was submitted under separate cover in December of 2001. All survey units that were decontaminated and decommissioned (D&D) (SU001, 002, 004 and the pipe line beneath SU005) and used to temporarily store drummed D&D wastes (SU008) were cleared as not containing radiological materials in excess of the DGCL's.

4.2 Alterations to Work Plan

The following were general alterations to the WP.

- SU001, as shown in Figure 4-2, was divided into two areas designated at SU001A and SU001B to be compliant with MARRSIM guidelines.
- The BROCK remote hammer was too large to fit into the existing access points to the the Isotope Area of SU001. Stone & Webster switched to electric jackhammers as the means to demolish the concrete.
- The Control Room for the X-Ray Treatment Room located in SU005 was cleared of all contents. The contents were surveyed and released as non-radioactive waste. The area was final status surveyed as part of SU005.
- At the direction of the USACE, lead tiles were removed from SU001A, (isotope storage area) and decontaminated to avoid classification as a mixed waste. The decontaminated lead tiles were sent to a local recycling facility.
- At the direction of the USACE, the X-Ray unit was removed from the 1000kvp Treatment Room disposed as clean waste.
- SU005 was reduced in area, as indicated by Figure 4-1. The areas removed from the scope of this project had previously been cleared by a final status survey performed by Weston and were not impacted by S&W's project activities.
- SU008 was sub-divided into two areas SU008A and SU008B, as indicated in Figure 4-3. This field change was made to allow clearance of SU008A while waste was stored in SU008B to coordinate the waste-shipping schedule with the FSS.
- At the direction of USACE, four drums of radioactive waste were reclassified from Class A disposal criteria to Class B. The original scope of work had assumed that all waste would be disposed in accordance with Class A disposal criteria. Details of the reclassification are contained in Section 5 of this report.

4.3 Delineation Work Zones

The Radiological Control Areas (RCA) were established at the access point to each work area. The RCA included SU001, SU002, SU004 and a portion of SU005. These areas were clearly marked with signing stating that the area was an access-restricted area. In order to create an air tight RCA, all ventilation ducts were secured and polyethylene sheeting and barriers was placed to restrict access. Decontamination areas were established and the access control points (ACP).

4.4 Removal of Contents and Decontamination of SU001

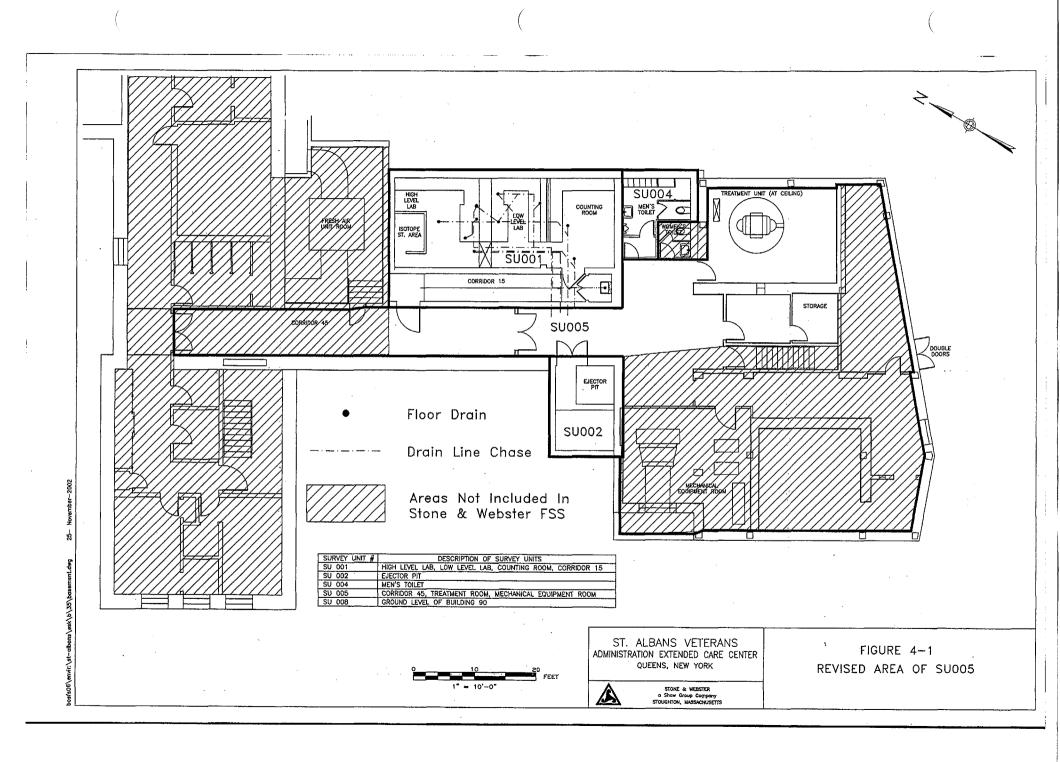
The D&D activities in SU001 included the Isotope Area, the High Level Laboratory, the Low Level Laboratory, the Counting Room, and Corridor 15. The Decommissioning Plan called for the removal of non-load bearing interior walls. After review of the building's plans and a site tour, Stone & Webster's structural engineer recommended against removal of the walls. The presence of the walls increased the surface area within SU001 that required surveying. To comply with MARSSIM guidelines SU001 was divided into SU001A and SU001B.

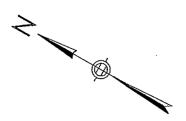
All loose debris contained in the laboratories (glassware, loose equipment, miscellaneous debris and two drums of tiles) were placed in the appropriate containers for disposal. Additionally, all appliances and furniture from the laboratories and counting room were removed. Items such as laboratory benches, shelves and fume hoods were disassembled to the extent practical. Initially, efforts were made to decontaminate and separate the debris and furniture contained within SU001, this practice was time consuming and required extensive manpower and was discontinued at the direction of the USACE. Additionally, the amount of debris contained in SU001 exceeded estimated quantities in the SOW and increased the amount of waste generated from this SU.

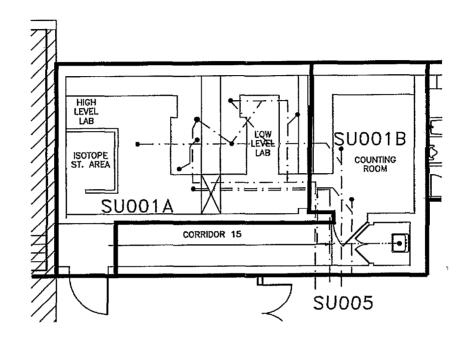
Prior to the removal of the cabinetry in SU001, all waterlines were tested to confirm that the lines were disabled. However, during the removal of the cabinetry in High Level Laboratory an unanticipated waterline still charged with water was cut. The waterline connected the sink area of laboratory to the main line in SU001. The water feed line was secured in position with hydraulic cement and an open drain hole in laboratory floor was sealed to prevent the water from migrating to the drain. To permanently plug the pipe, the concrete around the pipe was removed and a permanent plug soldered in place. This repair successfully prevented additional water leakage. The water leak generated approximately 100 gallons of potentially radiological impacted wastewater.

The water was collected, sampled, and analyzed for strontium 90, carbon 14 and tritium. Analytical results of the samples indicated that the collected water did not contain contaminants of concern above DGCLs and was evaporated on site at the direction of the USACE.

Radiological contamination from past practices had penetrated several inches into the laboratory concrete floors. After several different concrete removal methods were tested Stone & Webster determined that using a jackhammer was the most effective removal method. In order to manage the amount of radiological dust generated by the

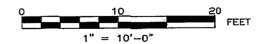






• Floor Drain

— Drain Line Chase

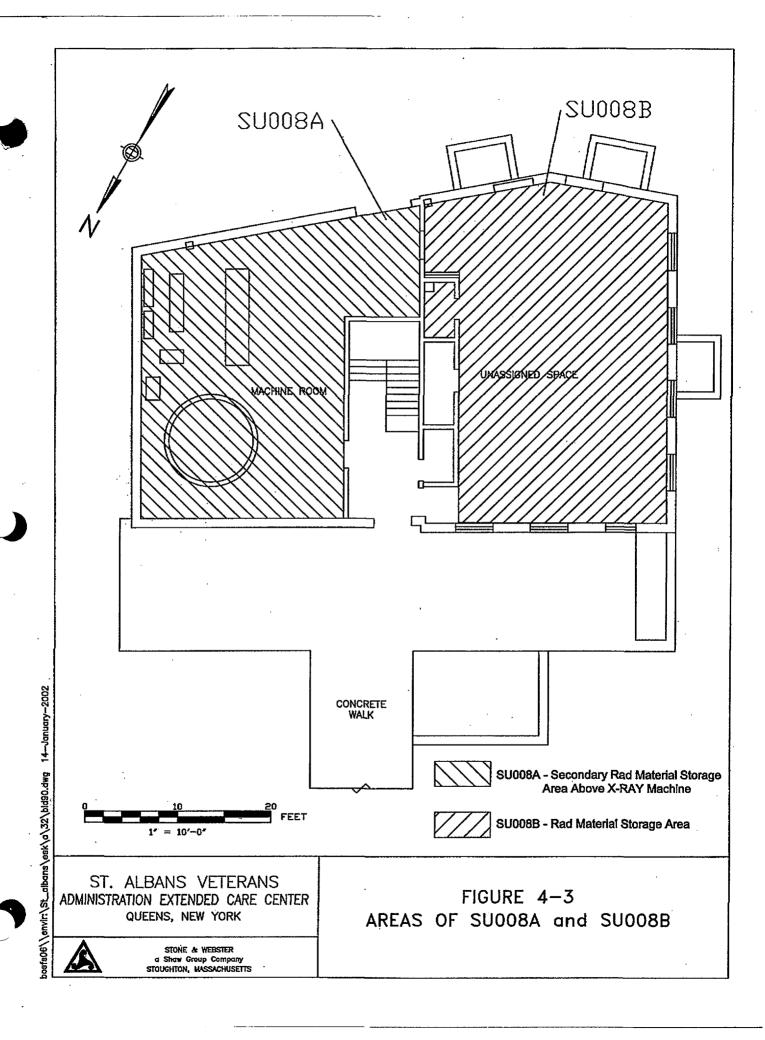


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QUEENS, NEW YORK

FIGURE 4—2 AREAS of SU001A and SU001B



STONE & WEBSTER
a Shaw Group Company
STOUGHTON, MASSACHUSETTS



jackhammer, a HEPA vacuum was attached to the bit. The benefits of using a jackhammer included increased maneuverability and overall productivity. All of the removed concrete was placed in appropriate containers and stored in the RMA prior to transportation for disposal at the approved facility.

Following the removal of the concrete floors in SU001A and 001B the main drain line, as shown on Figure 4-4, was removed due to the presence of elevated levels of radiological contaminants. This drain line was the main drain that led from the Lab area drains (sinks and floor drains) to the ejector pipe. The estimated run of pipe was 24 feet leading through the Labs to the ejector pit. After review of the waste classification guidelines in 10 CFR 61.55, USACE directed Stone & Webster to classify this waste as Class B Waste. The drums containing waste pipe materials were externally scanned with a frisker, removed, and placed in the waste staging area. A total of three drums were used for pipe storage from this area.

Lead shielding tiles were removed from SU001A. The tile was decontaminated to prevent classification as "Mixed Waste". Decontaminated lead tile was sent to a local recycling facility as described in Section 5.2.3 Recycling of Lead Tiles.

After the completion of the D&D activities and the asbestos abatement, SU001 was considered completely gutted. All walls with in the SU were stripped down to concrete. The area was then sealed to prevent recontamination.

4.5 Removal of Contents and Decontamination of SU 002

SU002 consisted of the Ejector Pit and all its contents. Initial inspection of the room revealed evidence that the room had been flooded. This evidence included the discoloration on two stainless steel tanks. The Decommissioning Plan indicated that the Ejector Pit Room contained one 50-100 gallon tank; the initial inspection revealed one 400-gallon tank and one 350-gallon tank.

The cleaning and removal of the interior piping from SU002 was conducted in accordance with the WP. The removal of the tanks however required more effort then anticipated because of the additional tank in the area. The cutting of the large stainless steel tank was difficult to perform. The use of various electric and pneumatic cutting tools was investigated with the best alternative being an electric reciprocating saw.

Upon completion of the D&D activities in SU002, all hardware was disconnected, removed, characterized, and decontaminated or disposed. Radiological waste items were placed in 55-gallon drums. Non-contaminated items were separately removed and disposed.

Contaminated drain lines, which were elevated into the slab, were removed, sectioned, and capped. The drain lines were sectioned using an electric saw with a cast iron cutting blade, efforts were made to minimize the amount of dust created during this activity. The contaminated drain lines were placed in 55-gallon drums. The four-inch cast iron pipe from the Ejector Pit Room to the outside sewer line was difficult to survey for

contamination. Due to the size constraint of the pipe, a "pancake " frisker type probe (Ludlum 44-9), attached to an extension, was used to access the pipe. The survey was limited to 48 inches because of the length of the cord on the probe.

Stone & Webster determined that additional characterization of this pipe was necessary for the FSS. Stone & Webster conducted this sampling procedure in July 2001. Sample results indicated that the piping did not contain contaminants of concern above the DGCLs. The survey results are included in Appendix B, FSS report.

A total of thirty-five drums containing Class A waste consisting of piping, ppe, miscellaneous debris, stainless steel tank components, valve heads, HEPA filters, concrete and poly; and one drum containing Class B waste from the trap of the 4" line were removed from the area and placed in the waste staging area. (See Appendix C for detail on waste log)

Upon completion of the D&D activities, the area was sealed until the FSS to prevent recontamination.

4.5.1 Sampling of Manhole

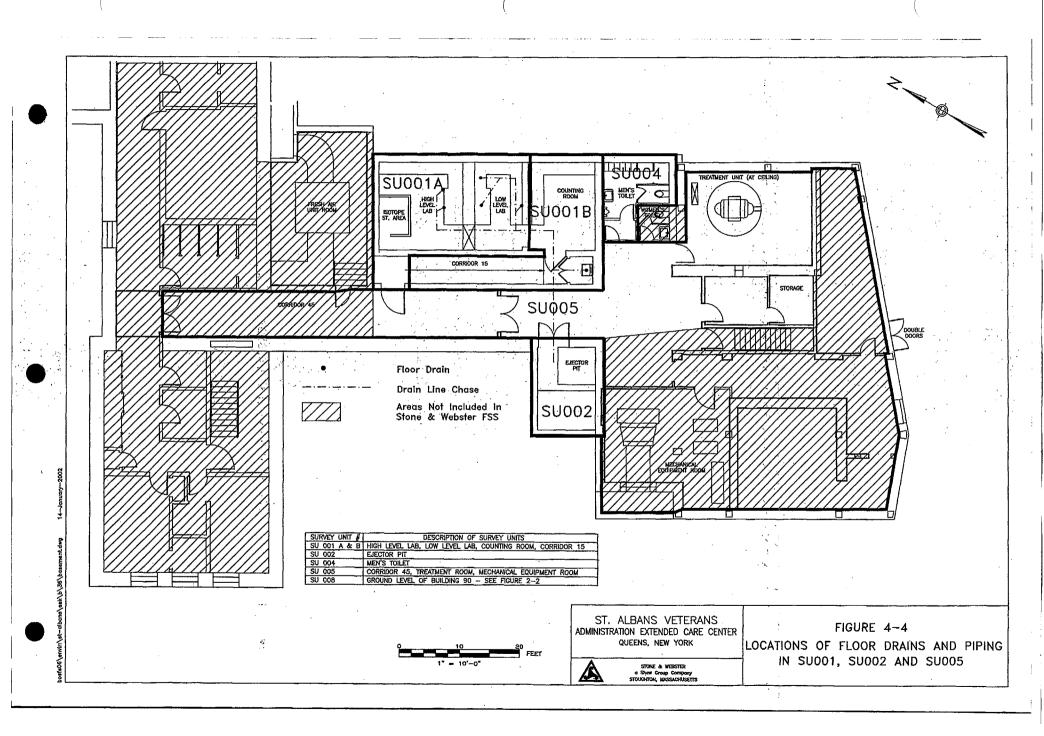
Stone & Webster sampled the manhole that was the waste discharge location for the four inch cast iron pipe running from the Ejector Pit Room to the outside sewer line. Four samples were extracted from the manhole (one sample each at the 1 foot, 2 feet, and 3 feet levels and one sludge sample at base of the manhole). Field screening indicated that the highest radiological concentration (slightly above the site background level) was from the sludge sample at the base of manhole. This sample was sent out for Sr-90 analysis with standard turn around time (30 days). The remaining samples were held in storage on site. The sample result did not contain detectable concentrations of Sr-90. The remaining samples were placed in drums with other compatible waste. Sample analytical results are presented in Appendix C.

4.6 Removal of Contents and Decontamination of SU 004

Activities at SU004 consisted of D&D operation in the men's bathroom in the basement of Building 90. All internal contents of the restroom, partitions, toilets, shower tile and fixtures, sink, etc., were removed and surveys taken to determine if the items contained radiological contaminants above the DGCLs. All material removed from the restroom was placed in drums.

Upon removal of the internal contents of the restroom, the floor tiles were removed using hand tools. The tile removal was conducted using methods that minimized the breaking of tiles and generation of airborne particulate to avoid the spread of contamination. The contaminated tiles and other materials were placed in four drums. Non-contaminated items were removed and disposed separately.

The concrete floor in the area of the men's toilet was scanned and areas determined to have contaminants above the DGCLs were removed. A total of nine drums of material were removed from this area.



The two floor drains in the men's room were characterized using a Ludlum 44-9 frisker type probe to determine the presence of potential contaminants. The drain screen and drain were determined to contain radiological contaminants above DGCL guidelines. The drain, up to 6 inches below grade, was removed and placed in a drum.

4.7 Decontamination of SU 005

Activities at SU005 consisted of accessing and removing of the drain line under Corridor 45 that connected the drain piping system through points in SU001 and SU002 and removing the contents of the control room adjacent to the teletherapy area. Jackhammers were used to remove the concrete. All slab concrete was disposed as non-hazardous construction waste. The exposed floor drain-line within the area was cut and characterized using a frisker. Approximately 12 linear feet of drain lines were removed, sectioned, and capped. The drain lines were cut using an electric saw fitted with a cast iron cutting blade. The drain lines with radiological contaminants were placed in three drums. Non-contaminated items were removed and disposed separate from the radiological containing wastes. The containerized waste was then sent to the access control point (ACP) to be released before temporary storage in the RMA.

Results of survey data and inspection of the drain line indicated the need for sampling of the soil beneath the drain line and frisker screening to determine if contaminants above DGCLs were present. Soil with radiological contaminants was placed in 12 drums. Noncontaminated soil was left in place. The containerized waste was then sent to the ACP to be released before being sent to the RMA for storage. The waste was subsequently transported for disposal at a licensed facility. Waste characterization forms and manifests are included in Appendix C.

4.8 Radiological Waste Clearance of SU008

SU008 was used for the temporary storage of drummed radiological waste generated from the D&D activities at SU001, 002, 004, and the pipe area beneath SU005. There was no waste reported to require D&D within SU008. The area of the waste storage was cleared with a FSS after removal of all the drums of waste.

4.9 Performance Standards and Quality Control

See Table 4.1 for objectives and performance results for decotamination and decommissioning activities.

Table 4.1 D&D Objectives and Performance Results

| Remedial Action Objectives | Performance Results |
|--|--|
| Mobilize and prepare site for D&D activities. | Constructed temporary structures, verified walls to be removed, displaced treatment unit for access to ground level of BLDG 90. |
| Removal and disposal of contents of SUs. | SU 001 and SU004 were stripped bare of shelving, tables, etc. Two tanks in SU 002 were removed and disposed off-site. All drainage systems were removed. |
| Decontamination of all radiological contamination areas consistent with the NRC approved modified DGCLs. | Final Status Survey used MARRISM approved statistical method and all SU were below DGCLs. |

5 WASTE MANAGEMENT

5.1 Handling of Waste

Prior to the start of remediation activities, the X-ray treatment unit was removed from the 1,000 kVp Treatment Room to facilitate the transfer of containerized waste from the basement level to the ground level. An electric hoist was installed in the ceiling access opening allowing waste to be transferred to the second floor. The hoist had a lift capacity of 4,000 pounds. When packaging the waste into the drums, care was taken to avoid exceeding the lift capacity of the hoist. The ground level area of Building 90 was designated and controlled as a RMA to be used for storage of drummed waste. Prior to this designation, the structural engineer confirmed the structural integrity of the location as feasible for use as an RMA. Barriers were constructed to secure the area and signs were posted stating "Radioactive Material Area Authorized Personnel Only".

All containerized waste was screened at the ACP. Upon radiological clearance, all waste was lifted through the ceiling of the Treatment Room to the ground level of Building 90. Waste was then stored in the RMA, in accordance with the waste management plan (WMP), until transportation to a licensed treatment, storage, and disposal facility. All stored wastes were properly labeled in accordance with the WMP. The RMA was inspected to ensure the integrity of the drums.

5.2 Disposal of Waste

Appendix C contains the waste characterization forms, waste shipping manifests, and waste shipping log for all hazardous or regulated wastes generated for this project.

5.2.1 Disposal of X-ray Treatment Unit

At the direction of the USACE, Stone & Webster identified and evaluated disposal options for the X-ray treatment unit removed from the 1000 kvp Treatment Room. Information developed from operating manuals and General Electric (the manufacture of the device) indicated that the unit could be disposed at a non-RCRA facility.

5.2.2 Disposal of Radiological Waste

Drummed Class A waste (307 drums) was shipped directly to Envirocare by Franklin Environmental. Four drums of Class B radiological waste was shipped to GTS/Duratek, a licensed TSDF, for temporary storage. GTS/Druatek shipped the drums to Barnwell Waste Management Facility on October 31, 2002.

The following explains the determination of the classification of the pipe beneath SU005 as Class B Waste. Initially the pipe waste was determined to be Class B based on external surveys and assumptions for Bremstrahlung effect relative to Strontium 90-concentrations. The scale within the pipes was subsequently sampled to establish a more accurate estimate of the radioactive concentrations within the pipe. The sample data, assumed volume of material within the pipe and the actual pipe volume were used to determine the waste classification. Based on calculations performed by USACE, the

results indicated that the waste met the criteria for Class B waste disposal in accordance with 10 CFR 61.55.

5.2.3 Recycling of Lead Pipe

Recycling of lead tile from isotope room in High level Lab were removed as part of the D&D operations. Tiles were decontaminated on site, radiologically scanned and confirmed to not contain radiological materials above the DCGLs, and shipped off site to a local recycling center.

5.2.4 Disposal of ACM Waste

All ACM waste generated from this site was categorized as radiological waste. This waste stream was placed in drums and shipped with the other radiological waste directly to Envirocare.

6 SITE RESTORATION

Stone & Webster conducted site restoration activities after receiving approval of the Final Status Survey by the NRC and direction from the USACE to proceed. Restoration included:

- 1. Restore the excavated areas to within 6 inches of finish grade using sand.
- 2. Place 6 inches of 4000 pound per square inch (psi) concrete with wire mesh reinforcing.
- 3. Clean soil removed from the hallway (stored in a nearby mechanical room) will be reused to fill the excavated area in the hallway. Specifications have not been supplied for fill, concrete, or wire mesh.
- 4. Quality control testing will be limited to concrete testing. Additional testing such as fill gradation/proctor analysis or compaction testing are not planned or budgeted at this time.
- 5. Fill, wire mesh, and concrete products will be standard products readily available at local suppliers.

6-1

6. Place final leveling course suitable to accept VT flooring.

7 REFERENCES

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- U.S. Environmental Protection Agency, 1992. Guide to Management of Investigation-Derived Wastes; Guidance Document No. 9345.3-03 FS; January, 1992.
- U.S. Environmental Protection Agency, 1993. Data Quality Objectives Process for Superfund; Guidance Document No. EPA540-R-93-071; September, 19

APPENDIX A SAMPLE CHAIN OF CUSTODY FORMS

AND

ANALYTICAL TESTING RESULTS

Table 1 Asbestos Abatement Air Monitoring Data Summary St. Albans Care Facility Queens, New York

| *************** | | 3 2000 | | | ~~~~~~~~~~ | *************************************** | 4 conscionate contributions |
|-----------------|----------|----------------------|--|-------------------|-----------------------|---|--|
| | | | | | LYTICAL ME NALYSIS | TEM | 1 |
| SAMPLE | | | | | | ANALYSIS | |
| | | SAMPLE TYPE | SAMPLE LOCATION | (f/mm²)1 | (9/se) ² | (1/45) | COMMENTS |
| 9/19/00 | 01 02 | Baseline Baseline | OWA - Inside X-ray room OWA - Outside Room #RT-4B | 28.0 <12.7 | 0.012 | | |
| | 03 | Baseline | OWA - Corridor by exit door #RTS | 26.8 | <0.005 0.011 | | ······································ |
| | 04 | Baseline | OWA - Corridor by Room #RT1 | 27.6 | 0.015 | | |
| | 05 | Baseline | OWA - Corridor 7 feet in front of double doors | 40.8 | 0.016 | | |
| | 06 | Baseline | IWA ⁶ - Off ramp north side | 36.9 | . 0.015 | | |
| | 07 | Baseline | IWA - 7 feet off ramp southeast | 30.6 | 0,012 | | |
| | 08 | Baseline | IWA - 10 feet off the ramp east | 28,0 | 0.012 | | |
| | 09 | Baseline | IWA - 10 feet off the ramp west | 40.8 | 0.017 | | |
| | 10 | Baseline | IWA - 7 feet off ramp northwest | 25.0 | 0.014 | | |
| | FB-1 | Fleid Blank | NA ⁷ . | <12.7 | NA . | | |
| 10/10/00 | . 01 | Baseline | OWA -1st floor, 7 feet in front of bsmt stairwell | 32.5 | 0.013 | | <u> </u> |
| | 02 | Baseline | OWA - At basement entrance door | 39.5 | 0.016 | | |
| | 03 | Baseline | OWA - Bsmt corridor, 7 feet east of rcom #RT-4B | 29.3 | 0.012 | | <u></u> |
| | 04 | Baseline | OWA - Inside personnel decon, clean room | 34.4 | 0.014 | | ļ |
| | 05 | Baseline | OWA - Outside personnel/waste decon units | 34.4 | 0.014 | | |
| | 06 | Baseline | IWA - north | AOID ₈ | VOID | | OVERLOADED |
| | 07 | Baseline | IWA - south | 57.3 | 0,023 | | 01/50104050 |
| | 9 | Baseline Baseline | IWA - center IWA - northeast | VOID <12.7 | VOID <0,005 | | OVERLOADED |
| | 10 | Baseline | IWA - southeast | <12.7 | <0,005 | | |
| | 11 | Baseline | OWA - At negative air machine exhaust | <12.7 | <0.005 | ~ ~~~ | |
| | FB-1 | Field Blank | NA | <12.7 | NA NA | | · — · — |
| | FB-2 | Field Blank | NA . | <12.7 | NA NA | | |
| | 01 | Containment | OWA - 1st floor, 7 feet in front of bsmt stairwell | 118.5 | 0,046 | <0.001 | |
| | 02 | Containment | OWA - At basement entrance door | 79.0 | 0.029 | 0,001 | |
| | 03 | Containment | OWA - Bsmt corridor, 7 feet east of room #RT-4B | 55.4 | 0,021 | <0.001 | |
| | 04 | Containment | OWA - Inside personnel decon, clean room | 89.2 | 0.034 | <0.001 | |
| | 05 | Containment | OWA - Outside personnel/waste decon units | 56,1 | 0.021 | <0.001 | · · · |
| | 06 | Containment | OWA - Inside waste decon, unit - holding area | 163,3 | 0.061 | <0.001 | |
| | 07 | Containment | IWA - southeast | <12.7 | <0.005 | 10.001 | ······································ |
| | 08 | Containment | OWA – At negative air machine exhaust | <12.7 | <0.004 | | |
| | FB-1 | Field Blank | NA | <12.7 | NA | | |
| | FB-2 | Fleid Blank | NA . | <12,7 | NA | | |
| 10/11/00 | 01 | Containment | IWA - north side | VOID | VOID | | OVERLOADED |
| | 02 | Containment | IWA - west side | VOID | VOID | | OVERLOADED |
| | 03 | Containment | IWA - east side | VOID | VOID | | OVERLOADED |
| | 04 | Containment | IWA - center | VOID | VOID | | OVERLOADED |
| 1 | 05 | Containment | IWA – south side | VOID | VOID | | OVERLOADED |
| | 06 | Containment | OWA - Basement corridor by room #RT-9 | 31.8 | 0.007 | | |
| | 07 | Containment | OWA - Basement in X-ray room | 22.9 | 0.005 | | |
| | . 08 | Containment | OWA - Basement by exit door RT-5 | 29.3 | 0.006 | | |
| | 09 | Containment | OWA - Basement corridor by room #RT-4B | 20.4 | 0.004 | | |
| | 10 | Containment | OWA - 1st floor by entrance | VOID | VOID | | OVERLOADED |
| | FB-1 | Fleid Blank | NA | <12.7 | NA | | |
| | FB-2 | Fleid Blank | NA . | <12.7 | NA | | |
| 10/18/00 | . 01 | Containment . | OWA - 1st floor by entrance | 45.9 | 0.016 | | |
| | 02 | Containment | OWA - By bsmt stairweli | 73.2 | 0.025 | <0.001 | |
| | 03 | Containment | OWA - Bsmt by room #RT-4B | 63.7 | 0.022 | | |
| | 04 | Containment | OWA - Outside personnel/waste decon units | 38,2 | 0.013 | | |
| | 05 | Containment | OWA - Inside personnel decon clean room | 66.2 | 0.025 | <0.001 | <u> </u> |
| | 06 | Containment | OWA - Inside waste decon holding area | VOID | VOID . | | OVERLOADED |
| | 07 | Containment | OWA - At negative air machine exhaust | 19.1 | 0.007 | | |
| | 08 | Containment | OWA - 1st floor by entrance | 27.4 | 0.009 | | |
| | 09 | Containment | OWA - By bsmt stairwell | 15,3 | 0.005 | | |
| | 10 | Containment | OWA - Bsmt by room #RT-4B | 47.1 | 0.016 | | |
| | 11 | Containment | OWA - Outside personnel /waste decon units | 26.1 | 0.010 | | |
| | 12 | Containment | OWA - Inside personnel decon dean room | 25.5 | 0.009 | | |
| | 13 | Containment | OWA - Inside waste decon holding area | VOID | VOID | | OVERLOADED |
| | 14 | Containment | OWA - At negative air machine exhaust | 24.6 | 0.008 | | |
| | 15 | Containment | OWA - 1st floor by entrance | 35,7 | 0,019 | | |
| | 16 | Containment . | OWA - By bsmt stairwell | 45.2 | 0.026 | | |

Table 1 **Asbestos Abatement Air Monitoring Data Summary** St. Albáns Care Facility Queens, New York

| | | | | | | THODS | |
|----------------|---------------|----------------------------|--|----------------|---------------------|--|---------------------------------------|
| | | | | | | TEM* | |
| SAMPLE DATE | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE LOCATION | (f/mm²)² | (f/cc) ² | ANALYSIS (1/cc) | CHARLESTE |
| | 17 | Containment | OWA - Bsmt by room #RT-4B | 20.4 | 0,011 | | COMMENTS |
| | 18 | Containment | OWA - Outside personnel /waste decon units | <12.7 | <0.007 | | |
| | 19 | Containment | OWA - Inside personnel decon clean room | 33,1 | 0.018 | | |
| | 20 | Containment | OWA - Inside waste decon holding area | <12.7 | <0,007 | | |
| | 21 | Containment | OWA - At negative air machine exhaust | 35.7 | 0.021 | | |
| | F8-1 | Fleid Blank | NA | <12.7 | NA NA | | - |
| | FB-2 | Field Blank | NA NA | <12.7 | NA NA | | |
| | FB-3 | Field Blank | NA NA | · <12.7 | NA NA | | |
| 10/19/00 | 01 | Containment | OWA - 1st floor by entrance | 39.5 | 0.014 | <0.001 | |
| 10/12/00 | 02 | Containment | OWA - By bsmt stairwell | 36.3 | 0.013 | 10.002 | |
| | 03 | Containment | OWA - 8smt by room #RT-4B | 45.9 | 0.016 | | |
| | 04 | Containment | OWA - Outside personnel /waste decon units | VOID | VOID. | | OVERLOADED |
| | 05 | Containment | OWA - Inside personnel decon clean room | VOID | VOID | | OVERLOADED |
| · · · · · · · | 05 | Containment | OWA - Inside waste decon holding area | ·VOID | VOID | | OVERLOADED |
| .:: | . 07 | Containment | OWA - At negative air machine exhaust | <12.7 | <0.004 | | OVERLUADED |
| | 07 | Containment | OWA - 1st floor by entrance | 17.8 | 0.006 | | |
| | 09 | Containment | OWA - By bsmt stairwell | 49 | 0.000 | | |
| | | Containment | OWA - Bsmt by room #RT-4B | 29.3 | 0.017 | | |
| | 10 | Containment | OWA - Outside personnel /waste decon units | 64.3 | 0.011 | : <0.00t | |
| | 12 | | OWA - Inside personnel decon clean room | 25.5 | 0.009 | <0.001 | _ · |
| | 13 | Containment Containment | OWA - Inside personner decor dean room OWA - Inside waste decon holding area | 42.7 | 0.009 | | |
| | 14 | Containment | OWA - At negative air machine exhaust | <12.7 | <0.005 | | · · · · · · · · · · · · · · · · · · · |
| | 15 | Containment | OWA - 1st floor by entrance | 43.9 | 0.012 | · | <u> </u> |
| | 16 | Containment . | OWA - By bsmt stakwell | 54.8 | 0.015 | | |
| | 17 | Containment | OWA - Bsmt by room #RT-4B | 41.4 | 0.013 | | |
| | 18 | Containment | OWA - Outside personnel /waste decon units | 24.2 | 0.007 | 0.003 | |
| | 19 | Containment | OWA - Inside personnel decon dean room | 35. | 0,007 | 0.003 | |
| · · · · · | 20 | Containment | OWA - Inside personner decon dean room OWA - Inside waste decon holding area | 39.5 | 0.01 | | |
| | 21 | Containment | OWA - At negative air machine exhaust | VOID | VOID | | OVERLOADED |
| : | FB-1 | Fleki Blank | NA | <12.7 | NA | | OVERLUADED |
| | FB-2 | Fleki Blank | NA · | <12.7 | NÄ | | |
| | FB-3 | Fleki Blank | NA . | ·<12.7 | NA NA | | |
| | 01 | Clearance | IWA - Basement lab west | <12.7 | <0.003 | | <u> </u> |
| | 02 | Clearance | IWA - Basement lab east | <12.7 | <0.003 | | <u> </u> |
| | | Clearance | IWA - Basement lab center | | | -0.00t | |
| | 03 | Clearance | IWA - Basement lab north | <12.7 <12.7 | <0.003 <0.003 | <0.001 | |
| | 05 | Clearance | IWA - Basement lab south | <12.7 | <0.003 | | |
| | . 06 | Clearance | IWA - Basement corridor tent | 15.3 | 0.003 | | |
| | 07 | Clearance | IWA - Basement corridor tent | <12.7 | <0.003 | | |
| | 09 | Clearance | IWA - Basement corridor tent | <12.7 | <0.003 | | |
| | 09 | Clearance | IWA - Basement corridor tent | <12.7 | <0.003 | | |
| | | Clearance | IWA - Basement corridor tent | <12.7 | <0.003 | · | |
| | 11 | Clearance | OWA - 1st floor by entrance | | <0.003 | | |
| | 12 | Clearance | OWA - 1st noor by entrance OWA - Basement entrance stairwell | <12.7 | <0.003 | | |
| | 13 | Clearance | OWA - Basement by room #RT-4B | <12.7 <12.7 | <0.003 | | |
| | | Clearance | OWA - Basement by room #RT-4B | | | | |
| | 14 | | | <12.7 | <0.003 | | |
| | 15 | Clearance | OWA - Basement by X-ray room | <12.7 | <0,003 | | |
| | FB-1 | Fleki Blank | OWA - Hallway south of crawl space access | <12.7 | NA NA | · | |
| | .FB-2 | Field Blank | OWA - HEPA exhaust | <12.7 | NA | ·· | |
| | FB-3 | Fleid Blank | OWA - Decon station shower room | <12.7 | NA NA | | <u> </u> |

- 'NOTES: 1 f/mm² fibers per square millimeter (expressed for blank results)
 - ² f/cc fibers per cubic centimeter
 - ³ PCM Phase Contrast Microscopy Fiber Count by NIOSH 7400 Method, Revision 3, Issue 2; August 15, 1994.
 - ⁴ TEM Transmission Electron Microscopy Fiber Count by NIOSH 7402 Method
 - ⁵ OWA Outside Work Area
 - ⁶ IWA Inside Work Area
 - ⁷ NA Field blank samples are used to correct fiber counts on samples submitted for laboratory analysis and cannot provide data for total fibers.
 - * VOID Sample overloaded. Sample not analyzed.

Table 2 Personnel Air Monitoring Data Summary St. Albans Care Facility Queens, New York

| SAMPLE | | | PEM [©] AN | ALYSIS | | |
|----------|---------------|----------------|----------------------|---------------------|------------|--|
| | SAMPLE NUMBER | INDIVIDUAL | (f/mm²) ¹ | (f/cc) ² | COMMENTS | |
| 10/18/00 | 01 | Edward Johnson | VOID | VOID | OVERLOADED | |
| | 02 | Edward Johnson | VOID⁴ | VOID | OVERLOADED | |
| | FB-1 | Field Blank | <12.7 | NA ⁵ | | |
| | FB-2 | Field Blank | <12.7 | NA | · | |
| 10/19/00 | 01 | James Brackson | <12.7 | <0.054 | | |
| | 02 | James Brackson | <12.7 | <0.054 | | |
| | FB-1 | Field Blank | <12.7 | NA | · | |
| | FB-2 | Field Blank | <12.7 | NA | | |

NOTES:

¹ f/mm² - fibers per square millimeter (expressed for blank results)

² f/cc - fibers per cubic centimeter

³ PCM - Phase Contrast Microscopy Fiber Count by NIOSH 7400 Method, Revision 3, Issue 2; August 15, 1994.

⁴ NA - Field blank samples are used to correct fiber counts on samples submitted for laboratory analysis and cannot provide data for total fibers.

⁵ VOID - Sample overloaded. Sample not analyzed.

Table 3 Bulk Material ACM Data Summary St. Albans Care Facility Queens, New York

| | | | FI M ³ / | WALYSIS | | ANALYSIE |
|------------------|---------------------------------------|---|---------------------|------------------------|-------------------------------|--------------------------------|
| SAMPLE NUMBER | SAMPLE DESCRIPTION | SAMPLE LOCATION | ASBESTOS % Type | NON-ASBESTOS % Type | ASHESTOS % Type | NON-ASBESTOS |
| 001 | 12° x 12° floor tile | Bsmt main corridor, outside electric room | <1% Asbestos | >99% Non-Asbestos | <1% Asbestos | >99% Non- Asbestos |
| 002 | 12" x 12" floor tile | Bsmt main corridor, outside electric room | <1% Asbestos | >99% Non-Asbestos | <1% Asbestos | >99% Non-Asbestos |
| 003 | 12" x 12" floor tile | Bsmt main corridor, outside electric room | <1% Asbestos | >99% Non-Asbestos | <1% Asbestos | >99% Non-Asbestos |
| 004 | 12" x 12" floor tile mastic | Bsmt main corridor, outside electric room | <1% Asbestos | >99% Non-Asbestos | <1% Chrysotile | >99% Non-Asbestos |
| 005 | 12" x 12" floor tile mastic | Bsmt main corridor, outside electric room | <1% Asbestos | >99% Non-Asbestos | 2.1% Chrysotile | >97.9% Non-Asbestos |
| 906 | 12" x 12" floor tile mastic | Bsmt main corridor, outside electric room | <1% Asbestos | >99% Non-Asbestos | 3% Chrysotile | >97% Non-Asbestos |
| 607 | Mastic residue | Laboratory | <1% Asbestos | >99% Non-Asbestos | 1.7% Chrysotile · | >98.3% Non-Asbestos |
| 008 | Mastic residue | Laboratory | <1% Asbestos | >99% Non-Asbestos | 2.3% Chrysotile | >97.7% Non-Asbestos |
| 009 | Mastic residue | Laboratory | <1% Asbestos | >99% Non-Asbestos | 1.4% Chrysonia | 98.6% Non-Asbestos |
| 910 | Roor layer down 4" in concrete | Laboratory | <1% Asbestos | >99% Non-Asbestos | <1.0% Chrysofile | >99% Non-Asbestos |
| 011 | Hood panel | Hood in high level laboratory | | | 65% Chrysotile | 35% Calcite |
| 012-1 | Pipe insulation Layer 1 | | | | None Detected ³ | 100% Cellulose |
| 012-2 | Pipe insulation Layer 2 | | | | 25% Amosite 75% Chrysotile | None Detected · |
| 012-3 | Pipe insulation Layer 3 | | | | None Detected : | 90% Cellulose 10% Synthetic |
| 013 | Vent cork | | | | None Detected | 100% Cark |
| 014 | Pipe mud | | | | 80% Chrysotile | 20% Calcite |
| CL-S-S-GR-116 | · · · · · · · · · · · · · · · · · · · | ······································ | | | 20% Chrysotile | 5% Cellulose 75% Synthetic |
| | | | | | | |

Note:

² PLM - Polarized Light Microscopy by EPA 600/R-93/116 Method

³ TEM - Transmission Electron Microscopy Fiber Count by NIOSH 7402 Method

³ None Detected - no asbestos fibers detected

Stone & Webster Engineering Corp.

CHAIN OF CUSTODY RECORD

| PROJECT: ST. ALBANS V. A Address | | | | SWEC Proj | | 66 | , 8. | 5 /0 | 9 | | | • | Re | ferer narou | und T | | W | Samp | Page le Dip | | of | | QC Rec | 0-26-00 uirements: |
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| LTNDEN \$ 17971 City State Queens N | Zip (| Code 1425 | | MPRC Telephone # Fax #: | <i>Bu</i> | 8- | <u> 29,</u> | 9- | 861. 861. | 3 | <u>e</u> v), | L | | × | 24 h 48 h 72 h 1 we 2 we | ours ours | ЦZ | | × | Disp Retu Arch | osal by um to S live | / Lab WEC | 7 Ja 1 cm | ns represent mposite Samp |
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Stone & Webster Engineering Corp.

CHAIN OF CUSTODY RECORD

| PROJECT: | | | SWEC Proje | ect# | : | | | - | | | | R | efere | ence # | | ····· | | Page | 9 . | of | *************************************** | Date: | <u> </u> | | |
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Chain of Custody Record

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| Special Instructions | | | | ¥ | : | · . | | · · | • | , |
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Chain of Custody Record

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| State | Zip Code | Site Contact | 2, 6, 6, | - | | | المالة | Analysis | |
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| Sample I.D. No. and Description | Date Time | Sample Type | Total Volume | Containers Type N | rs Preservative | Condition on Receipt | 15 15 168 | | |
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| Special Instructions | | • | | | | · · | . • | | |
| Possible Hazard Identification Non-Hazard Tritant | Irritant Poison B | | Y Unknown. I. D. D. | Sample Disposal | oosal n To Client | Disposal By Lab | b XAichlve For | ie For | Months |
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| N. M. | | . 67 | E | 1. Received By | By | · vol. | | Date | Time |
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| COMMENS FAX RESULTS TO ARUVE FAX # ASSO S-MAL FAX DISTRIBITION: WHITE- Stave with Sample CANARY, Beaumed in Client with Banch PINK, Field Con- | FAX # A IST | F- MAL /F | R | in Toyle | Tim Taylor (GWE ROSTON) | SEE | Row Martino | no Fak | notails. |
| Transportation in order - Till transportation | | | do a | for tra | fortion tralle | RADIA ALTINA | ٠. | MATERIAL | \ . |

Client: STOWE & WEBSTER

Sample ID: DRUM OO! (193)

Collected by: MARC BIANCO

Time: 1600

Preservative: (NHO3) Nitric Acid

Tests required:

C-14, H-3 & Sr-90

Client: STONE & Webster

Sample ID: Deum 00 | (2 43)

Collected by: MARC BIANCO

Date: 10-19-00 Time: 1600

Preservative: None

Tests required:

C-14, H-3 & Sr-90

Client: STONE & Webster

Sample ID: Drum 001 (343)

Collected by: MARC BIANCO

Date: 10-19-00 Time: 1600

Preservative: Name

Tests required:

C-14, H-3 & Sr-90

Client: STONE & WEBSTER

Sample ID: DRUM OOZ (143)

Collected by: MARC BIANCO

Date: 10-19-00 Time: 1600

Preservative: (NHD3) N Hric Acid

Tests required:

C-14, H-3 & Sr-90

Client: Stone & Webster

Sample ID: DRUM OOZ (243)

Collected by: Marc Bianco

Date: 10-19-00 Time: 1600

Preservative: None

Tests required:

C-14: H-3 & Sr-90

Client: Stone & Webster

Sample ID: Drum 002 (3-(3)

Collected by: MARC BIANCO

Date: 10-19-00 Time: 1600

Preservative: None

Tests required:

C-14, H-3+ & Sr-90





| UUA-4124 | | | | | | | | | • | | | <u>:</u> | <u> </u> | <u> </u> |
|-------------------------|---|------------------|--|---------------------------|----------------|---------------------------------------|--|--|--|--|-----------|------------------|-------------|--------------|
| Client | £ | • | | Project Manager | | . /. | , | • | Date | | Chain C | Of Custody | / Number | 7000 |
| STONE | E & WEBSTER | | | MARC Telephone Numb | BIANC | 0//0 | hn Z | Devine | | 5-00 | | <u> </u> | 4 | <u> 7624</u> |
| Address | | | | Telephone Numb | er (Area Code) | Fax Number | er . | 7 400 | Lab Number | | | . 1 | | b. |
| 245 | Summer St. | | | (T) 718 - | <u> 278-86</u> | 13 (P |) 7/2 | 8-278-8 | 8611 | 1 | Page _ | - | <u> </u> | |
| City | State | Zip Code | - | Site Contact | | | , | | • | 5 | Ai | nalysis | | |
| BOSTON |) MA | | | MARC Carrier/Waybill N | BIANCO | 1 John | 100 6 | DIVINE | • | | | | | |
| Project Name | | | | | | 7 | | | | ADMIUM | . . | 1 1 | | 1 } . |
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| Samala I D | No. and Description | Date | Time | Sample Type | Total | Contai | inėrs | Brosomietika | Condition on Possist |] - | | | | |
| Gample 1.D. | <u> </u> | Date | Tille | Sample Type | Volume | Туре | No. | Preservative | Condition on Receipt | 月 : | . . | | | |
| LABCCC 3 | WALLS & CEILING | 10-5-00 | 0900 | GEAK | 120 ML | G | | None | | X | 1. | | | |
| LABGOO4 | CABINETS | 10-5-00 | 0700 | GRAR | 120 ML | €1 | 1 | None | | X | 1 . | $\neg \neg$ | | |
| LAR CCOS | CONCRETE | 10-5-00 | 0900 | GRAB | 120 ml | G | 1 | WUNE | • | X | | | | |
| LAB 0006 | 5AND | 10-5-00 | 0900 | GRAB | 120 mil | GI | ŧ | Nine | | X | | | | |
| LAROCOT | WOLD | 10-5-00 | 0900 | E RAB | 12.0 ml | GI | 1 | None | | X | | | | |
| LABOOCS | WOLD . | 10-5-00 | | GRAB | 120 mL | GI | | Wone | | X | | | | |
| LABOCO9 | DRAIN PIPE | 10-5-00 | | | 120mL | GI | , | None | | | | 1 | 11 | |
| | | | | | | | - | | | | | | | |
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| Special Instructions | | <u>لــــ</u> | · | | J | | | | | | <u> </u> | | | |
| • | | 3, | | | | | | | | • | • | | | • |
| Possible Hazard Ident | ification | | | | - | Sample | Disposa | | ······································ | | | | | |
| Non-Hazard | ☐ Flammable ☐ Skin | Irritant | Poison E | 3 Kink | nown RAD | ب ا | Réturn To | Client | Disposal By Lab | [X Archiv | e For | 3 11 | onths . | |
| Turn Around Time Red | quired | | | QC Level | | | Specific | | | | 010/ | | 11010 | |
| ☐ Normat | Aush C.C.B WE | en Ichi | 1000 | □ i □ 1 | , [],, | | • | | • | 1. March 1988 | | | | • |
| 1. Relinquished By | - VVE | <u> </u> | | Date , | Time . | 1. Rece | elved By | | | · · · · · · · · · · · · · · · · · · · | , Date | , : : | Time | |
| - A.Ma | ASSO | <i>></i> | 1 | 10/5/00 | 0900 | | , | | • | • | | • | | • |
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| 3. Relinquished By | | | | Date | , Time | 3 Rece | ived By | ······································ | <u> </u> | | Date | | Time | |
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| Comments . | | • | | | <u> </u> | | | | | | | | | |
| FAX PECU | TE - Stays with Sample; CANAR | FAV H | 0.150 | a nasin to | ear it. | T. Ti | A. le | Week 10 | - 1 Patour | Lelly R | 12 10 10- | مسودانا وسو | Aller | 2010/ |
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| יוטאני יאטו יהפוע ו פוע | i E - Slays, willi Sampie; CANAM | i - metumed to t | JIBIIL WILL | napor; MNK - M | ыи фору | 555 | Ren | > MARTIN | Votative dutrile | ٠ - | | | | |



QUA-4124 Client

Chain of Custody Number 44422 of_ **Quanterr** Page Analysis Lab Number MAKE 191 MINO John Devine Telephone Number (4rea Code)1Fax Number (5) 718-298-8613 (6) 718-298-8611 Sile Contact MAKE BIPTICO / John Devine 245 Summer St. Space Species Soctons ST. A IBANS VA SITE Contract/Purchase Order/Quicie No. STONE & WEIGHTER Bos for

| | | | X Archive For 6 Months | Date Time | Date Time | Martino Per Details |
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| Contain Per Type Plashe Plaste Let 4 1427 | thought of | | Sample Disposal Return To Client Disposal By Lab Project Specific (Specify) | 1, Racelved By 2. Racelved By | 3. Received By | HAX to Tim Taylor (Swee Bestor) See: Roy Martino for Details |
| Date Time Sample Type Total 12/21/00 1600 Coll 30cg Pl 12/21/00 1600 Salid 30cg Pl 12/21/00 1600 Salid 30cg Pl | | | Poison B KUnknown RAD | | Date | Flow Clent with Report, Fink - Field Copy |
| CAST EE (DEAN) 17 LAS CAST EE (Clean out hether Boe) | | Special Instructions | Possible Hazard Identification Non-Hazard Trammable Skin Intrant Turn Wound Time Required Normal | 2. Relinquíshed by | 3. Relinquished By | EAX RESULT TO HOVE FAX # ALS E-MAIL DISTRIBUTION: WHITE - Stays with Sample; CANARY - Relumed to Client with Report. |

RADIO MENÍVE MATERIA

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WATERIAL LIMITED QUANTITY OF EXCEPTED PACKAGE \ GAMMATERIAL

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PADIOACTIVE MATERIAL





| QUA-4124 | , | • | | | | | | | | · | *** | • | | न | <u> </u> | | | | | |
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| Client | | | Project Ma | | | | , . | | | Date | | | <i>y</i> . | : | Chair | n Of C | Dustod | ly Numi | | A 0.0 |
| STONE & WERSTER | | | | MA | CC BIA | NCD, | Joh | n D4 | OVI. | ne C | 7//C | 23/ | 101 | <u>, </u> | | : | | | 44 | <u>426</u> |
| Address | | | | | | | | | | | lumber | | : : | · 1 | ĺ. | . : | , | | | ^ |
| 245 Summer Stre City BOSTEN MA | ent. | | (T) 71 | <u>۲. 2</u> | 98-861 | 3 (F) | 718- | - 298 - | -86 | 0/1 | | | | i | Page | | | 0 | | <u> </u> |
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| Project Name | | | Carrier/Wa | ybill Nu | imber . , | | | | | | | | | 1 | | | , | | İ | |
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| Sample I.D. No. and Description | Date | Title | Sample | Type | Volume | Туре | No. | - F16361VA | 11140 | Condition on He | eceipi. | _1. | | | | | | | <u> </u> | |
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| Special Instructions | | | ; | | | | | | | | • | | ·: | | | | | | | |
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| Possible Hazard Identification | | _ | | A | | | e Disposa | | | | | | · | * | | - | 7 | | | |
| | n Irritant . | Poison | | X,Unk | nown | | Return To | | | Disposal By L | ab | Ç | XArci | ılve F | or | <u>ٽ</u> | <u>3м</u> | onths | | |
| Turn Around Time Required | | • | QC Level | | | Project | Specific | (Specify) | | | | | | | | | : | | | |
| ☐ Normal ☐ Rush | | | | | | · . | ٠. | • | | | | • | | <u>:</u> | | ٠, | <u>. </u> | | | |
| Relinquished By | • | | Date / | , | Time | 1. Rec | eived By | , | | | • | | | | - D | ate | | 17 | ime | • |
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| Comments | • • | | | | | | | | | , , | | | | | | | | _ | | |
| FAX/E-MALL RESULTS TO DISTRIBUTION: ""TE- Stays with Sample; CANAF | TINIT | AVIOR | /MAR | CBI | 9110 | SFF: | Mil | KE GI | EHE | BER FUR | DETF | 11C | J_ | . · | .′' | | | | | • |
| DISTRIBUTION: "" TE - Stays with Sample; CANAF | RY - Returned to | Client with | Report; PIN | VK - Fle | old Copy | | | | | | | | | | نماه | 7.0 | م أبو ن | . / | | |
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Custody Record Chain or

Quanterra

44424 Chain Of Custody Number ซ Months Page 2 Analysis Date Date Date XArchive For 01/03/ Lab Number, Condition on Receipt Disposal By Lab Date (T) 718-298-8613 (F) 718-298-8611 Ichn Daving Preservative 7 Return To Client Project Specify) Sample Disposal Ŋ. 1. Received By 2. Received By 3. Received By Containers GIESS Type MARC BIANIO Carrier Maybill Number 1500 . Total Volume Time K Unknown □ " Project Manager Sample Type O1 /63/01 Ö Date Poison B Time Date Zip Code SITE 7 Skin Imitant Stret STONE & WERSTER Sample I.D. No. and Description * 1.4. ROJECT NAMA Flammable 245 Summer 1.55 308 XX 07/502551 ST. PHIBANS
Contract/Purchase Order/Quote No. 155 310 XX XX 11 2 551 155211XD Rush K Possible Hazard Identification Non-Hazard
Turn Around Time Required 2. Relinquished By Special Instructions 1. Relinquished By 3. Relinquished By SAI $\widetilde{\mathcal{F}}$ Normal T K T Comments Gua-4124 Client

1) Set DAGE CAL LGM MILLATT' DISTRIBUTION: WHITE-Stays with Sample; CANARY - Returned to Client with Report, PINK - Field Gopy

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| Stainless steet/cast iron common trench crossing comidor 15 ramp south side - Duplicate | OX915SSIAS |
|--|-------------|
| Cast from common trench piping trench beneath digitilation sink area in closet | XXateaataa |
| Stainless steel/cast iron corrmon brench crossing corridor 15 ramp south side | XXAIESSIAS |
| Staintess steellcast iron common trench crossing contidor 15 manp north side | XXELESSIAS |
| Stainless steet/cast fron common trench approximately 12 ft east of emergency shower dra | XXSIESSIAS |
| EY UNIT 18 (Counting Room, Wash Room & Corridor 15) | DESIGNATION |

Page 2

Jan-2-01 12:04PM;

| SOIL SAMPLE | r 45. Treatment Unit and Associated Equipment Room, and Foyer at Foot of Sta |
|-------------|--|
| DESIGNATION | COLLECTION LOCATION DESCRIPTION |
| SA5SS301XX | Stainless steel/cast iron common trench crossing conidor 45 north side |
| SA5SS302XX | Stainless steel/cast iron common trench crossing corridor 45 center |
| SA5SS303XX | Stainless steel/cast iron common trench crossing corridor 45 south side |
| SA5SS302XD | Stainless steel/cast iron common trench crossing corridor 45 center - Duplicate Sample |

| J | | UNIT 1A (High Level and Low Level Labs & Isotope Storage Area) |
|----------|-------------|---|
| 1 | SOIL SAMPLE | · |
| ļ | DESIGNATION | COLLECTION LOCATION DESCRIPTION |
| - | SA1SS301XX | Stainless steel piping trench below high level lab sink |
| | SA15S302XX | Stainless steel piping trench under high level lab fume hood drain north end |
| | SA1SS303XX | Stainless steel piping trench under high level tab fume hood drain south end |
| | SA1SS304XX | Stainless steel piping trench below low level teb sink northwest comer |
| | SA1SS305XX | Stainless steel piping trench below UST area |
| | SA1SS306XX | Steinless steel piping trench junction of low level sink and UST drain lines |
| | SA1SS307XX | Stainless steel piping trench below low level lab sink northeast comer |
| | SA1SS308XX | Stainless steel pipe trench beneath low level lab cabinet area |
| | SA1SS309XX | Cast fron piping trench beneath emergency shower drain area |
| <u> </u> | SA1SS310XX | Stainless steel/cast iron common trench approximately 4 ft east of emergency shower drain |
| | SA1SS311XX | Stainless steel/cast iron common trench approximately 8 ft east of emergency shower drain |
| | SA1SS301XD | Stainless steel piping trench below high level lab sink - Duplicate |
| | SA1SS309XD | Cast iron piping trench beneath emergency shower drain area - Duplicate |
| <u> </u> | SA1SS311XD | Stainless steel/cast iron common trench approximately 8 ft east of emergency shower drain |





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| QUA-4124 | | | | | | | | / | • | , — | • | * | | |
|--|----------------------|---------------------------------------|-------------------------------|---------------------------------------|--|--------------------|---------------------|--|---------------|-------------|--------------|---------------|----------------|----------------|
| Client | | Project Manage | Pr | | | | Date | | | Cha | n Of Cust | ody Numi | er | |
| STONE & WEBSTER ENG | 5 0. | Tolonhoos No. | TIM | TH | <u>YL0</u> | R | | -12 | -00 | | | | 144 | 25 |
| 245 Summer St. City BOSTON MA C | | генерлопа мит | ider (Area Code) - 17 | VFax Numbe | * - 10 | 80 (589 | AX) Lab Numb | ar 🕏 | | 1 | | 1 |] | |
| City D State Zip C | | Site Contact | | | - | • | _ | <u> </u> | | Pag | e Analysi | of | | |
| BOSTON MA | 2210 | John | 1 Devi | ine l | 817 | 298-8 | 8613 | 1 | 3 | | 1 | | | 7 |
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| ST. ALBAN'S VA. A. Contract/Purchase Order/Quote No. | ro ject | FEL | $\mathcal{L}_{\mathcal{X}}$. | | | | | 13 | 8 | | | • | ` | |
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| Special Instructions | | | · | · · · · · · · · · · · · · · · · · · · | 1 | | | | | | | | | - |
| Possible Hazard Identification | | ··- | | | | | | | | _ | | | | |
| Non-Hazard Flammable Skin Irritant | Poison | n M | 173 N N | Sample L | | | | λ | · | | /. | | | |
| Turn Around Time Required | L PUISOIT | QC Level | MOWN RAD | Project S | turn To pecific / | Client Specify) | Disposal By Lab | <u></u> | Archive | For | <u></u> | <i>donths</i> | | |
| Normal Rush 48 hp. | | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | ı. 🗆 m. | 1.1300.5 | ,,,,,,,, | | | | | | ΄, | | | |
| 1. Relinquished By |) | Date | Time | 1. Receiv | ed By | | | | | , De | te | , Tin | ne | |
| 2. Relingulentaties | , | 12-12-00 | 1200 | | | | | | | | | | | |
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| 3. Relinquished By | | . Date | Time | 3. Receiv | ad Du | | | | | | | | | |
| · | | | 1 | J. Hecely | eu by | | , | | | Da | te | Tin | 7 0 | |
| Comments | | | | | | ········· | | | | | | | | |
| FAY APPROVAL AN DISTRIBUTION: WHITE - Stays with Sample; CANARY - Retu | D RESU | CTS TO | TIM T | GULOR | _ A: | T 617- | 589-2160 | <i>.</i> | لہ | Jaha | | if the D | ۸- | - |
| DISTRIBUTION: WHITE - Stays with Sample; CANARY - Retu | urned to Client with | Report; PINK - Fie | aid Copy | 7 | | · WI | 201 0100 | <u> 4, v</u> | rG | 70 LIA | 114 | VINE | | |

| Client: STONE & WEBSTER | Client: STONE \$ WEBSTER |
|---|---|
| Sample ID: $4032-01$ (1015) | Sample ID: 4032-0/ (245) |
| Collected by: MARC BIANCO | Collected by: MARC BIANCO |
| Date: 12-12-00 Time: 1200 | Date: 12-12-00 Time: 1200 |
| Preservative: NONE | Preservative: None |
| Tests required: PH, reactive eyanide/sulfide, | Tests required: PH, reactive cyanide sulfide, |
| Photosonizer test, and oxidozer/reducer | Photoionizer test, and oxidizer/reducer |
| | |
| Client: Stone & WEBSTER | Client: Stone & Webster |
| Sample ID: 4032-01 (305) | Sample ID: 4032-01 (4055 |
| Collected by: MARC BIANCO | Collected by: MARC BIANCO |
| Date: 12-12-00 Time: 1200 | Date: 12-12-00 Time: 1200 |
| Preservative: NONE | Preservative: NoNE |
| Tests required: At, reactive cyanidesulfile | Tests required: +H, reactive cyanitesulfid |
| Photoimizer test, and oxidizer freducer | photosonizer test, and oxidizer freduces |
| Cliente | Clinute |
| Client: STONE & WEBSTER | Client: |
| Sample ID: 4032-01 (545) | Sample ID: |
| Collected by: MAKC BIANCO | Collected by: Date: Time: |
| Drogovy-ti | |
| Preservative: None | Preservative: |
| Tests required: PA, reactive cyanide Sulfide | Tests required: |
| Photoionizer test, and oxidizer /reducer. | |
| Client: | Client: |
| Sample ID: | Sample ID: |
| Collected by: | |
| Date: Time: | Date: Time: |
| Preservative: | Preservative: |
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| | |
| Client: | Client: |
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RADIOACTIVE MATERIAL

| ACCOUNTABILITY NO. | | OR | NONE REQUIRED | | | |
|------------------------|------------------|----------|------------------|--|--|--|
| DESCRIPTION OF MATERIA | AL | | | | | |
| CONTA | AMINATIO | N DATA | | | | |
| SURFACE CONTAMINATIO | N ON MATERIA | NL par | 7011 | | | |
| Seta-Gamma | • | -8 | Twe/100 cm2 | | | |
| Alpha | N// } | | uuc/100 cm2 | | | |
| RADIATION DATA | | | | | | |
| BURFACE DOSE RATE | = 0.0 | 008 | auem/hr | | | |
| ESTIMAT | ED CURII | CONTE | NT | | | |
| ĺ | | : | millicuries | | | |
| SPECIAL INSTRUCTIONS | | | | | | |
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| IEPRESENTATIVE | CS \$ | DA /c | 1TE 2-2000 | | | |
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CAUTION

CAUTION

RADIOACTIVE
MATERIALS



RADIOACTIVE MATERIAL

| ACCOUNTABILITY NO. | OR | NONE REQUIRED |
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| DESCRIPTION OF MATERIAL | | |
| CONTAN | INATION DATA | |
| SURFACE CONTAMINATION C Beta-Gerrina Alpha | N MATERIAL A N/A | D DM une/100 cm2 use/100 cm2 |
| RADI | ATION DATA | |
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| SPECIAL | INSTRUCTION | S |
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RADIOACTIVE MATERIAL

| | ACCOUNTABILITY NO. OR | NONE REQUIRED |
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| 1 | DESCRIPTION OF MATERIAL | |
| = | CONTAMINATION DATA | Δ |
| 2 | SURFACE CONTAMINATION ON MATERIAL SAME | 7 Day |
| - | Alpha | uuc/100 cm2 |
| - | RADIATION DATA SURFACE DOSE RATE | |
| - | ≤ 0.009 | anemilu |
| . | ESTIMATED CURIE CONT | ENT |
| | N/A | millicuries |
| - | SPECIAL INSTRUCTION | S |
| . | REPRESENTATIVE 0.11 | DATE |
| | nernesentante CS | 2-7-00 |
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RADIOACTIVE MATERIAL

| ACCOUNTABILITY NO. | OR | NONE REQUIRED |
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| DESCRIPTION OF MATERIAL | | |
| CONTAMINATI | ON DAT | A |
| SURFACE CONTAMINATION ON MATER | IAL | JAM |
| Beta-Gamma | · | uud/100 cm2 |
| Alpha/ | JA | uuc/100 cm2 |
| RADIATION | DATA | |
| SURFACE DOSE RATE CP. O. C | 971 | nrem/hr |
| ESTIMATED CUR | IE CON | TENT |
| | | militeuries |
| SPECIAL INST | RUCTIO | NS |
| | | |
| REPRESENTATIVE C. F.C. | | DATE 15-2-00 |



ate: 14-Nov-00

Barringer Laboratories, Inc.

CLIENT SAMPLE REPORT

15000 W 6th Avenue Suite 300 Golden, Colorado 80401-5047 (800) 654-0506 (303) 277-1687 Fax (303) 277-1689

| | ···· | | | | | | | | | |
|--|---------------------------------|---|------------------|------------|-------|----|---|------------------|---------|-------|
| Client: Stone & Webste Work Order: 0010228 Project: HTWR St. Alban | er - Boston ns VA, Queens NY | Client Sample ID; Comp Sample #0002 Tag Number; | | | | | Lab Sample ID: 0010228 Date Collected: 10/26/20 | | | |
| Analyte | CAS# | Method | Result ± 2 sigma | Limit Qual | Linit | DF | Matrix: Prepped | Soil Analyzed | Analyst | Batch |
| Carbon-14, total | 14762-75-5 | EPA 520-C01M | 0.64 ± 1.4 | 2 | pCi/g | 1 | | 11/09/2000 | | P7935 |
| Tritium, total | 10028-17-8 | EPA 906.0 | 0.18 ± 0.30 | 0.5 | pCi/g | 1 | 11/08/2000 | 11/14/2000 | AWT | P7924 |

L - Contract/Client reporting limit exceeded

M - Maximum contaminant level exceeded

E - Value above quantitation range

R - RPD outside accepted recovery limits

X - Duplicate sample(s) < 5 times limit

Date: 14-Nov-00



Barringer Laboratories, Inc.

15000 W 6th Avenue Suite 300 Golden, Colorado 80401-5047 (800) 654-0506 (303) 277-1687 Fax (303) 277-1689

Client:

Stone & Webster - Boston

Project:

HTWR St. Albans VA, Queens NY

Work Order:

0010228

CASE NARRATIVE

All reported values in this report have been rounded to the correct number of significant figures. All calculations have been performed before applying significant figures, therefore, not all calculations may be reproducible with the results printed in this report.



STL St. Louis 13715 Rider Trail North Earth City, MO 63045

Tel 314 298 8566 Fax 314 298 8757 www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. VA

St. Albans

Lot #: F1A080114

Tim Taylor

Stone & Webster Engineering Co 245 Summer Street Boston, MA 02210

SEVERN TRENT LABORATORIES, INC.

Ron Martino Project Manager

February 5, 2001

Case Narrative LOT NUMBER: F1A080114

This report contains the analytical results for the 23 samples received under chain of custody by STL St. Louis on January 8, 2001. These samples are associated with your St. Albans project.

All applicable quality control procedures met method-specified acceptance criteria.

This report is incomplete without the case narrative. All results are based upon sample as received, wet weight, unless noted otherwise.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperatures of samples on receipt.

There were no anomalies with this analysis.

METHODS SUMMARY

F1A080114

PARAMETER ANALYTICAL METHOD

PREPARATION

METHOD METHOD

STRONTIUM 90 Sr90-Y90 cal

DOE 7500-SR MOD

References:

DOE

"DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F1A0801.14

| WO # | SAMPLE# | CLIENT SAMPLE | ID SAMPLED DATE | SAMP TIME |
|---------|---------|---------------|-----------------|--------------|
| DTCW5 | 001 | SA5SS301XX | 01/03/01 | |
| DTCW8 | 002 | SASSS302XX | 01/03/01 | |
| DTCW9 | 003 | SA5SS303XX | 01/03/01 | |
| DTCXA | 004 | SA5SS302XD | 01/03/01 | |
| DTCXC | 005 | SA1SS312XX | 01/03/01 | |
| DTCXD | 006 | SA1SS313XX | 01/03/01 | |
| DTCXE | 007 | SA1SS314XX | 01/03/01 | |
| DTCXF | 608 | SA1SS315XX | 01/03/01 | |
| DTCXG | 009 | SA1SS314XD | 01/03/01 | |
| DTCXH | 010 | SA1SS301XX | 01/03/01 | |
| DTCXJ | 011 | SA1SS302XX | 01/03/01 | 15:00 |
| DTCXK | 012 | SA1SS303XX | . 01/03/01 | |
| DTCXL | 013 | SA1SS304XX | 01/03/01 | |
| DTCXM | 014 | SAISS305XX | 01/03/01 | |
| DTCXN | 015 | SA1SS306XX | 01/03/01 | |
| DTCXP | 016 | SALSS307XX | 01/03/01 | |
| DTCXQ | 017 | SA1SS308XX | 01/03/01 | |
| DTCXR | • | SA1SS309XX | 01/03/01 | |
| _ DTCXV | 019 | SA1SS310XX | 01/03/01 | |
| DTCXW | 020 | SA1SS311XX | . 01/03/01 | |
| DTCXO | 021 | SAISS301XD | 01/03/01 | |
| DTCX1 | 022 | SA1SS309XD | 01/03/01 | 15:0C |
| DTCX2 | • • • • | SA1SS311XD | 01/03/01 | 15:00 |

NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: SA5SS301XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-001

Work Order: DTCW5 Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pQ | i/g | 7500~ | SR MOD | | |
| Strontium 90 | -0.02 | U | 0.35 | 0.62 | 01/23/0 | 01/31/01 | 1023234 | 100 |

Client Sample ID: SA5SS302XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-002

Work Order: DTCW8
Matrix: SOLID

NB Date Rece

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Anolysis Date | Batch # | Yld * |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | ъС | i/g | 7500-9 | R MOD | | |
| Strontium -90 | 0.04 | υ | 0.42 | 0.72 | 01/23/01 | 01/31/01 | 1023234 | 100 |

Client Sample ID: SA5SS303XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-003

Work Order: DTCW9 Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | Yld 4 |
|---------------|-----------------|------|------------------------------|------|-----------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500 - 8 | R MOD | | |
| Strontium 90 | 0.47 | U | 0.40 | 0.65 | 01/23/01 | 01/31/01 1 | L023234 | 100 |

Client Sample ID: SA5SS302XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-004

Work Order:

DTCXA

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld 4 |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | i/g | 7500- | SR MOD | | |
| Strontium 90 | -0.07 | ប | 0.31 | 0.54 | 01/23/0 | 01/31/01 | 1023234 | 100 |

Client Sample ID: SA1SS312XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-005

DTCXC Work Order: SOLID Matrix:

Date Collected: 01/03/01

1500

Date Received: 01/08/01 0910

Date

Total

Uncert. (2 a + /-)

Analysis Prep

7500-SR MOD

Batch #

Yld %

Result Parameter SR-90 BY GFPC DOE 7500-SR MOD

Strontium 90

1.27

Qual

0.47

0.59

MDC

pCi/g

01/23/01 01/31/01 1023234

Date

100

Client Sample ID: SA1SS313XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-006

Work Order: DTCXD

Matrix:

SOLID

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld 4 |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | p C | i/g | 7500-SI | r mod | | |
| Strontium 90 | 0.33 | ·U | 0.36 | 0.60 | 01/23/01 | 01/31/01 | 1023234 | 100 |

Client Sample ID: SA1SS314XX

Quanterra, Inc. - Radiochemistry

Lab. Sample ID: F1A080114-007

Work Order: Matrix:

DTCXE SOLID Date Collected: 01/03/01 1500

Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | rid i |
|------------------|---------------|------|------------------------------|-------|--------------|------------------|---------|-------|
| SR-90 BY GFPC DO | E 7500-SR MOD | | - | pCi/g | 7500-8 | R MOD | | |
| Strontism Of | 2.14 | | 0.59 | 0.57 | 01/23/01 | 01/31/01 | 1023234 | 100 |

Client Sample ID: SA1SS315XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-008

Work Order: DTCXF Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|--------------|--------|------|------------------------------|-------------|--------------|----------------------|---------|-------|
| 4.0 | | | - | i/g 0,71 | | SR MOD 1 01/31/01 | 1023234 | 100 |
| Strontium 90 | 0.05 | U | 0.41 | 0.71 | 01/23/0 | 1 01/31/01 | 1023234 | 100 |

The are incomplete without the case narrative. MDC is determined by instrument performance only. Bold results are greater than the MDC

Result is less than the sample detection limit.

Client Sample ID: SA1SS314XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-009

Work Order: Matrix:

DTCXG

SOLID

Date Collected: 01/03/01 1500 Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date E | Batch # | Yld 1 |
|---------------|-----------------|------|------------------------------|-----|--------------|--------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | ./g | 7500- | SR MOD | | |
| Strontium 90 | 6.6 | | 1.4 | 0.6 | 01/23/ | 01/31/011 | 023234 | 100 |

Client Sample ID: SA1SS301XX

Quanterra, Inc. - Radiochemistry

pCi/g

Lab Sample ID:F1A080114-010

Work Order:

DTCXH

Matrix:

Parameter

Strontium 90

SOLID

Result

Qual

Date Collected: 01/03/01 01/08/01 0910 Date Received:

Total

Uncert. (2 gt/-)

MDC

Prep ·Date

7500-SR MOD .

Analysis Date

Batch # Yld &

SR-90 BY GFPC DOE 7500-SR MOD

1.07

0.47

0.66

01/23/01 01/31/01 1023234

100

Ata are incomplete without the case narrative. MDC is determined by instrument performance only. Bold results are greater than the MDC

Client Sample ID: SA1SS302XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-011

Work Order: Matrix:

DTCXJ SOLID Date Collected: 01/03/01

Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 gt/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pt | i/g | 7500-s | R MOD | | • |
| Strontium 90 | 0.20 | U | 0.39 | 0.66 | 01/23/01 | 01/31/01 | 1023234 | 97 |

Client Sample ID: SA1SS303XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-012

Work Order:

DTCXK

Matrix:

SOLID

Date Collected: 01/03/01

Date Received:

| . Parameter ; | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date Batch # | ¥1d % |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | p(| Ci/g | 7500- | SR MOD | |
| Strontium 90 | 1.84 | | 0.56 | 0.62 | 01/23/ | 01 01/31/01 1023234 | 100 |

Client Sample ID: SA1SS303XX DUP

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-012X

Work Order: DTCXK
Matrix: SOLID

Date Received:

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

Total

Uncert. Prep Analysis Result Qual $(2 \sigma^{+}/-)$ Date Date Batch # AJG # Parameter MDC SR-90 BY GFPC DOE 7500-SR MOD pCi/g 7500-SR MOD 1.76 0.54 Strontium 90 0.61 01/23/01 01/31/01 1023234 100

Client Sample ID: SA1SS304XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-013

Work Order:

DTCXL

Matrix:

SOLID

Date Collected: 01/03/01

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Data | Analysis Date E | latch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------|---------|-------------|
| SR-90 BY GFFC | DOE 7500-SR MOD | | pQ | i/g | 7500-8 | SR MOD | | , |
| Strontium 90 | 2.34 | | 0.60 | 0.51 | 01/24/0 | 1 02/01/011 | 024214 | 89 |
| | | | | | | **···· | | |

Client Sample ID: SA1SS305XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-014

Work Order:

DTCXM

Matrix:

SOLID

Date Collected: 01/03/01

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date E | Batch # | ing # |
|---------------|-----------------|------|------------------------------|-------|--------------|--------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | | pCi/g | 7500- | SR MOD | | |
| Strontium 90 | 0.9B | | 0.42 | 0.57 | 01/24/0 | 1 02/01/011 | 024214 | 80 |

Client Sample ID: SA1SS306XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-015

Work Order:

DTCXN

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|-------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | | pCi/g | 7500- | SR MOD | | |
| Strontium 90 | 0.68 | | 0.39 | 0.59 | 01/24/0 | 02/01/01 | 1024214 | 79 |

Client Sample ID: SA1SS307XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-016

Work Order:

DTCXP

Matrix:

SOLID

Date Collected: 01/03/01

1500

Date Received:

01/08/01

| Total | | | | | |
|----------|-----|------|----------|---------|-------|
| Uncert. | | Prep | Analysis | | |
| 12 -+/-1 | 100 | Date | Date | Batch # | Yld % |

Qual Result Parameter 7500-SR MOD SR-90 BY GFPC DOE 7500-SR MOD pCi/g 01/24/01 02/01/01 1024214 0.42 0.64 79 Strontium 90 0.72

Client Sample ID: SA1SS308XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-017

DTCXQ Work Order: Matrix: SOLID

Date Collected: 01/03/01

1500

Date Received:

01/08/01

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date I | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 1.69 | | 0.48 | 0.47 | 01/24/0 | 01 02/01/011 | 024214 | 90 |

Client Sample ID: SA1SS309XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-018

Work Order:

DTCXR

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

| SR-90 BY GFPC DOE 7500-SR MOD PCI/G 7500-SR MOD Strontium 90 6.81 0.89 0.60 01/24/01 02/02/01 1024214 88 | Parameter | Result | Qual | Total Uncert. (2 gt/-) | мос | Prep Date | Analysis Date Ba | atch # | Yld % |
|--|---------------|-----------------|------|------------------------------|------|--------------|---------------------|--------|-------|
| Strontium 90 6.81 0.89 0.60 01/24/01 02/02/01 1024214 88 | SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500-8 | R MOD | | |
| A PANER AND A A A A A A A A A A A A A A A A A A | Strontium 90 | 6.81 | | 0.89 | 0.60 | 01/24/01 | 02/02/01 10 | 24214 | 88 |

Client Sample ID: SA1SS310XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-019

Work Order:

DTCXV

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDG | Prep Date | Analysis Date | Batch # | Yld 4 |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 4.23 | | 0.95 | 0.56 | 01/24/ | 01 02/02/01 | 1024214 | 89 |

Client Sample ID: SA1SS311XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-020

Work Order:

DTCXW

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 o+/-) | MDC | Prep Date | Analysi: Date | Batch # | Yld & |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|------------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | E | Ci/g | 7500- | SR MOD | • | • |
| Strontium 90 | 4.6 | | 1.0 | 0.6 | 01/24/0 | 02/01/ | 01 1024214 | 74 |

Client Sample ID: SA1SS301XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-021

Work Order: Matrix:

DTCX0 SOLID

Date Received:

Date Collected: 01/03/01

01/08/01

Total Uncert. Analysis Prep (2 g+/-) Yld & Result Qual Date Date Batch # MDC Parameter SR-90 BY GFPC DOE 7500-SR MOD pCi/g 7500-SR MOD 0.05 U 0.39 0.67 01/24/01 02/01/01 1024214 . 71 Strontium 90

Client Sample ID: SA1SS309XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-022

Work Order: Matrix:

DTCX1 SOLID Date Collected: 01/03/01 1500 Date Received:

| Parameter | Reault | Qual | Total Uncert. {2 o+/-) | MDC | Prep Date | Analysis Date B | atch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC: | i/g | 7500- | SR MOD | | |
| Strontium 90 | 3.27 | | 0.81 | 0.63 | 01/24/0 | 02/01/01 10 |)24214 | 79 |



Client Sample ID: SA1SS311XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-023

Work Order: Matrix: DTCX2 SOLID

Date Collected: 01/03/01 1500

Date Received:

| Total |
|-------|
|-------|

| Parameter | Result | Qual | Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|---------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | • | • |
| Strontium 90 | 1.03 | _ | 0.40 | 0.52 | 01/24/0 | 1 02/01/01 | 1024214 | 86 |

METHOD BLANK REPORT

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F1A080114

Matrix:

SOLID

| | | | Total | | Lab Sample ID | | | |
|-------------------------------|--------------------------|------|---------------------|---------------------|---------------|------------------|----------------------|----------|
| Parameter | Result | Qual | Uncert. (2 g+/-) | мос | Prep Date | Analyais Date | Batch # | ¥ bik |
| SR-90 BY GFPC Strontium 90 | DOE 7500-SR MOD -0.05 | - ซ | pCi/g 0.35 | 7500-SR MOD 0.61 | 01/23/01 | | 30000-234 1023234 | 100 |
| SR-90 BY GFPC Strontium 90 | DOE 7500-SR MOD -0.11 | ប | pCi/g 0.43 | 7500-SR MOD 0.75 | 01/24/01 | | 40000-214 1024214 | 88 88 |

DUPLICATE EVALUATION REPORT

Quanterra, Inc. - Radiochemistry

ent Lot ID: k Order #: Matrix: F1A080114 DTAC SOLID

Date Sampled:

01/02/00

Date Received:

01/05/01

| | | | Total Uncert. | | DUPLICATE | Total Uncert. | | QC Sample ID | |
|---------------|-----|------------------|--------------------|-----------------|-------------------|---------------------|-------|--------------|-------|
| Parameter | | SAMPLE Result | (20+/-) | \$ Yld | Result | {2 \(\sigma +/-\) | 4 Yld | Precisi | .on |
| SR-90 BY GFPC | DOE | 7500-SR | pCi/g | 7500-sr | MOD | | . 1 | 1A050206-0 | 07 |
| Strontium 90 | | -0.05 Batch | U 0.34 | 87 (Sample) | 0.16 U 1024214 | 0.34 (Duplicate) | 90 | 367 | \$RPD |
| SR-90 BY GFPC | DOE | 7500-SR | pCi/g | 7500-SR | MOD | | E | 1A080114-0 | 12 |
| Strontium 90 | | 1.84 Batch | 0.56 4: 1023234 | 100 (Sample) | 1.76 1023234 | 0.54 (Duplicate) | 100 | 4 | %RPD |

Laboratory Control Sample Report



Quanterra, Inc. - Radiochemistry

Client Lot ID:

F1A080114

Matrix:

SOLID

| | | | | Total | | Lab Sample ID | | | |
|---------------|-----|--------------|---------|---------------------|--------------|---------------|-------|----------------------|--|
| arameter | | Spike Amount | Result | Uncert. (2 g+/-) | MDC | * Yld | * Rec | QC Control Limits | |
| SR-90 BY GFPC | DOE | 7500-SR MOD | pCi/g | | 7500-SR MOD | | F1A23 | 0000-234C | |
| Strontium 90 | | 9.83 | 5.8 | 1.2 | 0.6 | 100 | 59 | 49 - 126 | |
| Scrouttram 30 | | Batch #: | 1023234 | | AnalysisDate | 01/3 | 1/01 | • | |
| SR-90 BY GFPC | DOE | 7500-SR MOD | pCi/g | | 7500-SR MOD | | F1A24 | 0000-214C | |
| Strontium 90 | | 9.83 | 11.4 | 2.4 | 0.8 | 76 | 116 | 49 - 126 | |
| 00201102001 | | Batch #: | 1024214 | | AnalysisDate | 02/0 | 2/01 | | |



STL St. Louis 13715 Rider Trail North Earth City, MO 63045

Tel 314 298 8566 Fax 314 298 8757 www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. VA

St. Albans

Lot #: F0L220154

Tim Taylor

Stone & Webster Engineering Co 245 Summer Street Boston, MA 02210

SEVERN TRENT LABORATORIES, INC.

Ron Martino Project Manager

January 18, 2001

STL St. Louis is a part of Severn Trent Laboratories, Inc.

Case Narrative LOT NUMBER: F0L220154

This report contains the analytical results for the three samples received under chain of custody by STL St. Louis on December 22, 2000. These samples are associated with your St. Albans project.

All applicable quality control procedures met method-specified acceptance criteria.

Observations/Nonconformances

There were no anomalies with this analysis.

METHODS SUMMARY

F0L220154

PARAMETER

ANALYTICAL

PREPARATION

METHOD

METHOD

STRONTIUM 90 Sr90-Y90 cal

DOE 7500-SR MOD

References:

DOE

"DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F0L220154

| WO # SAMPLE | CLIENT SAMPLE ID | DATE | TIME |
|-------------------------------------|------------------------------------|----------------------------------|-------|
| DRXHJ 001 DRXHL 002 DRXHV 003 | CAST 002 (CLEANOUT BEFORE COOR.15) | 12/21/00 12/21/00 12/21/00 | 16:0C |

NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: CAST 001 (DRAIN IN LAB)

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F0L220154-001

Work Order: Matrix:

DRXHJ SOLID

Date Collected: 12/21/00 1600

Date Received:

12/22/00 1130

| Parameter | Result | Qual | Total Uncert. (2 c+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|-----|--------------|------------------|-----------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | -/g | 7500- | SR MOD | | |
| Strontium 90 | 72000 | + | 14000 | 20 | 01/12/0 | 01/16/0 | 1 1012333 | 75 |

Client Sample ID: CAST 001 (DRAIN IN LAB) DUP

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F0L220154-001X

Work Order: Matrix:

DRXHJ

SOLID

Date Collected: 12/21/00 1600

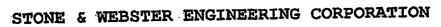
Date Received: 12/22/00 1130

| Paramater | Result | Qual | Total Uncert. (2 o+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % |
|------------------|---------------|------|------------------------------|-----|--------------|------------------|-----------|-------|
| SR-90 BY GFPC DO | 2 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 94000 | + | 18000 | 30 | 01/12/0 | 01/16/01 | . 1012333 | 69 |

ta are incomplete without the case narrative.

MDC is determined by instrument performance only. Bold results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.



Client Sample ID: CAST 002 (CLEANOUT BEFORE COOR.15)

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F0L220154-002

Work Order:

DRXHL

Matrix:

SOLID

Date Collected: 12/21/00 1600

Date Received:

12/22/00 1130

| Parameter | Result | Qual | Total Uncert. (2 _O +/-) | MDC | Prep Date | Analysis Date E | atch # | Yld % |
|---------------|-----------------|------|--|-----|--------------|----------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | - | 7500~S | R MOD 1 01/16/011 | 012333 | . 72 |
| Strontium 90 | 125000 | + | 24000 | 50 | 01712703 | | | |

Data are incomplete without the case narrative. MDC is determined by instrument performance only.

Bold results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Client Sample ID: CAST 003 (MIDWAY COORIDOR 45)

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F0L220154-003

Work Order: DRY

DRXHV

Matrix: SOLID

Date Collected: 12/21/00 1600 Date Received: 12/22/00 1130

Date Received: 12/22/00 1130

| Parameter | Result | Qual. | Total Uncert. (2 c+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|--------------|-----------------|-------|------------------------------|-----|--------------|------------------|---------|-------|
| | DOE 7500-SR MOD | | pCi/g | | 7500- | SR MOD | | |
| strontium 90 | 269 | | 53 | 1 | 01/12/ | 01 01/16/01 | 1012333 | 96 |

METHOD BLANK REPORT

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F0L220154

Matrix:

SOLID

| · | | | Total | | | Lab Sample ID | | | | |
|---------------|-----------------|------|---------------------|-------------|--------------|------------------|-----------|-------|--|--|
| Parameter | Result | Qual | Uncert. (2 a+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % | | |
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi/g | 7500-SR MOD | | F1A1 | 20000-333 | В | | |
| Strontium 90 | 0.04 | U | 0.25 | 0.44 | 01/12/01 | 01/16/01 | 1012333 | 90 | | |

DUPLICATE EVALUATION REPORT

Quanterra, Inc. - Radiochemistry

nt Lot ID: Work Order #:

F0L220154 DRXH

Date Sampled:

12/21/00

Matrix:

SOLID

Date Received:

12/22/00

Parameter

Strontium 90

SAMPLE Result

Total Uncert. $(2\sigma + /-)$

DUPLICATE Result % Yld

Total Uncert. (2 a +/-)

QC Sample ID Precision % Yld

F0L220154-001

27

SR-90 BY GFPC DOE 7500-SR

pCi/g 72000 14000

Batch #:

1012333 (Sample)

75 94000 1012333 (Duplicate)

7500-SR MOD

18000

69

%RPD

Data are incomplete without the case marrative. Calculations are performed before rounding to avoid round-off error in calculated results

For informational purposes only. The detection limit does not follow significant figures SOP.

Laboratory Control Sample Report

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F0L220154

Matrix:

SOLID

| | | | Total | | | Lab | Sample ID |
|-----------------|----------------|----------------|---------------------|---------------------|-------------|------------|----------------------|
| Parameter | Spike Amount | Result | Uncert. (2 g+/-) | MDC | % Yld | % Rec | QC Control Limits |
| SR-90 BY GFPC D | OE 7500-SR MOD | pCi/g | | 7500-SR MOD | | F1A12 | 0000~333C |
| Strontium 90 | 9.59 Batch #: | 8.5 1012333 | 1.7 | 0.4 AnalysisDate | 93 01/16 | 89 5/01 | 49 - 126 |

PSL20300

SEVERN TRENT LABORATORIES, INC. CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-001

PROJECT #: VA WORK ORDER: DTCW5

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01

P.O. NUMBER: SAMPLING DATE: 1/03/01 SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10 SAMPLE ID: SA5SS301XX

QC PACKAGE: CLP SDG# : SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: -00

> WRK REQUEST EXTRACTION ANALYSIS ***** <u>ANALYSIS</u> ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCW5-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 Page

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino

LAB ID: F-1A080114-002

PROJECT #: VA

WORK ORDER: DTCW8

REPORT TO: P.O. NUMBER: RECEIVING DATE: 1/08/01

SITE: St. Albans

SAMPLING DATE: 1/03/01.

AMOUNT REC'D: 120G

ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD

PRIORITY: 28

LOT COMMENTS: MATRIX: SOLID

SAMPLING TIME: 15:00 RECEIVING TIME: 9:10

SAMPLE ID: SA5SS302XX

SDG# :

QC PACKAGE: CLP SAMPLE COMMENTS:

Beginning Depth:

.00 Ending Depth:

Tim Taylor

.00

WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD

06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCW8-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 ^`ge 1

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Rum Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

1

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-003

PROJECT #: VA WORK ORDER: DTCW9

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28
LOT COMMENTS: SAMPLING TIME:

LOT COMMENTS: SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIME: 9:10

MATRIX: SOLID RECEIVING TIME: 9:10
SAMPLE ID: SA5SS303XX

QC PACKAGE: CLP SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS

***** ANALYSIS *****

LOC DATE EXP DATE EXP DATE

SDG# :

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCW9-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 Page

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-004

PROJECT #: VA WORK ORDER: DTCXA

Tim Taylor REPORT TO: RECEIVING DATE: 1/08/01

SAMPLING DATE: 1/03/01 P.O. NUMBER: ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01 SITE: St. Albans

AMOUNT REC"D: 120G

STORAGE LOC: RAD PRIORITY: 28

SAMPLING TIME: 15:00 LOT COMMENTS: MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SA5SS302XD

SDG# :

OC PACKAGE: CLP SAMPLE COMMENTS:

.00 Ending Depth: .00 Beginning Depth:

WRK REQUEST EXTRACTION ANALYSIS **** ANALYSIS **** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXA-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 ~qe

SEVERN TRENT LABORATORIES, INC. CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-005

PROJECT #: VA WORK ORDER: DTCXC

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC'D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28 LOT COMMENTS:

SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIME:

9:10 SAMPLE ID: SAISS312XX

OC PACKAGE: CLP SDG# : SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST . EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXC-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 Page

OC PACKAGE: CLP

Beginning Depth:

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

SDG# :

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-006

PROJECT #: VA WORK ORDER: DTCXD

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01

SAMPLING DATE: 1/03/01 P.O. NUMBER: SITE: St. Albans

ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01 AMOUNT REC"D: 120G

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00 MATRIX: SOLID

RECEIVING TIME: 9:10

SAMPLE ID: SA1SS313XX

SAMPLE COMMENTS:

WRK REQUEST EXTRACTION ANALYSIS

***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

.00

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

.00 Ending Depth:

(A-HL-ZP-01) DTCXD-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 `qe 1 SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino

Tim Taylor

LAB ID: F-1A080114-007

PROJECT #: VA

WORK ORDER: DICKE

REPORT TO:

RECEIVING DATE: 1/08/01

P.O. NUMBER:

SAMPLING DATE: 1/03/01

SITE: St. Albans AMOUNT REC"D: 120G ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD

PRIORITY: 28

LOT COMMENTS: MATRIX: SOLID

SAMPLING TIME: 15:00 RECEIVING TIME:

SAMPLE ID: SAISS314XX

9:10

OC PACKAGE: CLP SAMPLE COMMENTS: SDG# :

Beginning Depth: .00 Ending Depth:

.00

REQUEST EXTRACTION WRK ***** ANALYSIS *****

ANALYSIS <u>roc</u> DATE EXP DATE

SR-90 BY GPPC DOE 7500-SR MOD

1/08/01 06

0/00/00

7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXE-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 Page

SAMPLE COMMENTS:

SEVERN TRENT LABORATORIES, INC. CLIENT ANALYSIS SUMMARY

Rum Date: 1/08/01 Time: 9:02:07

User Id.: CLARKEJ

STL St. Louis

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-008

WORK ORDER: DTCXF PROJECT #: VA

Tim Taylor RECEIVING DATE: 1/08/01 REPORT TO: SAMPLING DATE: 1/03/01 P.O. NUMBER:

ANALYTICAL DUE DATE: 2/05/01N SITE: St. Albans

REPORT DUE DATE: 2/06/01 AMOUNT REC"D: 120G

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SAISS315XX

OC PACKAGE: CLP SDG# :

.00 Ending Depth: .00 Beginning Depth:

> WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021 (A-HL-ZP-01) DTCXF-1-AA Protocol: A QC Program: STANDARD TEST SET PSL20300 re 1

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

0

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562 PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-009

COUNCI RANAGER: ROIL MALCINO LAS INC. P-IAUGULIA-UU

PROJECT #: VA WORK ORDER: DTCXG

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01 STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

LOT COMMENTS: SAMPLING TIME: 15:00
MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SA1SS314XD
OC PACKAGE: CLP
SDG#:

QC PACKAGE: CLP SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS
***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP. RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXG-1-AA Protocol: A QC Program: STANDARD TEST SET

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION OUOTE/SAR #: 38562

LAB ID: F-1A080114-010 PROJECT MANAGER: Ron Martino

WORK ORDER: DTCXH PROJECT #: VA

Tim Taylor RECEIVING DATE: 1/08/01 REPORT TO:

SAMPLING DATE: 1/03/01 P.O. NUMBER:

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01

AMOUNT REC"D: 120G STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

RECEIVING TIME: 9:10 MATRIX: SOLID

SAMPLE ID: SAISS301XX QC PACKAGE: CLP SDG# :

SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** DATE EXP DATE EXP DATE FOC

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXH-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 ⁿage

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-011

PROJECT #: VA WORK ORDER: DTCKJ

Tim Taylor REPORT TO:

RECEIVING DATE: 1/08/01 SAMPLING DATE: 1/03/01 P.O. NUMBER:

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01 STORAGE LOC: RAD PRIORITY: 28

SAMPLING TIME: LOT COMMENTS: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SAISS302XX QC PACKAGE: CLP SDG# :

SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS **** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXJ-1-AA Protocol: A QC Program: STANDARD TEST SET

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION

Tim Taylor

QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino

LAB ID: F-1A080114-012

PROJECT #: VA

WORK ORDER: DTCXK

REPORT TO:

RECEIVING DATE: 1/08/01

P.O. NUMBER:

SAMPLING DATE: 1/03/01

SITE: St. Albans AMOUNT REC"D: 120G ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD

PRIORITY: 28

LOT COMMENTS: MATRIX: SOLID

SAMPLING TIME: 15:00

SAMPLE ID: SAISS303XX

RECEIVING TIME:

9:10

QC PACKAGE: CLP SAMPLE COMMENTS: SDG# :

Reginning Depth:

.00 Knding Depth:

-00

LOC

***** ANALYSIS *****

WRK REQUEST

EXTRACTION EXP DATE

ANALYSIS EXP DATE

06 1/08/01

DATE

0/00/00

7/02/01

SR-90 BY GFPC DOE 7500-SR MOD PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXK-1-AA Protocol: A QC Program: STANDARD TEST SET

Эe

SAMPLE COMMENTS:

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-013

PROJECT #: VA WORK ORDER: DTCXL

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01

P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01 STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SAISS304XX QC PACKAGE: CLP SDG# :

Beginning Depth: .00 Ending Depth: .00

> WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS *****. LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01 PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXL-1-AA Protocol: A QC Program: STANDARD TEST SET

REPORT TO:

SAMPLE COMMENTS:

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01

. Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION PROJECT MANAGER: Ron Martino

QUOTE/SAR #: 38562

LAB ID: F-1A080114-014

PROJECT #: VA WORK ORDER: DTCXM

Tim Taylor RECEIVING DATE: 1/08/01

P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01 STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SAISS305XX
QC PACKAGE: CLP SDG# :

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS

***** ANALYSIS *****

LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXM-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 `qe 1

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07 User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-015

PROJECT #: VA WORK ORDER: DTCXN

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01

P.O. NUMBER: SAMPLING DATE: 1/03/01 SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SA1S5306XX QC PACKAGE: CLP

SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

> WRK REQUEST EXTRACTION. ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SDG# :

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXN-1-AA Protocol: A QC Program: STANDARD TEST SET

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07 User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562 PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-016

PROJECT #: VA

WORK ORDER: DICKP REPORT TO: Tim Taylor

RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01 AMOUNT REC"D: 120G

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIME: 9:10

SDG# :

SAMPLE ID: SAISS307XX QC PACKAGE: CLP

SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC EXP DATE EXP DATE DATE

SR-90 BY GFPC DOE 7500-SR MOD 08 1/08/01 0/00/00 7/02/01 PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021 (A-HL-ZP-01) DTCXP-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 ^าae 1

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-017

PROJECT #: VA WORK ORDER: DTCXQ

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER:

SAMPLING DATE: 1/03/01 SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC'D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00 MATRIX: SOLID

RECEIVING TIME: 9:10 SAMPLE ID: SAISS308XX .

QC PACKAGE: CLP SDG# : SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

> WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXQ-1-AA Protocol: A QC Program: STANDARD TEST SET

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Rum Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ.

0/00/00

7/02/01

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-018

PROJECT #: VA WORK ORDER: DTCXR

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans

ANALYTICAL DUE DATE: 2/05/01N

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00
MATRIX: SOLID RECEIVING TIME: 9:10

MATRIX: SOLID RECEIVING TIME: 9:10 SAMPLE ID: SAISS309XX

QC PACKAGE: CLP SDG# :

SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS

***** ANALYSIS ***** LOC DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXR-1-AA Protocol: A QC Program: STANDARD TEST SET

PSL20300 7e 1

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY

STL St. Louis

Run Date: 1/08/01

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-019

PROJECT #: VA WORK ORDER: DTCXV

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01

SAMPLING DATE: 1/03/01 P.O. NUMBER: SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC'D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SAISS310XX

OC PACKAGE: CLP SAMPLE COMMENTS:

Beginning Depth:

.00 Ending Depth: .00

WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SDG# :

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCXV-1-AA Protocol: A QC Program: STANDARD TEST SET

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01 User Id.: CLARKEJ

Time: 9:02:07

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562 PROJECT MANAGER: Ron Martino

LAB ID: F-1A080114-020

PROJECT #: VA WORK ORDER: DTCXW

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

ANALYTICAL DUE DATE: 2/05/01N REPORT DUE DATE: 2/06/01 SITE: St. Albans

AMOUNT REC*D: 120G

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIME:

9:10 SAMPLE ID: SAISS311XX

OC PACKAGE: CLP SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

> WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SDG# :

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021 (A-HL-ZP-01) DTCXW-1-AA Protocol: A QC Program: STANDARD TEST SET PSL20300 ~98 1

SEVERN TRENT LABORATORIES, INC Run Date: 1/08/01 CLIENT ANALYSIS SUMMARY STL St. Louis

Time: 9:02:07

SDG# :

User Id.: CLARKET

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-021

PROJECT #: VA WORK ORDER: DTCX0

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER:

SAMPLING DATE: 1/03/01 ANALYTICAL DUE DATE: 2/05/01N SITE: St. Albans AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28

LOT COMMENTS: SAMPLING TIME: 15:00

MATRIX: SOLID RECEIVING TIME: 9:10

SAMPLE ID: SAISS301XD

QC PACKAGE: CLP SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

> WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCX0-1-AA Protocol: A QC Program: STANDARD TEST SET

SAMPLE COMMENTS:

SEVERN TRENT LABORATORIES, INC CLIENT ANALYSIS SUMMARY STL St. Louis

Run Date: 1/08/01 Time: 9:02:07

User Id.: CLARKEJ



CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-022

PROJECT #: VA WORK ORDER: DTCX1

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01

P.O. NUMBER: SAMPLING DATE: 1/03/01 SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT REC"D: 120G REPORT DUE DATE: 2/06/01

STORAGE LOC: RAD PRIORITY: 28 LOT COMMENTS:

SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIME:

9:10

SAMPLE ID: SAISS309XD QC PACKAGE: CLP SDG# :

Beginning Depth: .00 Ending Depth: - 00

> WRK REQUEST EXTRACTION ANALYSIS ***** ANALYSIS ***** FOC DATE

EXP DATE EXP DATE SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021 (A-HL-ZP-01) DTCX1-1-AA Protocol: A QC Program: STANDARD TEST SET PSL20300 l `ge

SEVERN TRENT LABORATORIES, INC Run Date: 1/08/01 CLIENT ANALYSIS SUMMARY

STL St. Louis

Time: 9:02:07

User Id.: CLARKEJ

CLIENT: 378644 STONE & WEBSTER ENGINEERING CORPORATION QUOTE/SAR #: 38562

PROJECT MANAGER: Ron Martino LAB ID: F-1A080114-023

PROJECT #: VA WORK ORDER: DTCX2

REPORT TO: Tim Taylor RECEIVING DATE: 1/08/01 P.O. NUMBER: SAMPLING DATE: 1/03/01

SITE: St. Albans ANALYTICAL DUE DATE: 2/05/01N

AMOUNT RECTD: 120G REPORT DUE DATE: 2/06/01 STORAGE LOC: RAD

PRIORITY: 28 LOT COMMENTS:

SAMPLING TIME: 15:00 MATRIX: SOLID RECEIVING TIMÉ:

9:10 SAMPLE ID: SAISS311XD

QC PACKAGE: CLP SDG# : SAMPLE COMMENTS:

Beginning Depth: .00 Ending Depth: .00

> WRK REQUEST EXTRACTION ANALYSIS **** ANALYSIS ***** LOC DATE EXP DATE EXP DATE

SR-90 BY GFPC DOE 7500-SR MOD 06 1/08/01 0/00/00 7/02/01

PREP RC-0003 , RC-0004 , SEP RC-0050 , CT SL-13021

(A-HL-ZP-01) DTCX2-1-AA Protocol: A QC Program: STANDARD TEST SET

of stody Record



| CHALLEMING RESULTS TO TIM TRYLOR MARIE BURNED DISTRIBUTION: Stays with Sample: CANARY - Retirmed to Client with Reacon - PINK - Flat Crow | s. nainquished By | or second market by | May King | Narmel A Rush | Mon-Hazard Flammable Skin Irrhant | Possible Hazard Identification | Special frametions | 135 3061 | ડ | SIGN ISS AND XX | 144 302 | 英 SA 1.53 301 XX | 0X 418221 AS (\$) | 15.3/ | XX TILS SS I AS ® | 100010 | SAS | - | 2 30 SA SSS 30 2 | U SASSS 30 1 XX | Sample I.D. No. and Description | And Michigan Assistant Anni | SI. ALBANS V.A. SITE | | BOSTEN MA | 245 Summer Stree | STONE & NEBSTER | Chan |
|---|-------------------|---------------------|--------------|----------------------|-----------------------------------|--------------------------------|--------------------|----------|---|-----------------|----------|------------------|-------------------|---------------|-------------------|----------|----------------|---|------------------|-----------------|---------------------------------|-----------------------------|----------------------|---|------------|-------------------------------|----------------------|--|
| TIMA TAYLOR | | | | | hant Poison B | | ¥ - ¥ | | | | <u> </u> | | | | | | | | | 1 3 0 1 | Date 71 | | E. C. | , [| 1 | + | | |
| MHC SI | Date | Date 1 | 01/03/01 | | ол В 💢 Илклочт | | / | | | | | | | | | | | | | Kan Cai | Time Sample Type | | | Carrie:/Waybill | Sue Canadi | (D) 718. | Telephone Nun | Project Manage |
| ANCO SEE | Time | | 500 |]111. | | | * | + | | | | - | | <u> </u> | | <u> </u> | | | | 4 | Total Volume | | MA | Carrier/Waybill Number | RIGATIO | 298-8613 | THE COMENTE | 97 |
| MUKE | 3. Acceived By | 2, Réceived By | Constant By | Project Spacific (Sp | Sample Disposal Return To Client | | 4 | | + | | | | | <u> </u> | | | | | - 1 | 3 | iners No | | | 1 de ses | 1 la hu | 718-298-8613 (=) 718-298-8611 | MARC BIANCO LJohn De | |
| GETBER | | - | Clark | | | 1 | • | | | | | | 640 | | | | 15. | | | 2 5 | Preservative COI | | | Jan 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | No.lino | 1198-8611 | Devine | |
| DE DETRICS | | | | | Disposal By Lab | | | | | | | | 74 MISS 111 ST | | | | SASTE OF STANK | | | | ndition on Receipt | -90 | | | | | ! | Dec |
| 165 | . | <u> </u> | | | Archivo For | • | ** | × | | | X | ×;* | * | \$\frac{1}{2} | X | X | ** | × | X.Þ | \ | Sr | -90 | | | | | 01/03/01 | |
| | Date | Dale | 1 | | entinom E | | | <u> </u> | | | | | | | | | | - | | | | | | | Analysis | Page / | nam of custody N. | The Contract of the Contract o |
| | Time | Tune | Tima OO/5 | | | | | | | | | - | | | | | | | | | | | | | | 2 | 44426 | |





| DISTRIBUTION; WHITE - Stays with Sample; CANARY - Rannard to Clear with | 3. Reinquished By | 2. Resimpushed By | Non-Hazard Flammeble Skin Inlant Turn Around Time Required: Normal Repuised: Relignified By Relignified By | Special Instructions 's | 22 | 0X 54 121 304 XV 0X 54 121 304 XV 0X 7 12 532 1 452 @ | Sample I.D. No. and Description # SA SS 308 XX | No. V.A. | Cilent STONE & WEBSTER Address 245 Summer Street City BOSTEN , MA State |
|---|-------------------|--|---|-------------------------|----|---|---|---------------|--|
| Ranyat | Data |) Date Of (v3) | Poison B | | | * | Date Time Samp | Si TE Carrier | Project Man My Telsphone Ty Ty Ty The Contact Ty Ty Ty Ty Ty Ty Ty Ty Ty T |
| BINK - Find Cans | Time 3. Recu | 101 1500 1. Rep. 1500 2. Rep. 1500 2. Rep. 1500 1. Rep. 1 | <i>w</i> . | | | * | Sample Type Volume Type Soil 1204 Gluss | 1 N | nager S.E.C. BIMMO Number (Area Code)Fax,fu 8-298-8613 |
| | 3. Received By | tained By Class by | al o Client (Specify) | | | | No. Preservative | | Jumbos 118-198-861 |
| , | | | Disposal By Lab XArc | | | | Condition on Receipt | 90 | Date O1 03 01 Lab Number |
| | ı | Date Time | Archive For 3 Mantirs | | | | | | Chain Of Custoby Number 44424 Page 2 of 2 Analysis |

;

| SOIL SAMPLE DESIGNATION COLLECTION LOCATION DESCRIPTION SA5SS301XX Stainless steelicast iron common trench crossing contdor 45 routh side SA5SS302XX Stainless steelicast iron common trench crossing contdor 45 center SA5SS302XX Stainless steelicast iron common trench crossing contdor 45 south side SA5SS302XD Stainless steelicast iron common trench crossing contdor 45 south side | SOIL SAMPLE DESIGNATION COI SA5SS301XX SA5SS302XX SAFESS302XX | frames in the same of Englands frames and the same of |
|---|---|---|
| | | |
| | | |
| | · · · · · · · · · · · · · · · · · · · | east irre common franch conseins consider all month often |
| | _ | lieseting commentation transfer executor equipments and |
| | | est from sommon fromth exterior exemples 65 as the side |
| | | Court of Continues person of Costant Advantage Country |

トコンシ

| SOIL SAMPLE | JRVEY UNIT 1B (Counting Room, Wash Room & Corridor 15) |
|-------------|--|
| DESIGNATION | COLLECTION LOCATION DESCRIPTION |
| SA1SS312XX | Steinless steel/cast imp sammer franch and the steel s |
| SA1SS313XX | Stainless steel/cast iron common trench approximately 12 ft east of emergency shower dra |
| SA1SS314XX | Stainless steel/cast iron common trench crossing confider 15 name north side Stainless steel/cast iron common trench crossing confider 15 name south side |
| SA1SS315XX | Cast iron common french piping trench beneath distillation sink area in closes |
| SA1SS316XD | Stainless steel/cast iron common french crossing corridor 15 ramp south side - Duplicate |
| \$14XD | The state of the s |

| SOIL SAMPLE | 4 T |
|-------------|--|
| DESIGNATION | COLLECTION LOCATION DESCRIPTION |
| A | |
| SA188301XX | Steirdess steet piping trench below high level lab sink |
| SA155302XX | Sizabless steet piping trench under high level leb furne hood drain north end |
| SA185303XX | Shalidess steel piping hench under Judy level lab fume hood drain south end |
| SA188304XX | Staintess steel pibero trems below love level teb sink portiwest comer |
| SA1SS305XX | Statiniess steet pining trench below UST area |
| SA1\$5506XX | Stainless steel piping freman hundren of low level sink and UST drain lines |
| SA1SS307XX | Stainless steel plans transh below low level lab sink northeast comer |
| SA188308XX | Staintass steel pipe tranch beneath tow level leb cabinet area |
| SA19S309XX | Cast Iron piping trench bengath emengency shower drain erea |
| SA1SS310XX | Stainless steel/cast from common trench approximately 4 it east of emergency shower drain |
| SA188311XX | Stainless steel/cast Iron confinon french approximately 6 fleast of emergency shower drain |
| SA18S301XD | Stainless steel pipha trench below high level lab sink - Duplicate |
| SA188308XD | Cast iron piping french beneath emergency shower drain area. Dublicate |
| CXLLESSIAS | Signification of the street of |

පු\⊅ ලෙකු පි Jan-2-01 12:05PM;

8802882281

eaur mi: commesy semices!



Lot No .: FIA 08011

Condition Upon Receipt Variance Report St. Louis Laboratory

| Quote N Shipper | lo:_ /No: | tone 4 Wobster 38562 Fed Ex 8127 8521 5208 Variance (Check all that apply): | Ini | iated l | 1080 Time: 0910 by: 11 Clark C Numbers: 44424 |
|--------------------|--------------|--|------------------------|--------------|--|
| t. | | Sample received broken/leaking. | 8. | × | Sample ID on container does not match sample ID |
| 2. | | Sample received without proper preservative. | • | • | on paperwork. Explain: See notes |
| | | ☐ Cooler temperature not within 4°C ± 2°C | 3 | | |
| | | Record temperature: | | | |
| | | □ рН | 9. | ·□ | All coolers on airbill not received with shipment. |
| | | Other: | 10. | | Sample volume insufficient for analysis |
| 3. | | Sample received in improper container. | 11. | | Other (explain below) |
| 4. | | Sample received without proper paperwork. Expl | lain: | | |
| 5, | | Paperwork received without sample. | | | |
| б. | | No sample ID on sample container. | | | |
| 7. | | Custody tape disturbed/broken/missing/not rampe | r evident type (circle | all that | apply). |
| | | variances were noted during sample receipt. | | | |
| X | Co | oler Temperature Upon Receipt in ^a C: | 7 | · | , |
| Temper | ature | warlance Does Not Affect the Following Analys | es: Kad | In. | alipea |
| Notes: 5 | Sa | mple # SA 5 SS302 XD | is labeled | as | SA55S302DX and |
| Sa | nf | k # SAISS 314 XD is | labeled c | 5 | SAISS3WDX on jar |
| Correcti | ve A | ction: | | | |
| | c | lient's Name: | Informed verbally o | n: | By: |
| | С | lient's Name: | Informed in writing | on: | By: |
| | 5 | ample(s) processed "as is". | | | |
| | S | ample(s) on hold until: | | | If released, notify: |
| • | | ol Supervisor Review: (or designate) | lalke Do | te: <u>(</u> | 10801, |
| Linderry | remin | SIGNED ORIGINAL | AVIOR DE DEVEATATION | 731 7071 | IN DIA PROPERTY FOR |

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED

IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY HIS/HER INITIALS

AND THE DATE NEXT TO THAT ITEM

Form: SI.-ADMIN-0004, Revised 6/21/00 SOP Reference: STL-QA-0006



STL St. Louis 13715 Rider Trail North Earth City, MO 63045

Tel 314 298 8566 Fax 314 298 8757 www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. VA

St. Albans

Lot #: F0J240212

Tim Taylor

Stone & Webster Engineering Co 245 Summer Street Boston, MA 02210

SEVERN TRENT LABORATORIES, INC.

Ron Martino Project Manager

November 30, 2000

STL St. Louis is a part of Severn Trent Laboratories, Inc.

Case Narrative LOT NUMBER: F0J240212

This report contains the analytical results for the two samples received under chain of custody by STL St. Louis on October 24, 2000. These samples are associated with your St. Albans project.

All applicable quality control procedures met method-specified acceptance criteria.

Observations/Nonconformances

There were no anomalies with this analysis.

METHODS SUMMARY

F0J240212

PARAMETER

ANALYTICAL

PREPARATION

METHOD

METHOD ·

H-3 by Distillation & LSC by LSC STRONTIUM 90 Sr90-Y90 cal

EPA 906.0 MOD

SMWW 7500-SR MO

References:

EPA

"EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY

PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

SMWW

"STANDARD METHODS FOR WASTE WATER"

SAMPLE SUMMARY

F0J240212

| ₩O # | SAMPLE# | # CLIENT SAMPLE ID | DATE | TIME |
|----------------|------------|-----------------------|----------------------|------|
| DNNCG DNNCL | 001 002 | Ditor of men instance | 10/19/00 10/19/00 | |

NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

STONE & WEBSTER ENGINEERING CORPORATION

Client Sample ID: DRUM 001-LAB WATER

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F0J240212-001

Work Order: Matrix:

DNNCG WATER Date Collected: 10/19/00

1600

Date Received:

10/24/00 0845

| Parameter | Result | Qual | Total Uncert. (2 ₀ +/-) | мос | Prep Date | Analysis Date | Batch # | Yld % |
|------------------|----------------|-------------|--|-------------|--------------|---------------------|-----------|-------|
| TRITIUM (Distill | .) by EPA 906. | O MOD U | 160 | Ci/L 270 | 906,0 | MOD . 0 11/15/00 | 1 0319234 | |
| SR-90 BY GFPC SM | | | | Ci/L | | SR MOD | | |
| Strontium 90 | 183 | | 36 | 2 | 10/31/0 | | 0 0305170 | 74 |

STONE & WEBSTER ENGINEERING CORPORATION

Client Sample ID: DRUM 002-LAB WATER

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F0J240212-002

Work Order:

DNNCL

Matrix:

WATER

Date Collected: 10/19/00

1600

Date Received:

10/24/00 0845

| Parameter | Result | Qua1 | Total Uncert. (2 of/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|-----------------|-----------------|----------|------------------------------|------------|--------------|------------------|---------|-------|
| TRITIUM (Disti) | .1) by EPA 906. | O MOD | ρQ | i/L | 906.0 | MOD | | |
| Tritlum | -50 | U | 160 | 280 | 11/13/00 | 11/15/00 0 | 318234 | |
| SR-90 BY GFPC S | MWW 7500-SR MG | DD CO | pq | i/L | 7500-8 | R MOD | | |
| Strontium 90 | 195 | | 38 | . 2 | 10/31/0 | 0 11/13/00 0 | 305170 | 88 |

METHOD BLANK REPORT

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F0J240212

Matrix:

WATER

| | Result C SMWW 7500-SR 1 | | Total | | | Lab | | |
|---------------|----------------------------|---------|---------------------|-------------|--------------|------------------|-----------|-------|
| Parameter | Result | Qual | Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
| SR-90 BY GFPC | SMWW 7500-SR M | MOD | pCi/L | 7500-SR MOD | | F0J3 | 10000-170 | В |
| Strontium 90 | | U | 2.3 | 4.0 | 10/31/00 | 11/15/00 | 0305170 | 84 |
| TRITIUM (Dist | 111) by EPA 900 | 5.0 MOD | pCi/L | 906.0 MOD | | FOK1 | 30000-234 | B |
| Tritium | 10 | υ? | 150 | 260 | 11/13/00 | 11/15/00 | 0318234 | |



are incomplete without the case narrative.

MDC is determined using instrument performance only Bold results are greater than the MDC $\,$

? For informational purposes only. The result does not follow significant figures SOP U Result is less than the sample detection limit.

DUPLICATE EVALUATION REPORT

Quanterra, Inc. - Radiochemistry

ient Lot ID: k Order #:

F0J240212

Date Sampled:

10/10/00

Matrix:

DNNJ WATER

Date Received:

10/20/00

Total

Total

QC Sample ID

Parameter

Sample

Uncert. (2 o +/~)

0318234 (Sample)

Result % Yld

Uncert. (2 g+/-)

a Yld

Precision

TRITIUM (Distill) by EPA

pCi/L

906.0 MOD

F0J240228-013

Tritium

-180

U 150 Batch #:

-220 0318234 (Duplicate)

DUPLICATE

150

U

-21

%RPD

ata are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off error in calculated results

Result is less than the sample detection limit.

Laboratory Control Sample Report

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F0J240212

Matrix:

WATER

| | | Total | | Lab S | ample ID |
|-------------|----------------------------------|---------------------|---------------------|----------------|----------------------|
| Parameter . | Spike Amount Result | Uncert. (2 g+/-) | MDC | % Yld % Rec . | QC Control Limits |
| TRITIUM | (Distill) by EPA 906.0 MOD pCi/L | 906. | 0 MOD | FOK13 | 0000-234C |
| Tritium | 9990 9500 Batch #: 0318234 | 1000 | 300 AnalysisDate | 95 11/15/00 | . 74 - 122 |

Laboratory Control Sample/LCS Duplicate Report



Quanterra, Inc. - Radiochemistry

Client Lot ID: '

F0J240212

Matrix:

WATER

| | | | | | Total | | | Lab Sample ID | | | |
|---------------|-------|--------------|---|---------------------|------------|----------|-----------|--------------------------|--------|-------|--|
| Parameter | | Spike Amount | Result | Uncert. (2 c+/-) | | % Y1d | % Rec | QC Control Limits | Prec: | ision | |
| SR-90 BY GFPC | SMWW | 7500-SR MOD | *************************************** | pCi/L | 7500- | SR MOD | | F0J3 | 10000- | -170C | |
| strontium 90 | Spk 2 | 9.59 9.59 | 9.4 10.3 | | 2.4 2.2 | 88 81 | 98 107 | (34 - 126) (34 - 126) | 9 | RPD | |
| | | Batch #: | 0305170 | | | Analysi | .sDate: | 11/13/00 | | | |



STL ST. LOUIS

Radiochemical Analysis By

Severn Trent Laboratories Richland

2800 G.W. Way, Richland, Wa 99352, (509) 375-3131

Data Package Contains __/_ Pages

Report Nbr: 11892

| SDG Nbr | ORDER Nbr | CLIENT ID NUMBER | LOT Nbr | WORK ORDER | RPT DB ID | BATCH |
|---------|---|------------------|-------------|------------|-----------|---------|
| 15889 | | DRUM 001 | F0J24021200 | DNNCG1AD | 9DNNCG10 | 0304331 |
| | and a company of the control of the | DRUM 002 | F0J24021200 | DNNCL1AD | 9DNNCL10 | 0304331 |

1000

Comments:

CERTIFICATE OF ANALYSIS



STL Richland 2800 George Washington Way Richland, WA 99352-1613

Tel: 509 375 3131 Fax: 509 375 5590 www.stl-inc.com

STL St. Louis 13715 Rider Trail North Earth City, MO 63045

November 17, 2000

Attention: Ron Martino

Date Samples Received

October 25, 2000

Sample Type

Water

SDG Number

15889

Client

Stone and Webster

I. Introduction

On October 25, 2000 water samples were received by the STL Richland Laboratory for radiochemical analysis. Upon receipt, the samples were assigned the laboratory ID numbers to correspond with the client specific ID's as found on the first page of the attached report. The samples were logged into Lot F0J240212.

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Liquid Scintillation Counting
Carbon 14 by Method RICH-RC-5022

STL St. Louis November 17, 2000 Page 2



STL Richland

2800 George Washington Way Richland, WA 99352-1613

Tel: 509 375 3131 Fax: 509 375 5590

II. Quality Control

The analytical results for each analysis performed under SDG 15889 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Liquid Scintillation Counting

Carbon 14 by Method RICH-RC-5022

The LCS, batch blank, samples and sample duplicates results are within requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

Doug Swenson Project Manager

Drinking Water Method Cross References

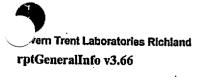
| DRINKING WAT | ER METHOD CROSS REFERENCE |
|---------------|--|
| Isotope(s) | STL Richland's SOP numbe |
| Cs-134, I-131 | RICH-RC-5017 |
| Alpha & Beta | RICH-RC-5014 |
| Ra-226 | RICH-RC-5005 |
| Ra-228 | RICH-RC-5005 |
| Sr89/90 | RICH-RC-5006 |
| Total Radium | RICH-RC-5027 |
| Uranium . | RICH-RC-5058 |
| Tritium | RICH-RC-5007 |
| | |
| | |
| | Isotope(s) Cs-134, I-131 Alpha & Beta Ra-226 Ra-228 Sr89/90 Total Radium Uranium |

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_e) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.





Date: 11/17/00

Sample Results Summary Severn Trent Laboratories Richland

REPORT No.: 11892

SDG NBR: 15889

| CLIENT ID | .WORK ORDER NUMBER | PARAMETER | RESULT | UNITS | YIELD | MDA | |
|--------------------|-----------------------|-----------|----------------------------|-------|---------|----------|---|
| DRUM 001 | DNNCG1AD | C-14 | 3.00E+00 +- 6.11E+00 (2s) | pCi/L | 100.00% | 9.11E+00 | * |
| DRUM 001 | DNNCG1AE . | C-14 | -4.25E+00 +- 5.75E+00 (2s) | pCi/L | 100.00% | 9.13E+00 | |
| DRUM 002 | DNNCL1AD | C-14 | 1.25E+00 +- 6.02E+00 (2s) | pCi/L | 100.00% | 9.11E+00 | |
| BLANK QC | DN2WR1AA | C-14 | -6.72E-01 +- 5.93E+00 (2s) | pCi/L | 100.00% | 9.11E+00 | |
| LCS | DN2WR1AC | C-14 | 3.87E+01 +- 9.01E+00 (2s) | pCi/L | 100.00% | 1.05E+01 | |
| Number of Results: | 5 | | , , , | • | | , | |

Comments:



Date: 11/17/00

FORM I

SAMPLE RESULTS

LAB NAME:

CLIENT ID:

STL Richland

DRUM 001

SDG:

15889

COLLECTION DATE: 10/19/00 4:00:00 PM

LOT,RPT DB ID:

F0J240212--00 9DNNCG10

REPORT NBR: 11892

ORDER NBR:

RECEIVED DATE:

MATRIX:

Water

| | | | | | *************************************** | | | | | | | | |
|---|----------|-------------------------|----------------------|----------|---|---------|---------|------------|------------------|-----------------|-------------|----------------|------------------|
| ISOTOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | RST/MDC | RST/CNTERR | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
| Batch: 0304331 C-14 Number of Results | 3.00E+00 | DNNCG1AD 1.9E-01 | 6.1E+00 | 9.11E+00 | pCi/L | 100.00% | 0.33 | (31.8) | 11/16/00 01:33 a | 0.2 | L | LSC6 | RICHRC5022 |



SAMPLE RESULTS

LAB NAME:

STL Richland

SDG:

15889

COLLECTION DATE: 10/19/00 4:00:00 PM

LOT,RPT DB ID:

F0J240212--00 9DNNCL10

REPORT NBR: 11892

RECEIVED DATE:

CLIENT ID:

DRUM 002

ORDER NBR:

MATRIX:

Water

| ISOTOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | RST/MDC R | ST/CNTERR | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER | • |
|--------------------|-------------|-------------------------|----------------------|-------------|----------------|---------|-------------|-----------|------------------|-----------------|-------------|----------------|------------------|---|
| Batch: 0304331 | Work Order: | DNNCL1AD | | | | ····· | | | | | | | | • |
| C-14 | 1.25E+00 | 8.0E-02 | 6.0E+00 | 9.11E+00 | pCi/L | 100.00% | 0.14 | (31.4) | 11/16/00 02:57 a | 0.2 | L | LSC6 | RICHRC5022 | |
| Mermhau at Casacit | | | | | | | | | | | | | | |

Number of Results: :1

Comments:



DUPLICATE RESULTS

LAB NAME:

STL Richland

SDG:

15889

COLLECTION DATE: 10/19/00 4:00:00 PM

RPT DB ID/ORIG ID: DNNCG1ER / 9DNNCG10

REPORT NBR: 11892

RECEIVED DATE:

CLIENT ID:

DRUM 001

ORDER NBR:

MATRIX:

Water

| ISOTO | PE R | ESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | ORIG RESULT | RPD | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|------------|---------|------------|-------------------------|-----------------------|----------|----------------|---------|----------------|----------|------------------|-----------------|-------------|----------------|------------------|
| Batch: 030 | 04331 W | ork Order: | DNNCG1AE | | | | | | | | | | | |
| C-1 | 4 -4 | .25E+00 | 2.8E-01 | 5.8E+00 | 9.13E+00 | pCi/L | 100.00% | 3.00E+00 | 1159.63% | 11/16/00 02:15 | 0.2 | L | LSC6 | RICHRC5022 |

Number of Results: 1



FORM II

Date: 11/17/00

BLANK RESULTS

LAB NAME:

STL Richland

SDG:

15889

ORDER NBR:

LOT,RPT DB ID: J0J300000-331 DN2WR1AX

REPORT NBR: 11892

MATRIX:

WATER

| ISOTOPE | RESULT | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDC | REPORT UNIT | YIELD | RST/MDC | RST/CNTERR | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|---|-----------|------------------------|----------------------|----------|----------------|---------|---------|------------|------------------|-----------------|-------------|----------------|------------------|
| Batch: 0304331 C-14 Number of Resul | -6.72E-01 | DN2WR1AA 4.4E-02 | 5.9E+00 | 9.11E+00 | pCi/L | 100.00% | -0.07 | -(30.9) | 11/16/00 12:09 2 | 0.2 | L | LSC6 | RICHRC5022 |

Comments:



LABORATORY CONTROL SAMPLE

LAB NAME:

STL Richland

SDG:

15889

ORDER NBR:

LOT,RPT DB ID: J0J300000-331 DN2WR1CS

REPORT NBR: 11892

MATRIX:

WATER

Date: 11/17/00

| ISOTOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | Expected | Expected Uncert | Recovery | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|------------------------|-------------------------|-------------------------|----------------------|----------|----------------|---------|----------|--------------------|----------|------------------|-----------------|-------------|----------------|------------------|
| Batch: 0304331 C-14 | Work Order: 3.87E+01 | DN2WR1AC 2.2E+00 | 9.0E+00 | 1.05E+01 | pCi/L | 100.00% | 4.62E+01 | 0.0E+00 | 83.63% | 11/16/00 12:51 | 0.2 | L | LSC6 | RICHRC5022 |

Number of Results: 1

Severn Trent Laboratories, Inc SAMPLE ANALYSIS REQUISITION

SDL 15889

LABORATORY:

ATTN:

STL Richland

2800 George Washington Way

Richland

WA 99352-1613.W

NEED ANALYTICAL REPORT BY 11/20/00

LAB PURCHASE ORDER: SR027163 CLIENT CODE: 378644 PROJECT MANAGER: Ron Martino NUMBER OF SAMPLES IN LOT: 0000 ANALYSIS REQUIRED. SAMPLE I.D. SAMPLING DATE 10/19/00 Carbon-14 by Liquid Scint F0J240212-001 (RC14) METHOD: C-14 by LSC DNNCG-1-AD 10/19/00 Carbon-14 by Liquid Scint F0J240212-002 (RC14) METHOD: C-14 by LSC DNNCL-1-AD NEED DETECTION LIMIT AND ANALYSIS DATE INCLUDED IN REPORT. SHIPPING METHOD: AIREBORNE DATE: 10/24/00 SEND REPORT TO: RON MARTINO Mentic DATE: 1025-00103C SAMPLE RECEIVED BY: PLEASE SEND A SIGNED COPY OF THIS FORM WITH REPORT AT COMPLETION OF ANALYSIS. THANK YOU. STL St. Louis 10/24/00 14:09:50 INT: STL Richland 2800 George Washington Way Richland WA 99352-1613.W DATE/TIME: 10.24.00 15:80 RELINQUISHED BY: DATE/TIME: RELINOUISHED BY: DATE/TIME: LIVED FOR LAB BY:

PLEASE RETURN ORIGINAL SAMPLE ANALYSIS REQUISITION



STL St. Louis 13715 Rider Trail North Earth City, MO 63045

Tel 314 298 8566 Fax 314 298 8757 www.stl-inc.com

ANALYTICAL DRAFT REPORT

PROJECT NO. VA

St. Albans

Lot #: F0J240212

Tim Taylor

Stone & Webster Engineering Co 245 Summer Street Boston, MA 02210

SEVERN TRENT LABORATORIES, INC.

Ron Martino Project Manager

November 27, 2000

STL St. Louis is a part of Severn Trent Laboratories, inc.

METHODS SUMMARY

F0J240212

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

H-3 by Distillation & LSC by LSC STRONTIUM 90 Sr90-Y90 cal

EPA 906.0 MOD SMWW 7500-SR MO

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY

PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

SMWW "STANDARD METHODS FOR WASTE WATER"

SAMPLE SUMMARY

F0J240212

| <u>WO #</u> | SAMPLE# | CLIENT SAMPLE | E ID | DATE | TIME |
|----------------|------------|------------------------------|------|----------------------|------|
| DNNCG DNNCL | 001 002 | DRUM 001-LAB DRUM 002-LAB | | 10/19/00 10/19/00 | |

NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: DRUM 001-LAB WATER

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F0J240212-001

Work Order: Matrix:

DNNCG

WATER

Date Collected: 10/19/00

1600

· Date Received:

10/24/00 0845

| Parameter | Result | Qua1 | Total Uncert. (2 o+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % . |
|----------------|------------------|-------|------------------------------|------|--------------|------------------|---------|---------|
| TRITIUM (Disti | .11) by EPA 906. | O MOD | . P | Ci/L | 906.0 | MOD | | • |
| Tritium | 0.0 | | 0.0 | 0.0 | 11/13/0 | | 0318234 | |
| SR-90 BY GFPC | SMWW 7500-SR MC | D O | p | Ci/L | 7500- | SR MOD | | |
| Strontium 90 | 183 | | 36 | 2 | 10/31/0 | 0 11/13/00 | 0305170 | 74 |

Client Sample ID: DRUM 002-LAB WATER

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F0J240212-002

Work Order:

DNNCL

Matrix:

WATER

Date Collected: 10/19/00 1600

Date Received:

10/24/00 0845

| Parameter | . Result | Qual | Total Uncert. (2 o+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|------------------|-------|------------------------------|------|--------------|------------------|---------|-------|
| TRITIUM (Dist | ill) by EPA 906. | 0 MOD | | ci/L | 906.0 | MOD | * | |
| Tritium | 0.0 | | 0.0 | 0.0 | 11/13/0 | 0 | 0318234 | |
| SR-90 BY GFPC | SMWW 7500-SR MC | Ď | Į | Ci/L | 7500~8 | er mod | | |
| Strontium 90 | 195 | | 38 | 2 | 10/31/0 | 0 11/13/00 | 0305170 | 88 |



METHOD BLANK REPORT

Quanterra, Inc. - Radiochemistry

Client Lot ID: F0J240212

Matrix:

WATER

| | | | Total. | | | Lab Sample ID | | | | |
|----------------|----------------|---------|---------------------|-------------|--------------|------------------|-----------|-------|--|--|
| Parameter | Result | Qual | Uncert. (2 o+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % | | |
| SR-90 BY GFPC | SMWW 7500-SR 1 | 10D | pCi/L | 7500-SR MOD | | F0J3 | 10000-170 | В | | |
| Strontium 90 | 0.8 | U | 2.3 | 4.0 | 10/31/00 | 11/15/00 | 0305170 | 84 | | |
| TRITIUM (Disti | 11) by EPA 906 | S.O MOD | · pCi/L | 906.0 MOD | | FOK1 | 30000-234 | В | | |
| Tritium | | | | | 11/13/00 | • | 0318234 | | | |

DUPLICATE EVALUATION REPORT

Quanterra, Inc. - Radiochemistry

ent Lot ID:

F0J240212

Order #:

DNNJ WATER Date Sampled:

10/10/00

Date Received: 10/20/00 .

Total

QC Sample ID

F0J240228-013

Parameter

SAMPLE

Uncert.

DUPLICATE Result

Uncert.

% Yld

Precision

TRITIUM (Distill) by EPA

Result

(20+/-)

906.0 MOD

(2 g +/-)

&RPD

Tritium

0.0

pCi/L

Batch #:

0318234 (Sample)

0318234 (Duplicate)

Data are incomplete without the case narrative. Calculations are performed before rounding to avoid round-off error in calculated results

Laboratory Control Sample Report

Quanterra, Inc. - Radiochemistry

Client Lot, ID:

F0J240212

Matrix:

WATER

Total

Lab Sample ID

Uncert.

QC Control

Parameter ·

Spike Amount Result

(2 g+/-)

% Yld % Rec

Limits

TRITIUM (Distill) by EPA 906.0 MOD

pCi/L

906.0 MOD

MDC

F0K130000-234C

Tritium

Batch #: 0318234

AnalysisDate

Laboratory Control Sample/LCS Duplicate Report

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F0J240212

Matrix:

WATER

| | | | Total | | | | Lab Sample ID | | | |
|---------------|-------|--------------|---------------------------------------|-------|---------------------|---------|---------------|----------------------|---------|-----|
| Parameter | | Spike Amount | Result | | Uncert. (2 g+/-) | % Yld | % Rec | QC Control Limits | Precis | on |
| SR-90 BY GFPC | SMWW | 7500-SR MOD | · · · · · · · · · · · · · · · · · · · | pCi/L | 7500- | SR MOD | | F0J3: | 10000-1 | 70C |
| Strontium 90 | | 9.59 | 9.4 | | 2.4 | 88 | 98 | (34 - 126) | | |
| | Spk 2 | 9.59 | 10.3 | | 2.2 | 81 | 107 | (34 - 126) | 9 | RPD |
| • | | Batch #: | 0305170 | | | Analysi | .sDate: | 11/13/00 | | |



STL ST. LOUIS

Radiochemical Analysis By

Severn Trent Laboratories Richland

2800 G.W. Way, Richland, Wa 99352, (509) 375-3131

Data Package Contains // Pages

Report Nbr: 11892

| SDG Nbr | ORDER Nbr | CLIENT ID NUMBER | LOT Nbr | WORK ORDER | RPT DB ID | ВАТСН |
|---------|-----------|------------------|-------------|------------|-----------|---------|
| 15889 | | DRUM 001 | F0J24021200 | DNNCG1AD | 9DNNCG10 | 0304331 |
| | | DRUM 002 | F0J24021200 | DNNCL1AD | 9DNNCL10 | 0304331 |



CERTIFICATE OF ANALYSIS

STL Richland 2800 George Washington Way Richland, WA 99352-1613

Tel: 509 375 3131 Fax: 509 375 5590 www.stl-inc.com

STL St. Louis 13715 Rider Trail North Earth City, MO 63045

November 17, 2000

Attention: Ron Martino

Date Samples Received

October 25, 2000

Sample Type

Water

SDG Number

15889

Client

Stone and Webster

I. Introduction

On October 25, 2000 water samples were received by the STL Richland Laboratory for radiochemical analysis. Upon receipt, the samples were assigned the laboratory ID numbers to correspond with the client specific ID's as found on the first page of the attached report. The samples were logged into Lot F0J240212.

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Liquid Scintillation Counting
Carbon 14 by Method RICH-RC-5022

STL St. Louis November 17, 2000 Page 2



STL Richland 2800 George Washington Way Richland, WA 99352-1613

Tel: 509 375 3131 Fax: 509 375 5590 www.stl-inc.com

II. Quality Control

The analytical results for each analysis performed under SDG 15889 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Liquid Scintillation Counting

Carbon 14 by Method RICH-RC-5022

The LCS, batch blank, samples and sample duplicates results are within requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

Doug Swenson

Project Manager

Drinking Water Method Cross References

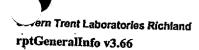
| | DRINKING WAT | ER METHOD CROSS REFERENC |
|---|---------------|--------------------------------|
| Referenced Method | Isotope(s) | STL Richland's SOP numbe |
| EPA 901.1 | Cs-134, I-131 | RICH-RC-5017 |
| EPA 900.0 | Alpha & Beta | RICH-RC-5014 |
| EPA 903.1 | Ra-226 | RICH-RC-5005 |
| EPA 904.0 | Ra-228 | RICH-RC-5005 |
| EPA 905.0 | Sr89/90 | RICH-RC-5006 |
| ASTM D2460-70 | Total Radium | RICH-RC-5027 |
| Standard Method 7500-U-C & ASTM D57174-91 | Uranium | RICH-RC-5058 |
| Iritlum | Tritium | RICH-RC-5007 |
| | | |
| NOTE: | | |
| 1010. | 1 . | ecified in the case narrative) |

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.





Sample Results Summary Severn Trent Laboratories Richland

REPORT No.: 11892

SDG NBR: 15889

| CLIENT ID | WORK ORDER NUMBER | PARAMETER | RESULT | UNITS | YIELD | MDA |
|--------------------|----------------------|-----------|----------------------------|---------|---------|------------|
| DRUM 001 | DNNCG1AD | C-14 | 3.00E+00 +- 6.11E+00 (2s) | · pCi/L | 100.00% | 9.11E+00 |
| DRUM 001 | DNNCG1AE | C-14 | -4.25E+00 +- 5.75E+00 (2s) | pCi/L | 100.00% | 9.13E+00 |
| DRUM-002 | DNNCL1AD | C-14 | 1.25E+00 +- 6.02E+00 (2s) | pCi/L | 100.00% | 9.11E+00 . |
| BLANK QC | DN2WR1AA | C-14 | -6.72E-01 +- 5.93E+00 (2s) | pCi/L | 100.00% | 9.11E+00 |
| LCS | DN2WR1AC | C-14 | 3.87E+01 +- 9.01E+00 (2s) | pCi/L | 100.00% | 1.05E+01 |
| lumber of Results: | 15 | | • | | | |

Comments:





SAMPLE RESULTS

LAB NAME:

CLIENT ID:

STL Richland

DRUM 001

SDG:

15889

COLLECTION DATE: 10/19/00 4:00:00 PM

LOT,RPT DB ID:

F0J240212--00 9DNNCG10

REPORT NBR: 11892

ORDER NBR:

RECEIVED DATE:

MATRIX:

Water

| | ESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT | YIELD | RST/MDC | RST/CNTERR | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|-------------|----------------------|-------------------------|----------------------|----------|--------|---------|---------|------------|------------------|-----------------|-------------|----------------|------------------|
| | ork Order: 00E+00 | DNNCG1AD 1.9E-01 | 6.1E+00 | 9.11E+00 | pÇi/L | 100.00% | 0.33 | (31.8) | 11/16/00 01:33 a | 0.2 | L. | LSC6 | RICHRC5022 |





SAMPLE RESULTS

LAB NAME:

STL Richland

SDG:

15889

COLLECTION DATE: 10/19/00 4:00:00 PM

LOT,RPT DB ID:

F0J240212-00 9DNNCL10

REPORT NBR: 11892

RECEIVED DATE:

CLIENT ID:

DRUM 002

ORDER NBR:

MATRIX:

Water

| ISOTOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | RST/MDC 1 | RST/CNTERR | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|-------------------|-------------|-------------------------|----------------------|----------|----------------|---------------------------------------|-----------|------------|------------------|-----------------|-------------|----------------|------------------|
| Batch: 0304331 | Work Order: | DNNCL1AD | | | | · · · · · · · · · · · · · · · · · · · | | | | *** | | | |
| C-14 | 1.25E+00 | 8.0E-02 | 6.0E+00 | 9.11E+00 | pCi/L | 100.00% | 0.14 | (31.4) | 11/16/00 02:57 a | 0.2 | L | LSC6 | RICHRC5022 |
| Number of Results | s: <u>1</u> | | | | | | | , | | | _ | | |



FORM II **DUPLICATE RESULTS**

LAB NAME:

STL Richland

SDG:

15889

COLLECTION DATE: 10/19/00 4:00:00 PM

RPT DB ID/ORIG ID: DNNCG1ER / 9DNNCG10

REPORT NBR: 11892

RECEIVED DATE:

CLIENT ID:

DRUM 001

ORDER NBR:

MATRIX:

Water

| ISOTOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | ORIG RESULT | RPD | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|------------------------|--------------------------|-------------------------|-----------------------|----------|----------------|---------|----------------|----------|------------------|-----------------|-------------|----------------|------------------|
| Batch: 0304331 C-14 | Work Order: -4.25E+00 | DNNCG1AE 2.8E-01 | 5.8E+00 | 9.13E+00 | pCi/L | 100.00% | 3.00E+00 | 1159.63% | 11/16/00 02:15 | 0.2 | l. | LSC6 | RICHRC5022 |



BLANK RESULTS

LAB NAME:

STL Richland

SDG:

15889

ORDER NBR:

LOT,RPT DB ID:

J0J300000-331 DN2WR1AX

REPORT NBR: 11892

MATRIX:

WATER

Date: 11/17/00

| ISOTOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2s) | М́DС | REPORT UNIT | YIELD | RST/MDC | RST/CNTERR | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|---|--------------------------|-------------------------|----------------------|----------|----------------|---------|---------|------------|------------------|-----------------|-------------|----------------|------------------|
| Batch: 0304331 C-14 Number of Resul | Work Order: -6.72E-01 | DN2WR1AA 4.4E-02 | 5.9É+00 \ | 9.11E+00 | pCi/L· | 100.00% | -0.07 | -(30.9) | 11/16/00 12:09 a | 0.2 | Ļ | LSC6 | RICHRC5022 |

Comments:





FORM II

LABORATORY CONTROL SAMPLE

LAB NAME:

STL Richland

SDG:

15889

ORDER NBR:

LOT, RPT DB ID:

J0J300000-331 DN2WR1CS

REPORT NBR: 11892

MATRIX:

WATER

| ISC | TOPE | RESULT | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDC | REPORT UNIT | YIELD | Expected | Expected Uncert | Recovery | ANALYSIS DATE | ALIQUOT SIZE | ALQ UNIT | DETECTOR ID | METHOD NUMBER |
|--------|-----------------|-------------------------|-------------------------|----------------------|----------|----------------|---------|----------|--------------------|----------|------------------|-----------------|-------------|----------------|------------------|
| Batch: | 0304331 C-14 | Work Order: 3.87E+01 | DN2WR1AC 2.2E+00 | 9.0E+00 | 1.05E+01 | pCi/L | 100.00% | 4.62E+01 | 0.0E+00 | 83.63% | 11/16/00 12:51 | 0.2 | L | LSC6 | RICHRC5022 |

Severn Trent Laboratories, Inc SAMPLE ANALYSIS REQUISITION

SDL 15889

LABORATORY:

STL Richland

2800 George Washington Way

D DETECTION LIMIT AND ANALYSIS DATE INCLUDED IN REPORT.

Richland

WA 99352-1613,W

NEED ANALYTICAL REPORT BY 11/20/00

ATTN:

LAB PURCHASE ORDER: SR027163

CLIENT CODE:

378644

PROJECT MANAGER: Ron Martino

NUMBER OF SAMPLES IN LOT: 0000

| SAMPLE I.D. F0J240212-001 DNNCG-1-AD | SAMPLING DATE 10/19/00 | ANALYSIS REQUIRED Carbon-14 by Liquid Scint (RC14) METHOD: C-14 by LSC | 14) |
|--|---------------------------|---|------|
| F0J240212-002 DNNCL-1-AD | 10/19/00 | Carbon-14 by Liquid Scint (RC14) METHOD: C-14 by LSC | 1617 |

| SHIPPING METHOD: AIREBORNE | DATE: 10/24/00 |
|------------------------------|--|
| SEND REPORT TO: RON MARTINO | |
| SAMPLE RECEIVED BY: | LC DATE: 1025-00103C |
| | ORM WITH REPORT AT COMPLETION OF ANALYSIS. |
| THANK YOU. | |
| STL St. Louis | 3 |
| | INT: 10/24/00 14:09:50 |
| | ************************************** |
| STL Rich | nland |
| 2800 Geo | orge Washington Way |
| Richland | - · · |
| . , | |
| RELINQUISHED BY: John Wolfer | DATE/TIME: 10.24:00 15:80 |
| RELINQUISHED BY: | DATE/TIME: |
| RECEIVED FOR LAB BY: | DATE/TIME: |
| DIENCE DETENT OPTOTAL | CAMPLE ANALYCIC DEGUICIONOM |

ANALYTICAL DRAFT REPORT

PROJECT NO. VA

St. Albans

Lot #: F0J160127

Tim Taylor

Stone & Webster Engineering Co 245 Summer Street Boston, MA 02210

SEVERN TRENT LABORATORIES, INC.

Ron Martino Project Manager

October 24, 2000

METHODS SUMMARY

F0J160127

PARAMETER

ANALYTICAL PREPARATION METHOD

Trace Inductively Coupled Plasma (ICP) Metals

SW846 6010B

SW846 1311/3010

References:

SW846

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

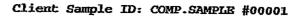
SAMPLE SUMMARY

F0J160127

| WO # 1 | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|--------|---------|-----------------------------|----------|-------|
| DM7QG | 001 | COMP.SAMPLE #00001 | 09/21/00 | 16:00 |
| DM7QM | 002 | LAB 0010 GREEN TILE | 10/13/00 | 09:00 |
| DM7QP | 003 | LAB 0011 YELLOW PAINT | 10/13/00 | |
| DM7QQ | 004 | LAB 0012 DRAIN CONCRETE | 10/13/00 | |
| DM7QT | 005 ' | LAB 0013 COUNTING RM. METAL | 10/13/00 | 09:00 |

NOTE (S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.



TCLP Metals

Lot-Sample #...: F0J160127-001

Date Sampled...: 09/21/00 16:00 Date Received..: 10/14/00

Leach Date....: 10/19/00

Leach Batch #..: P029303

REPORTING

PREPARATION-WORK

Matrix..... SOLID

PARAMETER

RESULT LIMIT

ANALYSIS DATE ORDER #

Prep Batch #...: 0294361

Cadmium 15800 125

ug/L

UNITS

SW846 6010B

10/20-10/23/00 DM7QG1AD

Dilution Factor: 2.5

Analysis Time..: 15:58

NOTE(S):

Client Sample ID: LAB 0010 GREEN TILE

TCLP Metals

Lot-Sample #...: F0J160127-002

Matrix..... SOLID

Date Sampled...: 10/13/00 09:00 Date Received..: 10/14/00

Leach Date....: 10/19/00

Leach Batch #..: P029303

PREPARATION-WORK

PARAMETER

RESULT

LIMIT

ANALYSIS DATE ORDER #

Prep Batch #...: 0294361

ND

125

ug/L

SW846 6010B

10/20-10/23/00 DM7QM1AD

Dilution Factor: 2.5

REPORTING

Analysis Time..: 16:02

NOTE (S):

Cadmium

Client Sample ID: LAB 0011 YELLOW PAINT

TCLP Metals

Lot-Sample #...: F0J160127-003

Date Sampled...: 10/13/00 09:00 Date Received..: 10/14/00

Leach Date....: 10/19/00

Matrix..... SOLID

Leach Batch #..: P029303

REPORTING

LIMIT

PREPARATION-WORK

PARAMETER

RESULT

UNITS

ANALYSIS DATE

ORDER #

ug/L

SW846 6010B

METHOD

Prep Batch #...: 0294361

Cadmium

125 Dilution Factor: 2.5

Analysis Time..: 16:07

10/20-10/23/00 DM7QP1AD

NOTE(S):

Client Sample ID: LAB 0012 DRAIN CONCRETE

TCLP Metals

Lot-Sample #...: F0J160127-004

Matrix....: SOLID

Date Sampled...: 10/13/00 09:00 Date Received..: 10/14/00 Leach Date....: 10/19/00

Leach Batch #..: P029303

REPORTING

PREPARATION-WORK

PARAMETER

RESULT

UNITS

ANALYSIS DATE

ORDER #

LIMIT

Prep Batch #...: 0294361 Cadmium

ND

125 ug/L SW846 6010B

10/20-10/23/00 DM7QQ1AD

Dilution Factor: 2.5

Analysis Time..: 16:12

NOTE (S):



Client Sample ID: LAB 0013 COUNTING RM. METAL

TCLP Metals

Lot-Sample #...: F0J160127-005

Date Sampled...: 10/13/00 09:00 Date Received..: 10/14/00

Leach Date....: 10/19/00

Leach Batch #..: P029303

REPORTING

LIMIT

PREPARATION- WORK
ANALYSIS DATE ORDER #

Matrix..... SOLID

PARAMETER RESULT

Prep Batch #...: 0294361

Cadmium ND

125 ug/L

SW846 6010B

METHOD

10/20-10/23/00 DM7QT1AD

Dilution Factor: 2.5 A

Analysis Time..: 16:26

NOTE(S):

METHOD BLANK REPORT

TCLP Metals

Client Lot #...: F0J160127

Matrix..... SOLID

REPORTING

PREPARATION-WORK

PARAMETER

RESULT LIMIT UNITS

125

ANALYSIS DATE ORDER #

MB Lot-Sample #: F0J190000-297 Prep Batch #...: 0294361

Leach Date....: 10/19/00

Leach Batch # ..: P029303

ug/L

SW846 6010B

10/20-10/23/00 DNEV81AA

Cadmium

Dilution Factor: 2.5

Analysis Time..: 15:44

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

O'ERIEN & GERE LABORATORIES, INC.

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Direct Line For No. (315) 463-7554

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COMPANY: Stone 1 was fan

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LABORATORY ANALYSIS REPORT

CLIEN:

Sevent Trent Laboratories

PROJECT:

V.A. St. Albana

NS

Project 1: 1013 NUMBER:

8095.001.510 A CONT HEOSIA

MBTHOD: . CERTIFICATION:

10155

Air Sample Amelysis Results

| : | SAMPLE | SAMPLE | FIBERS/ | FIBERS | | | |
|---|--------|-------------------|---------|----------|--|--------------|--------------|
| _ | | DATE | MM2 | <u> </u> | LOCATION | ACTIVITY | SAMPLETYPE |
| | 01 | . 09/19/00 | 28.0 | 0.012 | OWA-Ioside X-Ray | Monitoring | Beckground |
| | | | | | room | | • |
| | 02 | 09/19/00 | <12.7 | ₹0,005 | OWA-Outside mont | Monitoring | Beckground |
| | . 03 | D9/19/00 | 26.8 | 0.011 | OWA-Corridor by exit close #RT5 | producing. | Beskground |
| | 04 | Ó9/19/00 | 37,5 | 0.015 | OWA-Consider by mean | Monitoring | Background |
| • | 05 | 09/19/00 | 40.8 | 0.016 | OWA-Corridor 7Ft in front of double doors | Monitoring | Background . |
| | 06 | 09/19/00 · | . 36.9 | 0.015 | IWA-Off remp North | Monitoring . | Background. |
| | 07 | 09/19/00 | 30.6 | 0.012 | TWA-7 FL off ramp Southeast | Monitoring | Background |
| | . 80 | 09/19/00 | 28,0 | 0.012 | IWA-10FL off the ramp East | Monitoring | Background |
| | 09 | 09/19/00 | 40,8 | .0.017 | IWA-10 Ft. off the ringip West | Monitoring | Background |
| | 10 | 09/19/00 | 35.0 | 0,014 | IWA-7 Pt. off xamp Northwest | Monitoring | Background · |
| | FBI | 09/19/00 | <12.7 | NA | Field Blank | Monitoring | Background |
| | | | | | | | |

Analysis Only Performer. By O'Brien & Gere Laboratories, Inc.

< less than

> GREATER THAN

Blank results are enquessed in fibers per sequent millioniers.

Only fiber counting parformed by O'Brien & Gree Laboratories Personnel. Laboratory not responsible for sample collection.

AUTHORIZED: ELA Helek

DATE: 09/22/00 PAGE: I



O'Brain & Gare Unterstance, Inc., an O'B' on & Gore examply 5000 Brainfast Partney, PD, Ear AND, Byrocuse, New York 1922' (1888 - 3) (2001) FAR (319), 1921 SEP - Will werening som ... and offices for major U.S. action

PAGE: 003,003



LABORATORY ANALYSIS REPORT

CLIENT:
PROJECT:
Project #:
JOB NUMBER:
METHOD:
CERTIFICATION:

Seven Thout Laboratories V.A. St. Albara

8095,001.510 NIOSH 7400.A 10155

H

09/19/00

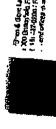
Andysis Only Perlumed Ey O'Brien & Gere Laborator

< LESS THAN
> GREATER THAN
Bisic remits on copressed a fibers per square millionars.

Only fiber counting performed by Officia & Caro Lebentaries Pens Lebonstay not responsible & c sample collection.

AUTHORIZED

DATE: 09/22/00 PAGE: 2





Facsimile

Date:

9-25-00

To:

GREGOR PETRANEK

Company:

TAYLOR ENVIRONMENTAL

Phone:

516-358-2955

Fax:

516-358 - 1780

From:

Marc Bianco / John Devine

Phone:

718-298-8613

Fax:

: 718-298-8611

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GREGOR,

ATTACHED ARE THE BACKGROUND AIR MONITORING AND THE MASTIC RESULTS FOR ST. ALBANS.

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THANKS.

USACE St. Albans VA Site Linden & 179th Streets Queens, NY 11425 Field Phone: 617-592-4338 www.stoneweb.com

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RESULT

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9-25-00

To:

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Company:

TAYLOR ENVIRONMENTAL

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Direct Line Fax No. (315) 463-7554

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C)



CABORATORIES, NO.

LABORATORY ANALYSIS REPORT

CLIENT:
PROJECT:
Project#:
JOB NUMBER:
METHOD: ZS Severn Trent Laboratories
V.A. St. Albans

CERTIFICATION: 8095.001.510 NIOSH 7402 10155

THM Air Sample Analysis Results

| 8 | : 6 | \$ | 8 | 8 | 01 | SAMPLE # |
|-------------|---------------|-------------|----------------|----------|-------------|------------------------------|
| 10/10/00 | 10/10/00 | 10/10/00 | 10/10/00 | 10/10/00 | 10/10/00 | SAMPLE DATE |
| 0.061 | 0.021 | 0.034 | 0.021 | 0.029 | 0.046 | PCM fco |
| 40.001 | 40.001 | 0.001 | ₽.001 | 0.001 | 40.001 | TEM Asbestos fico |
| 0.009 (NSD) | (CISN) 010.0 | 0.011 (NSD) | 0.015 (NSD) | 0.013 | 0.032 (NSD) | TEM Non-Asbestos |
| ı | I | I | 1 | 0.0625 | | Optically Viable Fraction |
| 190.05 | ∆ .021 | <0.034 | ⇔ 0.029 | 40.001 | 40,046 | Adjusted PCM ffca |

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

NSD - No structures detected.
< LESS THAN
> GREATER THAN

AUTHORIZED

Only fiber counting performed by O'Brien & Gere Laboratories Personnel. Laboratory not responsible for sample collection.

DATE: 10/16/00 PAGE: 1



| O'BRIEN & | GERE LABORATORIES | TNIC |
|-----------|-------------------|------|
|-----------|-------------------|------|

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| OCT-12-00 10:00 THU | TELD | IDJENUIRONYEN | TAL PAGE: 00 | 11 R=974 |
| PAGE: 0017003 | 1198865 817:0T | <u> </u> | FROM: ENVIRONMENTAL | 001-15-00 10:02 |



CLIENT:

Severn Trent Laboratories

PROJECT:
Project #:

St. Albans VA Care Facility

JOB NUMBER:

Bld, #90 Bsmt, Lab 8095.001.510

METHOD:

NIOSH 7400 A

CERTIFICATION:

10155

Air Sample Analysis Results

| • | • | | | TOTAL STATE | | |
|-------------|----------------------|----------------|----------|---|--------------------------|------------------|
| Sample # | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ | • | ٠. | |
| • 01 | 10/10/00 | 118.5 | 0.046 | OWA-1st FL 7 ft in front of | ACTIVITY | SAMPLE TYPE |
| . 02 | 10/10/00 | 79.0 | 0,029 | stairwell to Bent. OWA-At Bent, entrance | Monitoring | During |
| 03 | 10/10/00 | 55,4 | 0.021 | door. | Monitoring | During |
| 04 | 10/10/00 | 89,2 | 0.034 | OWA-Bant. corridor 7ft East from room #RT-4B. | Monitoring | During |
| · 05 | 10/10/00 | 56.1 | 0.021 | OWA-inside personel decon clean room. | Monitoring | During |
| 06 | 10/10/00 | 163,3 | | OWA-Outside personel / waste decon units. | Monitoring | During |
| 07 | 10/10/00 | | 0.061 | OWA-Inside waste decon unit - holding area | Monitoring | During. |
| 08 | 10/10/00 | <12.7 | <0.005 | IWA-Inside work area Southeast | Monitoring | During |
| FB1 | | <127 | <0.004 | OWA-At negative air machine exhaust | Monitoring | . During |
| FB2 | 10/10/00 10/10/00 | <12.7 <12.7 | na Na | Field Blank Field Blank | Monitoring Monitoring | During During |

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

VOID - Sample over loaded, sample not analyzed. < LESS THAN

· OREATER THAN

Hank results are expressed in fibers per square millimeters.

AUTHORIZED:

Inly fiber counting performed by O'Brien & Gere Laboratories Personnel. aboratory not responsible for sample collection.

DATE: 10/12/00 PAGE: 1





CLIENT: PROJECT:

Severn Trent Laboratories

Project#:

St. Albans VA Care Facility

JOB NUMBER: METHOD:

Bld. #90 Bamt Lab 8095.001.510 .NIOSH 7400 A

CERTIFICATION:

10155

Air Sample Analysis Results

| SAMPLE # | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ CC | LOCATION | | |
|-------------|----------------|----------------|---------------|--|------------|-------------|
| 01 | 10/10/00 | 32,5 | 0.013 | | ACTIVITY | SAMPLE TYPE |
| 02 | 10/10/00 | 39.5 | | OWA-1st fl. 7ft in front of stairwell to Bant. | Monitoring | PRE |
| | • | 37.0 | 0.016 | OWA-At Bant, entrance door. | Monitoring | PRE |
| 03 | 10/10/00 | 29.3 | 0.012 | OWA-Bant, consider 7ft | Monitoring | PRE |
| 04 | 10/10/00 | 34,4 | 0.014 | East from room #RT-4B OWA-Inside personel | Monitoring | |
| 05 | 10/10/00 | 34.4 | 0.014 | decon. clean room. OWA-Outside personel & | | PRE |
| GG | 10/10/00 | VOID | VOID | Waste decon, units. | Monitoring | PRE . |
| 07 | 10/10/00 | 57.3 | 0.023 | IWA North | Monitoring | PRE |
| 08 | 10/10/00 | VOID | VOID | IWA-South | Monitoring | PRE · |
| 09 | 10/10/00 | <12.7 | <0.005 | IWA-Center | Monitoring | PRE |
| 10 . | 10/10/00 | <12.7 | <0.005 | IWA-Northeast | Monitoring | PRE |
| 11 | 10/10/00 | <12.7 | <0.005 | IWA-Southeast | Monitoring | PRE |
| | | | -0.005 | OWA-At negative air | Monitoring | PRE |
| FB1 | 10/10/00 | <12.7 | NA | machine exhaust | _ | |
| FB2 | 10/10/00 | <12.7 | NA. | Field Blank | Monitoring | PRE |
| , | - | 3 | | Field Blank | Monitoring | PRE |

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

VOID - Sample over loaded, sample not analyzed.

< Less than

> Greater than

Blank results are expressed in fibers per square millimeters.

Only fiber counting performed by O'Brien & Gere Laboratories Personnel. Laboratory not responsible for sample collection.

AUTHORIZED:

DATE: 10/12/00 PAGE: 1

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CLIENT:

Severn Trent Laboratories

PROJECT:

V.A. St. Albans

Project#:

NS

JOB NUMBER: METHOD:

8095.001.510 NIOSH 7400 A

CERTIFICATION:

10155

Air Sample Analysis Results

| SAMPLE # | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ CC | LOCATION | 4 (1777) YAFE | |
|-------------|----------------|----------------|---------------|----------------------|----------------|----------------|
| 01 | 10-11-00 | VOID | VOID | IWA-North side | ACTIVITY | SAMPLE TYPE |
| 02 | : 10-11-00 | VOID | VOID | | Monitoring | Ambient |
| 03 | 10-11-00 | VOID | | IWA-West side | Monitoring | Ambient |
| · 04 | 10-11-00 | | VOID | IWA-East side | Monitoring | Ambient |
| 05 | | AOID | VOID | TWA-Center | Monitoring | Ambient |
| 06 | 10-11-00 | AOID | AOID | IWA-South side | Monitoring | Ambient |
| U.O. | 10-11-00 | 31.8 | 0.007 | OWA-Bamt corridor by | Monitoring | Ambient |
| 07 | j | | | 100m#RT-9 | | - |
| U <i>j</i> | 10-11-00 | 22.9 | 0,005 | OWA-Bant in Xray | Monitoring | Á |
| | 1 | | • | room | Transfer Marie | Ambient. |
| Q8 | 10-11-00 | 29.3 | 0.006 | OWA-Bsmt by axit | Monitoring | |
| | 1 | | | door RT-5 | TACHTOUTHE | <u>Ambient</u> |
| 09 | 10-11-00 | 20,4 | 0.004 | OWA-Bant consider by | Monitoring | |
| | | | | room#RT-4-B | MOUTOTHE | Ambient |
| 10 | 10-11-00 | VOID | VOID | OWA-1st floor by | % r | |
| | | | | entrance | Monitoring | Ambient |
| FB1 | 10-11-00 | <12.7 | NA. | Field Blank | | • |
| FB2 | 10-11-00 | <12.7 | NA | | Monitoring | Ambient |
| | | | TALL | Field Blank | Monitoring | Ambient |
| | } | | | | | |

Analysis Only Performed By O'Brien & Gero Laboratories, Inc.

VOID - Sample overloaded, sample not analyzed.

< Less than

> GREATER THAN

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DATE: 11/13/00 PAGE: 1



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CLIENT:

Seven Trent Laboratories

PROJECT:

V.A. St. Albans

Project #:

N\$

JOB NUMBER:

8095.001.510 **NIOSH 7402**

METHOD: CERTIFICATION:

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10155

TEM Air Sample Analysis Results

| SAMPLE , | SAMPLE DATE | PCM f/cc | TEM Asbestos f/cc | TEM Non-Asbestos f/cc | Optically Viable Fraction | Adjusted PCM f/cc |
|------------|----------------|----------|-------------------------|--------------------------|------------------------------|----------------------|
| 02 | 10/18/00 | 0.025 | <0.001 | 0,003 (NSD) | ### | <0.025 |
| 05 | 10/18/00 | 0.025 | <0.001 | 0.001 | 0.333 | 0.008 |
| 03 | 10/19/00 | <0.003 | <0.001 | <0.001 (NSD) | we . | <0,003 |
| | 10/19/00 | <0.003 | <0.001 | <0.001 (NSD) | _ | <0.003 |
| 08 | 10/19/00 | 0.014 | <0.001 | 0.019 (NSD) | | <0.014 |
| 01 ! | | 0.025 | <0.001 <0.001 | 0.024 (NSD) | | <0.025 |
| . II 18 | 10/19/00 | 0.023 | 0.003 | 0.004 | 0.429 | 0.003 |

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NSD - No structures detected.

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AUTHORIZED: Joyh 2 h for

DATE: 10/27/00

PAGE: 1

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Severn Trent Laboratories

PROJECT:

V.A. St. Albans

Project#:

NS

JOB NUMBER: METHOD: 8095,001.510 NIOSH 7400 A

CERTIFICATION:

10155

Air Sample Analysis Results

| SAMPLE | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ CC | LOCATION | ACTIVITY | SAMPLE TYPE |
|---------|----------------|----------------|---------------|--|------------|-------------|
| # 01 | 10/18/00 | 45.9 | 0.016 | OWA-Bldg. #90 1st | Monitoring | During |
| | | | | floor by entrance | • | Dualas |
| 02 | 10/18/00 | 73.2 | 0.025 | OWA-Bent, Bldg, #90 by stairwell | Monitoring | During |
| 03 - | 10/18/00 | 63.7 | 0.022 | OWA-Bsmt. Bldg. #90 by room #RT-4-B | Monitoring | During |
| 04 | 10/18/00 | 38.2 | 0.013 | OWA-Outside personal & waste decon units | Monitoring | During |
| 05 | 10/18/00 | 66.2 | 0.025 | OWA-Inside personal decon clean room | Monitoring | During |
| 06 | 10/18/00 | VOID | VOID | OWA-Inside waste decon holding area | Monitoring | During |
| 07 | 10/18/00 | 19.1 | 0.007 | OWA-At negative air machine exhaust | Monitoring | During |
| 08 | 10/18/00 | 27.4 | 0.009 | OWA-Bldg. #90 1st floor by entrance | Monitoring | During |
| | 10/18/00 | 15.3 | 0.005 | OWA-Bamt. Bldg. #90 by stairwell | Monitoring | . During |
| 10 | 10/18/00 | 47.1 | 0.016 | OWA-Bsmt. Bldg. #90 by room #RT-4-B | Monitoring | During |

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VOID - Sample overloaded, sample not analyzed.

< LESS THAN

> GREATER THAN

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AUTHORIZED:

DATE: 10/30/00 PAGE: 1

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PROJECT:

V.A. St. Albans

Project#:

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JOB NUMBER: METHOD: 8095,001.510 NIOSH 7400 A

CERTIFICATION:

10155

| • | | •. | | | | |
|--------|----------|---------|--------|---|------------|-------------|
| SAMPLE | SAMPLE | FIBERS/ | FIBERS | | | C |
| ## | DATE | MM2 | CC | LOCATION | ACTIVITY | SAMPLE TYPE |
| 11 | 10/18/00 | 26.1 | 0.010 | OWA-Outside personal & waste decon units | Monitoring | During |
| 12 | 10/18/00 | 25.5 | 0.009 | OWA-Inside personal decon clean room | Monitoring | During |
| 13 | 10/18/00 | VOID | VOID | OWA-Inside waste decon holding area | Monitoring | During |
| 14 | 10/18/00 | 24.6 | 0.008 | OWA-At negative air machine exhaust | Monitoring | During |
| 15 | 10/18/00 | 35.7 | 0.019 | OWA-Bldg. #90 1st floor by entrance | Monitoring | During · |
| 16 | 10/18/00 | 45.2 | 0.026 | OWA-Bsint, Bldg. #90 by stairwell | Monitoring | During |
| 17 | 10/18/00 | 20.4 | 0.011 | OWA-Bsmt. Bldg. #90 by room #RT-4-B | Monitoring | During |
| 18 | 10/18/00 | <12.7 | <0.007 | OWA-Outside personal & waste decon units | Monitoring | During |
| 19 | 10/18/00 | 33.1 | 0.018 | OWA-Inside personal decon olean room | Monitoring | During |
| 20 | 10/18/00 | <12.7 | <0.007 | OWA-Inside waste decon holding area | Monitoring | During |
| 21 | 10/18/00 | 35.7 | 0.021 | OWA-At negative air machine exhaust | Monitoring | During |
| FB1 | 10/18/00 | <12.7 | NA | Field Blank | Monitoring | During |

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

VOID - Sample overloaded, sample not analyzed.

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AUTHORIZED: MA Selve

DATE: 10/30/00 PAGE: 2



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C)



CABORATORIES, NO.

LABORATORY ANALYSIS REPORT

Severn Trent Laboratorics V.A. St. Albans

CLIENT:
PROJECT:
Project #
JOB NUMBER:
METHOD:
CERTIFICATION: 8095.001.510 NIOSH 7400 A 10155 z

SAMPLE SAMPLE DATE 10/18/00 10/18/00 MAD A12.7 <12.7 PHERS/ CC NA Field Blank Field Blank LOCATION Monitoring Monitoring ACTIVITY SAMPLE TYPE During During

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

VOID - Sample overloaded, sample not analyzed. < LESS THAN

> GREATER THAN

Blank results are expressed in fibers per square millimeters.

AUTHORIZED:

DATE: 10/30/00 PAGE: 3

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CLIENT:

Severn Trent Laboratories

PROJECT:

V.A. St. Albans

Project #:

NS

JOB NUMBER: METHOD: 8095.001.510 NIOSH 7400 A

CERTIFICATION:

10155

Air Sample Analysis Results ·

| Sample # | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ CC | LOCATION | ACTIVITY | SAMPLE TYPE |
|---------------|----------------|----------------|---------------|-----------------------------------|------------|-------------|
| 01 | 10/18/00 | VOID | VOID | Edward Johnson SS# 097-56-8560 | Monitoring | OSHA |
| 62 . · | 10/18/00 | VOID | VOID | Edward Johnson SS# 097-56-8560 | Monitoring | OSHA |
| FB1 | 10/18/00 | <12.7 | NA | Field Blank | Monitoring | OSHA. |
| FB2 | 10/18/00 | <12.7 | NA | Field Blank | Monitoring | OSHA |

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VOID - Sample overloaded, sample not analyzed.

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Blank results are expressed in fibers per square millimeters.

AUTHORIZED: May Sule.

DATE: 10/30/00 RAGE: 1

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CLIENT:

Severn Trent Laboratories

PROJECT:

V.A. St. Albans

Project #:
JOB NUMBER:

NS

METHOD:

8095,001.510 NIOSH 7400 A

CERTIFICATION:

10155

Air Sample Analysis Results

| | SAMPLE # | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ CC | LOCATION | ACTIVITY | SAMPLE TYPE |
|---|----------|----------------|----------------|---------------|---|------------|-------------|
| | 01 | 10/19/00 | 39.5 | 0.014 | OWA-Bldg. #90 1st floor by entrance | Monitoring | . During |
| | 02 | 10/19/00 | 36.3 | 0.013 | OWA-Bsmt. Bldg. #90 by stairwell | Monitoring | During |
| • | 03 | 10/19/00 | 1 45.9 | 0.016 | OWA-Bsmt, Bldg, #90 by room #RT-4-B | Monitoring | During |
| | 04 | 10/19/00 | VOID | VOID | OWA-Outside personal & waste decon units | Monitoring | During |
| | 05 | 10/19/00 | VOID | VOID | OWA-Inside personal decon clean room | Monitoring | During . |
| | 06 | 10/19/00 | VOID | VOID | OWA-Inside waste decon holding area | Monitoring | During . |
| | 07 | 10/19/00 | <12.7 | <0.004 | OWA-At negative air machine exhaust | Monitoring | During . |
| | 08 | 10/19/00 | 17.8 | 0.006 | OWA-Bldg. #90 1st floor by entrance | Monitoring | During |
| • | .09 | 10/19/00 | 49.0 | 0.017 | OWA-Bsmt. Bidg. #90 by stairwell | Monitoring | During |
| | 10 | 10/19/00 | 29.3 | 0.011 | OWA-Bsmt. Bldg. #90 by room #RT-4-B | Monitoring | During |

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

VOID - Sample overloaded, sample not analyzed.

< LESS THAN

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AUTHORIZED: MA July

DATE: 10/30/00 PAGE: 1



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CLIENT: PROJECT: Severn Trent Laboratories

Project#: ·

V.A. St. Albans

JOB NUMBER:

NS

METHOD:

8095.001.510 **NIOSH 7400 A**

CERTIFICATION:

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| | | • | | | • | • | |
|---|--------|----------|---------|---------|---|------------|-------------|
| | SAMPLE | Sample | FIBERS/ | FIBERS/ | | | |
| | ## | DATE | MM2 | CC | LOCATION | ACTIVITY | SAMPLE TYPE |
| | 11 | 10/19/00 | 64.3 | 0.025 | OWA-Outside personal & waste decon units | Monitoring | During |
| | 12 | 10/19/00 | 25.5 | 0.009 | OWA-Inside personal decon clean room | Monitoring | During |
| | 13 | 10/19/00 | 42.7 | 0.015 | OWA-Inside waste decon holding area | Monitoring | During . |
| | 14 | 10/19/00 | <12.7 | <0.005 | OWA-At negative air machine exhaust | Monitoring | During |
| | 15 | 10/19/00 | 43.9 | 0.012 | OWA-Bldg. #90 1st floor by entrance | Monitoring | During |
| | 16 | 10/19/00 | 54.8 | 0.015 | OWA-Bamt, Bldg. #90 by stairwell | Monitoring | During |
| | 17 | 10/19/00 | 41.4 | 0.012 | OWA-Bsmt, Bldg, #90 by room #RT-4-B | Monitoring | During - |
| | 18 | 10/19/00 | 24.2 | 0.007 | OWA-Outside personal & waste decon units | Monitoring | During |
| | 19 | 10/19/00 | 35.0 | 0.010 | OWA-Inside personal decon clean room | Monitoring | During |
| • | 20 | 10/19/00 | 39.5 | 0.011 | OWA-Inside waste decon holding area | Monitoring | During |
| | 21 | 10/19/00 | VOID | VOID | OWA-At negative air machine exhaust | Monitoring | During |
| | FB1 | 10/19/00 | <12.7 | NA. | Field Blank | Monitoring | During |

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

VOID - Sample overloaded, sample not analyzed.

Laboratory not responsible for sample collection.

< LESS THAN

> GREATER THAN

Blank results are expressed in fibers per square millimeters.

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DATE: 10/30/00 PAGE: 2



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CERIEN EGERE LABOPATOPIES, INC.

LABORATORY ANALYSIS REPORT

Severn Trent Laboratories V.A. St. Albans NS CLIENT:
PROJECT:
Project #:
JOB NUMBER:
METHOD:
CERTIFICATION:

8095.001.510 NIOSH 7400 A 10155

| SAMPLE TYPE | During . During |
|---------------|----------------------------|
| ACTIVITY | Monitoring Monitoring |
| LOCATION | Field Blank Field Blank |
| FIBERS/ CC | NA NA |
| FIBERS/ | <12.7 <12.7 |
| SAMPLE | 10/19/00 |
| SAMPLE # | FB2 FB3 |

Analysis Only Performed By O'Brien & Gera Laboratories, Inc.

VOID - Sample overloaded, sample not analyzed. < LESS THAN > GREATER THAN

AUTHORIZED:

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DATE: 10/30/00 PAGE: 3



CIBRIEN GOERE LABORATORIES, INC.

LABORATORY ANALYSIS REPORT

Severn Treat Laboratories V.A. St. Albans 8095.001.510 NIOSH 7400 A 10155 CLIENT:
PROJECT:
Project #:
JOB NUMBER:
METHOD:
CERTIFICATION:

Air Sample Analysis Results

| SAMPLE TYPE | OSHA | OSHA | OSEIA |
|----------------|-----------------------------------|-----------------------------------|----------------------------|
| ACTIVITY | Monitoring | Monitoring | Monitoring Monitoring |
| LOCATION | James Brackson SS# 122-56-2274 | James Brackson SS# 122-56-2274 | Field Blank Field Blank |
| FIBERS/ CC | <0.054 | 40.004 | ¥ ¥ |
| FIBERS/ | <12.7 | <12.7 | <12.7 |
| SAMPLE DATE | 10/19/00 | 00/61/01 | 10/19/00 |
| SAMPLE # | 10 | 8 | FB1 FB2 |

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VOID - Sample overloaded, sample not analyzed.
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> GREATER THAN
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DATE: 10/30/00 PAGE: 1



CLIENT:

Severn Trent Laboratories

PROJECT:

V.A. St. Albans

Project#:

NS

JOB NUMBER:

8095.001.510 NIOSH 7400 A

METHOD: CERTIFICATION:

10155

Air Sample Analysis Results

| SAMPLE | SAMPLE DATE | FIBERS/ MM2 | FIBERS/ CC | LOCATION | ACTIVITY Monitoring | SAMPLE TYPE Post |
|---------|----------------|----------------|----------------|--------------------------------|------------------------|---|
| # 01 | 10/19/00 | <12.7 | <0.003 | IWA-Basement lab West | Manname | |
| 02 | 10/19/00 | <12.7 | <0.003 | IWA-Basement lab | Monitoring | Post . |
| UZ | | 407 | <0.003 | East IWA-Basement lab | Monitoring | Post |
| 03 | 10/19/00 | <12.7 | | - Center | Monitoring | Post |
| 04 | 10/19/00 | <12.7 | ⋖ 0.003 | IWA-Basement lab North | | Post |
| 05 | 10/19/00 | <12.7 | <0.003 | IWA-Basement lab | Monitoring | rust |
| 05 | | | 0.003 | South IWA-Basement corridor | Monitoring . | Post |
| 06 | 10/19/00 | 15.3 | 0.003 | tent | Monitoring | Post |
| 07 | 10/19/00. | <12.7 | <0.003 | IWA-Basement corridor tent | | · 174 |
| | 10/19/00 | <12.7 | <0.003 | IWA-Basement corridor | Monitoring | Post |
| 08 | 10(13)00 | | | tent IWA-Basement corridor | Monitoring | Post |
| 09 | 10/19/00 | <12.7 | <0.003 | tent | | Post |
| 10 | 10/19/00 | <12.7 | <0.003 | IWA-Basement corridor tent | Monitoring | • |

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VOID - Sample overloaded, sample not analyzed.

< LESS THAN

> GREATER THAN

Blank results are expressed in fibers per square millimeters.

AUTHORIZED:

DATE: 10/30/00 PAGE: 1

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LABORATORY ANALYSIS REPORT

Severn Trent Laboratories V.A. St. Albans 8095.001.510 NIOSH 7400 A 10155 Project #:
JOB NUMBER:
METHOD:
CERTIFICATION: CLIENT: PROJECT:

| | SAMPLE TYPE | Post | ď | 1 1 A | 101. | Post Post Post |
|----------------|------------------|---|--------------------------------|-----------------------------------|--|---|
| | Monitoring | Monitoring | Monitoring | Monitorino | Monitorine | Monitoring Monitoring Monitoring |
| · | OWA-Bldg #90 1st | floor by entrance OWA-Bidg. #90 Bent. by entrance - | stairwell. OWA-Bidg. #90 by | toom #RT-8 OWA-Bent, Bldg. #90 | by room #RT-4-B OWA-Bidg, #90 Bsmt. | by X-Ray room Field Blank Field Blank |
| FIBERS/ CC | 40.003 | <0.003 | <0.003 | <0,003 | <0.003 | NA NA NA |
| FIBERS/ MM2 | <12.7 | <12,7 | <12.7 | <12.7 | <12.7 | <12.7 <12.7 <12.7 |
| SAMPLE | 10/19/00 | 10/19/00 | 10/19/00 | 10/19/00 | 10/19/00 | 10/19/00 10/19/00 10/19/00 |
| SAMPLE # | = | 2 | 13 | 72 | 15 | FB1 FB2 FB3 |

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< LESS THAN
> GREATER THAN
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DATE: 10/30/00 PAGE: 2

TAYLOR EN RONMENTAL GROUP DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

| TECHNICIAN | | 1 | CLIENT | | | SITE ADDRESS | | | | | | DATE | SUBMITTED | | |
|--|-------------------|----------------------|-----------------------|---|------------------------|-----------------|------------|-------------|---------------------|-------------------------|--------|---------------------------|-----------|-------------------|------|
| CAITLOS J | OFAT | | STONE | # Webster | R | ST ALE | N ZUAS | A CD | BE FAC | ILITY | | | 10-10 | - CO | |
| DATE SAMPLED | • | | | | 1 | WORK AREA | | | | | | DATE | LOGGED | | |
| 10-10-00 | | | TIM TI | 4 Loiz. | | Bld # | | smt L | A6. | | | | | | |
| ROTOMETER NO. | | | PROJECT NO. | | | PROJECT MANA | | _ | | | | DATE APPROVED / SIGNATURE | | | |
| 7 E E 53 | <u> </u> | | | | | PETRANEF GREGOK | | | | | | | | | |
| SAMPLE & PUMP # | LABORATORY No. | | | OCATION, A ND/OR EMP | | FLOW ON/OFF | TIME ON | TIME OFF | DURATION MINUTES | FLOW (AVER- AGE) | LITERS | FIELDS | FIBERS | F/MM ² | F/CC |
| ØI | | IWA □/st OWA ©TO | | FRONT OF | STAIRWOLL | 13 | 1547 | 1701 | 74 | 13.5 | 999 | | | | |
| ەك | | IWA □ A† OWA QI ⊃ | BSALT E | NTRANCE | | 14 14 | 1548 | 1702 | 74 | ાપ્ | 1036 | | | | |
| 03 | | IWA DES | MT COIRI OH # RT | -4B. | East FROM | 14 | 1549 | 1.41. | 74 | · 14 | 103k | | | | |
| сч | | AS & AWO | ISIDE PEI LEAU ROC | om, | | 14 | 1550 | 1704 | 74 | 13.5 | 444. | | | | |
| ०ऽ | | OWA Ø | tside Pei Econ Uni | ts . | · | 14 14 | 1551 | 1705 | 74 | 14 | 1036 | | • | | |
| 66 | | OWA Q U | SIDE WA | cheline. | AUEA. | 14 14 | 1222 | 1706 | 74 | ાવ | 1036 | | | | |
| 7.0 | | DWA O 50 | ilheast | | | 14 14 | 1557 | 1707 | 69 | ly | 466 | | | | |
| 08 | | OWA PEN | twee ation | IE AIR | MHCHINE | 14 14 | 1546 | אסדו | 82 | i ų. | ાપ્જ | | | | |
| FB 1 | | IWA 🗆 pı | ELD BL | ank | | | | | | ,, ,,,, ,,,, | | | | | |
| FB 2 | | IWA () OWA () F(| et9 BL | ANK | | | | | | | | | | • | |
| | | O AWI | | , | • | | | | · | | | | | | |
| | | OWA () | • | | , | | | | | | | | * | | |
| | | IWA 🗆 | | | | | | | | | | | | | |
| relinguished to teg drop | BOX (SIGNATURE) | • | DATE | TIME | RECEIVED FROM TEG DROP | BOX (SIGNATURE | 3) | | DATE. | TIME | | | PCM | TEM | |
| Carks Charles (SIGNATURE) DATE TIME RECEIVED BY: (SIGNATURE) 10-10-00 1720 | | | | RECEIVED BY: (SIGNATURE) | TURE) DAYE TIME | | | | BGRD OSHA | PRE | DURING | POST | | | |
| ANALYST: (SIGNATURE) DATE TIME COMMENTS WHITE: Office Copy YELLOW: Lab Copy | | | | LOTA 419 FER FILTER MANUFACTURER E. EXPL255 | | | | | :45 | | | | | | |

TAYLOR E RONMENTAL GROUP DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

| TECHNICIAN | , | | | | | SITE ADDRESS | | | | | _ | IO-IO-OO | | | |
|---|--------------------|---------------------|---------------------|--------------------------|---------------------------|---------------------------------|-------------|--------------|---------------------|------------------------|----------|--|---------------|-------------------|------|
| opielos | JC FAT | | 560NE | & Webste | e | ST ALE | BAUS 1 | 1.5 C | are fa | CILIT | 4 | | LOGGED | -00 | |
| DATE SAMPLED | | | CONTACT | | | WORK AREA | | | • | • | | DATE | waseD | | İ |
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TAYLOR E RONMENTAL GROUP

DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

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DAILY MONITORING SEET AND CHAIN OF CUSTODY RECORD

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RONMENTAL GROUP DAILY MONITORING LET AND CHAIN OF CUSTODY RECORD

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TAYLOR ENTRONMENTAL GROUP DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

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DAILY MONITORING LET AND CHAIN OF CUSTODY RECORD

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TAYLOR ETRONMENTAL GROUP

DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

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TAYLOR E- RONMENTAL GROUP DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

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RONMENTAL GROUP DAILY MONITORING STET AND CHAIN OF CUSTODY RECORD PAGE

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TAYLOR EN RONMENTAL GROUP

DAILY MONITORING SET AND CHAIN OF CUSTODY RECORD

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December 19, 2000.

Mr. Ron Martino STL - St. Louis Laboratories 13715 Rider Trail North Earth City, MO 63045

Re:

Asbestos PLM Bulk

Analysis Results

File:

8095.001.510

Dear Mr. Martino:

The purpose of this letter is to formally convey to you the results of the analysis of the Bulk Asbestos samples submitted by STL - St. Louis Laboratories.

Should you have any questions regarding the enclosed analytical report, please feel free to contact me at your convenience.

Very truly yours,

O'Brien & Gere Laboratories, Inc.

Michael J. Gerber

Manager - Analytical Services

MJG:rmf/wptem\temrepor\plm



@ 002

O'Brien & Gere Laboratories, Inc.

Client: Severn Trent Laboratories Project: STL - ACE Project Proj. Desc.

Analytical Results Asbestos

Jab No.: 8095.001.510 Certification NY No.: 10155 Received: 09/20/00 .

Ashestos in Non-Friable Organically Bo

| | | | Anicalla Re | ound Mat | erials Mel | hod | | 41 |
|-----------|----------|-------|------------------|---------------------|---|-------------------|------------------|-------------|
| Sample# | Client# | Color | Combust- | Percent Acid | PLMI | ixemination | TEM | Examination |
| 2000 000 | <u>.</u> | | ible Material | Soluble Material | Percent Asbestos | Asbestos Types | Percent | Asbestos |
| 09:)0-230 | 1 | TAN | 18.4 | 77.6 | <1.0 | ND | Asbestos <1.0 | |
| 09×0-231 | 2 | TAN | 18.2 | 77.4 | - <i.0< td=""><td>ND</td><td></td><td>ND</td></i.0<> | ND | | ND |
| 0900-232 | 3. | TAN | 18.6 | 77,4 | <1.0 | | <1.0 | ND |
| 0903-233 | 4 | BLACK | 78.1 | | | ND | <1.0 | ND |
| 090:1-234 | 5 | BLACK | | 14.6 | <1.0 | ND | . <1.0 | Chrysotile |
| 090x-235 | | | 78.0 | 15.0 | <1.0 | מא | 2.1 | Chrysotile |
| <u> </u> | 6 | BLACK | 78.7 | 14.6 | <1.0 | ND | 3.0 | Chrysotile |
| 0900-236 | 7 . | BLACK | 80.5 | 8.3 | <1.0 | ND | | |
| 0900-237 | 8 | BLACK | 78.6 | 13.6 | <1.0 | | 1.7 | Chrysotile |
| 0900-238 | . 9 | BLACK | 87.9 | | | ND | 2.3 | Chrysofile |
| | ليسيد | | 01.9 | 7.4 | <1.0 | ND | 1.4 | Chrysofile |

Notes:

ND

Less Than I percent of the sample remained after matrix reduction.

Sample not analyzed.

Methoc: ELAH Item Numbers 198.1 and 198.4

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

Authorized:

Date: September 21, 2000

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

OBRIEN & GERE ENGINEERS

O'Brien & Gere Laboratories, Inc.

Client: Severn Trent Leboratories Project: St. Albana V.A. Site Proj. Desc: NB

Analytical Results Asbestos

Job No.: 8095.001.510 Certification NY No.: 10155 Received: 10/04/10

Asbestos in Frieble Materials

| | TALEDIE MANGE | riais | | | E | | | |
|-----------|---------------|--------|--------------------------------|----------|-------------|--------------|----------|--|
| Sample# | Client # | | | Ashestos | | Non-Asbestos | | |
| 1000-058 | | Layer# | Color | * | Турс | % | Туре | |
| 1000-1238 | Of 1 | 1 | BLK/ GRY | 65 | Chrysotile. | 35 | Calcite | |
| 1. | | | A STATE OF THE PERSON NAMED IN | | | | <u> </u> | |

Notes:

ND NA

None Detected Not Applicable

FG - Fibrous Glass

CE - Cellulose

SY - Synthetic

Hoop in high Level Lab.

Analyst: Method: HLAF been Mumbers 198.1

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

Authorized:_

Date: October 5, 2000 Michael J. Gerber

5000 Brittonfiel Parkway / Suite 300, Box 4942 / Syramuse, NY 13221 / (315) 437-0200

OBRIEN & GERE ENGINEERS

@003

O'Brien & Gere Laboratories, Inc.

Client Severs Trent Laboratories Project: St. Albana V.A. Site Proj. Deso:

Analytical Results Asbestos

Job No.: 8095.001.510 Certification NY No.: 10155 Received: 10/04/00

Ashestos in Non-Friable Organically Box

| - 1 | Sample # | City | | Journal Materials | | | | | | |
|-----|----------|---------|-------|-------------------|---------------------|----------|-----------------|---------------------|-------------|---|
| | | Client# | Color | Percent | Percent | Prace | | | | |
| | | } | | Combust. | Acid | | TEM Examination | | 1 | |
| ł | | | | ible Material | Soluble Material | Percent | Asbestos | | | ı |
| | 1000-057 | 010 | GRAY | | vérgnétitil | Asbestos | | Percent Ashestos | Asbestos | ĺ |
| - | | | | 93.9 | 1.7 | <1.0 | ND | | | |
| - 3 | Notice | | | | | | | <1.0 | Christanii. | 1 |

M

None Detected

Less Than I percent of the sample remained after matrix reduction.

FLOOR LAYER Down 4" in

Analyst: Method: El At Item Numbers 198.1 and 198.4 Analysis Only Performed By O'Rvien & Gere Leberstories, inc.

Authorized: Date: October 5, 2000 Michael J. Garber

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syricuse, NY 13221 / (315) 437-0200

617-589-2160

TO:718 2988611 OBRIEN & GERE ENGINEERS

PAGE: 001/003 Ø 001

O'BRIEN & GERE LABORATORIES, INC.

This factivile transmission is intended only for the use of the individual or entity to which it is addressed may contain confidential information belonging to the sender. If you are not the intended recipient

| | 4 | Job Number | • |
|--|---------------|---|---------------------------------------|
| DATE: | 10-5-00 | | |
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| NTE | TIME | SIGNATURE | |

OCT-05-00 14:42 THU TEL 315 463 7554

IDJENUIRONMENTAL



Facsimile

Date: 10-9-00

TO: GREGOR PETRANEL

Company: TAYLOR ENVIRONMENTAC

Phone: 516-358-2955

Fax: 6-576-358-1780

From:

Marc Bianco / John Devine

Phone:

718-298-8613

Fax: 718-298-8611

Pages (including cover):

Comments:

GREGOR.

The following MRE the results for the those Ponels
in the high level hab and the floor layer in the
concrete of Lab.

(Mr.)

TRANSACTION REPORT

OCT-09-00 01:47 PM

FOR: SWEC ST ALBANS 718 2988611

SEND

START DATE RECEIVER PAGES TIME NOTE

OCT-09 01:44 PM 915163581780 3 2,59" 0K

O'Brien & Gere Laboratories, Inc.

Client: Severn Trent Laboratories Project: St. Albans V.A. Site

Proj. Desc: NS

Analytical Results Asbestos

Job No.: 8095.001.510 Certification NY No.: 10155 Received: 10/26/00

Asbestos in Friable Materials

| | | | | | | | • |
|-------------|----------|---------|-------|----------|-----------------------|-----|--------------|
| Sample# | Client# | , | | | Asbestos | | Non-Asbestos |
| 1000-560 | | Layer# | Color | % | Type | % | Турс |
| | 012 P.T. | 1 - 2% | BRN | ND | NA | 100 | |
| 1000-560 | . 012 PI | 2-13% | GRY. | 25 75 | Amosite Chrysotile | ND | CE NA |
| 1000-560 | 012 P.I | 3 - 85% | ERN | ND | NA | 90 | CE |
| 1000-561 | 013 Jest | DAIL | DOLZ | | | 10 | SY |
| 1000-562 | 014 P.P. | | BRN | ND ND | NA. | 100 | Cork |
| | 014 100 | | GRY | 80 | Chrysotile | 20 | Calcite |

Notes:

ND NA

None Detected Not Applicable

FG - Fibrous Glass

CB - Cellulose

SY - Synthetic

Analyst: Method: HIAP Kem Numbers 198,1

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

Authorized:___

Date: October 26, 2000

Michael J. Gerber

5000 Brittonfiel Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Client: Severn Trent Laboratories Project: St. Albans V.A. Site

Proj. Desc: NS

Analytical Results Asbestos :

Job No.: 8095.001.510 Certification NY No.: 10155

Received: 11/30/00

Asbestos in Friable Materials

| | | | | A | sbestos | | Non-Asbestos | · |
|----------|-------------------|--------|--------|------|------------|---------|----------------------|---|
| Sample # | Client# | Layer# | Color. | % | Туре | % | Туре | |
| 1100-6 | CL-S-S-GR- 116 | 1 | Tan | · 20 | Chrysotile | 5 75 | Cellulose Calcite | |

Notes:

ND None Detected FG - Fibrous Glass

Not Applicable NA

CE - Cellulose

SY - Synthetic

Method: ELAP Item Numbers 198.1

Authorized: Date: November 30, 2000

Michael J. Gerber

Analysis Only Performed By O'Brien & Gere Laboratories, Inc.

5000 Brittonfiel Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

- TAYLOR ENVIRONMENTAL GROUP, INC. -

George Taylor



PLM Sampling Data & Chain of Custody Record

| INSPECTOR: | CLIENT | · · · · · · · · · · · · · · · · · · · | CONTACT: | Bonc. | DATE SUBMITTED | |
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| Relinquished By: (Signature |) | Date: Time: | Received by Labor | atory: (Signature) | Date: | fime: |
| Comments: Sand | TAYLOR SHARRONNICETTS | Le GROUP, INC.FLORAL PARK CORPORATE CENTER - 110 JERIC | HO TOKE: ELOPAL PADES AN ALONG | PHONE ICLE TER THE PROPERTY AND INC. | | |





| QUA-4124 - 5 | | | | | * , 1 | ٠. | | | i | <u> </u> | <u>.</u> , | | <u> </u> | <u>:</u> | <u> </u> | · · · |
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| Client | _ | | Project Manager | | • | 1. | | . Date | : : | ·: | : ` (| Chain Of | Custody I | iumber. | ide |) E |
| STONE & WEBSTE | 2 | | MA | RC BIN | NCD | // | inn De | VINE 10-5 | · C | 00 | - | <u>, : </u> | <u> </u> | 4 | 762 | <u>C-1</u> |
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| 245. Summer S | TY & & T | | Site Contact | 275-86 | 0/5 (| <i>F</i>) | 113-618 | -8C11 | | - (2) | . ! | Page | alysis | _ or | -/- - | |
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| Sample I.D. No. and Description | Date | Time | Sample Type | Volume | Туре | No. | Preservative | Condition on Receipt | 1 | 45 | | 1 | | | | |
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| Possible Hazard Identification | 74 | | | | Sample | Disposa | l | | | | | · . | | | | |
| ☐ Non-Hazard ☐ Flammable ☐ Ski | n Irritant | Polson E | 3 🗷 Unk | anown | ⊡ R | eturn To | Client | Disposal By Lab | 2 | Archi | ve Fo | r <u> </u> | Mon | ths | • | |
| Turn Around Time Required | | Barbara . | QC Level Date | | Project S | Specific (| (Specify) | | | • | | | • | | | |
| Normal / Rush | *************************************** | T. Wash | | ı. \square m. | · . | | | | | • | · *: | • • • | | • | | |
| 1. Relinquished By | | | Date | Time | 1. Recei | ved By | • | • | . • | | | Date | • | Time | | |
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| 3. Relinquished By | | 1 | Date | Time | 3. Recei | ива ву | | | ٠. | •• | | Date | : • | Time | | |
| Comments | | | | | L | | | | · · · | | <u>:</u> | | : | | | |
| FAX RESULTS TO A DISTRIBUTION; TE-Stays with Sample; CANA | AR WIT | د درسر | v ± hu | enn | | /n_ < | C- N N | Patientin III | , Z | Pan | (1) 14 | VIII | I 11 | 100 | ا محابته | iA) |
| DISTRIBUTION: 'TE - Stays with Sample: CANA | IDVVE RY - Returned to 1 | ر وسر سر Client with | Report PINK E | eld Copy | <u>, </u> | 0-3 | 00 . | 101811101110 | 1-/4 | - 11111 | V/) | 6 / / VE | <u>~ . / / / / - ~</u> | | -7- // | 1 |
| a - Stays with Sample; CANA | ti - Halamaa lo l | CHOIN WINI | Traport, FINN ~ FI | aid Gupy | 7 | | | / | مردتها | | , | | | (| | |





POTENTIALLY RADICACTIVE MATERIAL

CARIEN & GERE

| QUA-4124 | | | | • | ٠. | | | • | : • | _ | | × 1,1 | <u> </u> | ą. | ٠,٠ | - | - ن | . • |
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| Client | | | Project Manager | | | , | • | , | Date | ٠, | | | Chain | Of C | ustody | Numbe | er _ | |
| STENE & WEBST | ER | | M A / | CC RIAN | vco 1. | lah | n DOV | ina | Lab Number | :/c | 0.0 | ; | ١ | • • | | 4 | 4.1 | 421 |
| Maniese | | | Telephone Numl | er (Area Code)/l | Fax Number | | | | Lab Number | - | | | · | | | | · · · | |
| City 245 Summer ST | <u> </u> | | T) 718- | 298-86 | 13: /= | 17 | 18-298. | -8611 | | : | | • | Page | , | | of _ | | |
| State | | | Sité Contact | _ | • | | | | | | | ; | . 2 | Analy | /sis | | | |
| Project Name MA | <u> </u> | | MA / | C BIA | MCD, | <u>/ Jo</u> | hn Dev | line. | | 21,00 | . 3 | | | | | T | | |
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| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Contain Type | ers No. | Preservative | Condition | on Receipt | 4500 | 458 | | | | • | | | - |
| 6/2 LAP PIPE HELL. | 10-25-06 | | | 1 | RAG | CIZ | NA | | | X | X | $\neg \neg$ | | . | | | 7 | |
| C13 LAB VENT CCRX | 10-25-00 | | | 1 | BAG | 013 | NA | | | Χ | Y | | | | | | | |
| 014 LAB pipe MUD | 10-25-00 | 1400 | GRAR | | BAG | 014 | N/A | | | X | X | | | | | | | |
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| Special Instructions | | | | | | | | | • | | | | | | | | | |
| Possible Hazard Identification | • | | | | | | | | | | | ٠, | | ٠; | <u>:</u> | : | | |
| □ Non-Hazard □ Flammable □ Skin | | | r\ z (| | Sample D | | | | | ٠, | بىرىن | | | ~ | | | • | |
| Turn Around Time Required | imtant , | Poison B | Unk الكل Unk OC Level | nown RAD | Project S | | | ☐ Dispos | al By Lab | | Arci | nive Fo | <u> </u> | <u>ځد</u> | Mon | ths · | | |
| Normal Rush | - | | □ <i>ı</i> . □ <i>ı</i> | | Project of | | эрвспу) | | • • | ٠. | . ' | | | : | | | | i. |
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| Allan Ald |) | | 10-25-00 | 1400 | | | - | | | | | · | Dai | | | Time | | |
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| Comments | , | | | , , | | | | ** | | | | | | | | | • | |
| FAX RESULTS TO ARVVE DISTRIBUTION: WHITE - Stays with Sample; CANAR | FAX# | by | COB. | 10/27/00 |) SE | - 1 | NIKE G | FRER | FUP. | 'n | <u> </u> | ic | : 2 | | • | | | |
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Chain of Custody Record

SKIEN & GERE

| QUA-4124 | | | | • | | | • | |
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| Client | | Project Manager | i | l | Date | 6,7,7 | Chain Of Custody Number | Ç |
| STONE & WEBSTER | | 11/1 | MHRC BIR | SIGNIO / JOHN | | 00/27/11 | # | クソロ |
| Address 245 Summer Stree | + | Telephone Numbe | r (Area Code)/F | Telephone Number (Area Code)/Fax Number $(+)$ 7/ X - 29 S - $X_G//$ | | Lab Number | Page of | |
| State | Zip Code | Site Contact | 1 5 9 | 1/ 6/1/ | / / / / / | | Analysis | |
| | | /0/ | MAKE SHAVIO | 7 | JUNIO CAVINA | #3 | | |
| Project Name ST. ALBANS V.A. SITE | E/M. EUCERA | Carrier/Waybill Number | mber X//A | | | <i>t)</i> s | | |
| Contract/Purchase Order/Quote No. | | | | | , | aps d | | <u> </u> |
| Sample I.D. No. and Description | Date Time | Sample Type | Total Volume | Sic No. | Preservetive Condition on Receipt | | | |
| 51-S-S-S-116 | 11/29/00 | GRAR | / | | N/A | X | | |
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| Supplied Institute of | _ | | | | | - | | |
| Special instructions | | | | | | | | |
| Possible Hazard Identification Non-Hazard Tlammable Skin Irritant | Irritant Dolson B | 1.B M Unknown | пмог | Sample Disposal | t Disposal By Lab | Lab Archive For | For 3 Months | |
| | | C Level | - | Project Spacific (Spacify) | | | | |
| ☐ Normal ` ★ Rush | | | ;; [] | ∹ | | | | |
| 1. Rethration by American | | 129/00 | Time /4/00 | - | | | | |
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| Comments RESULTS TO AM | AKOVE FAX | # 2/1 | 6.0.8 | 12/4/00 | SEN MIER | F GERBER | FOR DIETHICS | |
| N; ''-4TE - Stays with Sample; CAN | Y - Returned to Client w | ith Report, PINK- Fie | ild Copy | | | 1 | | |

Chain o



OBRIEN & GERE

| Propose the Weight Propose t | <u>Gby-41</u> | 24.11 | <u></u> | -1. | · | | | • | | | | · · · · · · | | | | | 2 - 4 - 2 | <u></u> |
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| Service Street Service Street Service | Client | STONE & WERGER | | | Project Manager | nor Ri | notion | 11 | ha Do | Date | 11/2 | a/n | 0 | Chại | n Of Cu | stody N | | |
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| Special frames State State Center MARC STATUTO State State Center MARC STATUTO State | | 249 Summer St | reet | | (T) 718- | 298-8 | 613 G | 7 | 18-298 | -86// | | . :•.• | y | Pag | è | <i>/</i> | of | <u> </u> |
| Continued Condition Cond | - Olty | Sta | ite Zip Code | | Site Contact | | | • | | | | | | | Analy | sis | | |
| Sample 1D No. and Description Date Tripe Sample Type Volume. Typin No. Preservative. Containers Typin No. Typin No. Typin No. Typin No. Typin Typ | . <u> </u> | | A | · ; ; ; | M | ARC. C | MANE | D: _ /: | John L | DEVIRE | <u>;; : • [</u> | | 1. 1 | | - - | 7.7 | | -1:- |
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| Sample ID, No. and Description Date Time Sample Type Volume. CL S S GR - 116 11/29 no GRAB. I BAG I N/q cA X | · - 2 | 1 ALBANS V.A. | ITE! ME | UGERA | | N/A | · | • | · | <u> </u> | 2.130 | بي . | | . | . . | | | |
| Sample type C S C M M M M M M M M M | Contra | CURTURNASA Organ/Quote No. | | | | | | | | | ! | \$ | 1 1 | . . | 1 | , : : | • | |
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APPENDIX B FINAL STATUS SURVEY REPORT

Final Report: Final Status Survey of St. Albans Veterans Administration Extended Care Center Facility – Queens, New York

Prepared for:

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January 2003

Executive Summary

Cabrera Services, Inc. (CABRERA), under contract to Stone and Webster Engineering Corporation, performed final status surveys on portions of the St. Albans Veterans Administration Extended Care Center Facility (VAECC), located in Queens, New York. CABRERA also provided daily radiological support services during the field remediation phase of the project. The Final Status Survey (FSS) was performed in accordance with guidance as outlined in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and Stone and Webster documents "Work Plan for Decontamination and Decommissioning" and "Sampling and Analysis Plan for Decontamination and Decommissioning."

The VAECC facility was operated as a Naval Hospital providing nuclear medicine services under an NRC license until 1973. The affected area of the facility has been locked and inactive since radioactive contamination in excess of NRC release criteria was found by previous surveys. The radionuclide of concern (ROC) at the site is strontium-90 (Sr-90).

A FSS was performed in accordance with MARSSIM and approved Stone and Webster Work Plans. The Derived Concentration Guideline Level (DCGL) for Sr-90, established by WESTON for the U.S. Department of the Army, New England District, Corps of Engineers, was 8,700 dpm/100 cm² for concrete surfaces remaining in place (MADONIA). In addition, a soil contamination DCGL limit was set at 11 pCi/g using RESRAD with the review and approval of the US NRCto address potential contamination surrounding removed drainage piping.

The FSS consisted of scans using a beta scintillator, static measurements at discrete locations, transferable contamination measurements at the same discrete locations, and collection and analysis of soil samples from areas adjacent to locations where piping was removed and soil was exposed. Scan surveys were provided for 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters.

The results of the FSS show Sr-90 residual activity may be present This FSS conclude that Sr-90 activity levels are well below the respective DCGL of 8,700 dpm/100 cm² of total and 870 dpm/100 cm² of transferable activity on the walls and floors of affected areas at the site. Soil sample results also establish that residual Sr-90 concentration in affected site soils are well below the respective DCGL of 11 pCi/g. The DCGLs presented above meet the requirements of 10CFR20 Subpart E regulation dose requirements which limit dose to an average member of the critical group to 25 millirem in any one year.

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation

Definition

DCGL Derived Concentration Guideline

DOD Department of Defense

DQO Data Quality Objectives

EPA Environmental Protection Agency

FSS Final Status Survey

HSA Historical Site Assessment

LBGR Lower Bound Gray Region

MARSSIM Multi-Agency Radiation Survey and Site Investigation Manual

MDC Minimum Detectable Concentration

NRC Nuclear Regulatory Commission

ROC Radionuclides of Concern

SSHP Site Safety and Health Plan

SU Survey Unit

TLD Thermo Luminescent Dosimeter

VAECC St. Albans Veterans Administration Extended Care Center

Facility

1.0 INTRODUCTION

This report presents the results of radiological surveys that were conducted in accordance with the Work Plan and provides an analysis of the final status survey data using Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) statistical tests and guidance. Final status survey results are presented in Section 6.0.

2.0 BACKGROUND AND SITE DESCRIPTION.

The Veteran's Administration Extended Care Center (VAECC) facility is a fifteen building complex located on approximately a 55-acre site at 179th Street and Linden Boulevard in Queens, New York. Only Building 90 and Tunnel 45, which connects the subsurface levels of Building 90 to Building 91, have been impacted by the D&D activities.

The VAECC facility was operated as a Naval Hospital prior to its acquisition by the Veteran's Administration (VA). The Naval Hospital provided nuclear medicine services under a NRC license, which included several amendments. NRC licensed activities ended with the termination of Nuclear Regulatory Commission (NRC) license # 31-00076-06 on December 31, 1973. In 1976, the St. Albans facility was transferred from the Navy to the VA. The VA did not hold a radioactive materials license at the St. Albans facility. In May of 1992 the USACE, while performing a review of former Department of Defense (DOD) sites, visited the St. Albans facility and identified areas of elevated radioactivity. In July of 1992, Teledyne Isotopes performed survey work at the St. Albans facility and recommended an expanded survey and decontamination of other rooms in the report titled "Radiation Safety Survey for VA Medical Center Queens, NY, July 1992" (Teledyne Isotopes, 1992). In September 1997, Ogden Environmental and Energy Services Co., Inc., (Ogden) surveyed the nuclear labs and the ejector pit located adjacent to Tunnel 45 and identified radioactive contamination in excess of NRC release criteria in effect at that time (NEA). The Ogden report concluded the scope of the survey needed to be expanded.

Stone & Webster prepared a records review report (HSA, 1998) for the USACE, chronicling the use of radioactive materials at the St. Albans facility. The Stone & Webster report identified areas in Buildings 64, 90 and 91, which needed to be characterized and remediated to support unrestricted use of the St. Albans facility.

In 1999, Roy F. Weston Company, Inc. (Weston), conducted characterization surveys of Buildings 64, 90 and 91 (Weston, 1999a). Previous characterization of the buildings divided areas into logical survey units (SU). Based on the previous characterization efforts and small-scale decontamination activities, data demonstrate that all SUs in Buildings 64 and 91 (Weston, 1999b) met the DCGL criteria for the FSS. The Weston surveys included Carbon 14, Tritium and Strontium as radionuclides of concern. The 1999 radiological surveys conducted by Weston concluded that Carbon 14 and Tritium were not present and that strontium 90 is the only identified isotope of concern remaining at St. Albans. The Women's Bathroom (SU003) on the basement floor and the ground floor (SU008) of Building 90 met the requirements for the FSS. SUs 001, 002 and 004 (located in the Building 90 basement) contained contamination that required remediation, followed by a comprehensive FSS (Weston, 1999b).

Table 2-1
Survey Unit Summary

| SURVEY UNIT# | DESCRIPTION | MARSSIM CLASS | DECON- TAMINATION REQUIRED | FINAL STATUS SURVEY COMPLETE |
|-----------------|--|------------------|----------------------------------|---------------------------------------|
| SU 001A | Nuclear Medicine Laboratory (High and Low Level Lab) | CLASS 1 | Y | Y |
| SU 001B | Nuclear Medicine Laboratory (Corridor and Count Room) | CLASS 1 | Y | Y |
| SU 002 | Ejector Pit | CLASS 1 | Y | Y |
| SU004 | Men's Toilet | CLASS 1 | Y | Y |
| SU005 | Basement Level Building 90 | CLASS 2 | N | Y |
| SU 008A | Ground Level Building 90 (RMA Storage) | CLASS 2 | N | Y |
| SU 008B | Ground Level Building 90 | CLASS 3 | . N | Y |

Table 2-2
Survey Units Surveyed by Weston

| SURVEY UNIT | DESCRIPTION | MARSSIM CLASS | DECON- TAMINATION REQUIRED | FINAL STATUS SURVEY COMPLETE |
|-------------|--|------------------|----------------------------------|------------------------------------|
| SU 003 | Womens Toilet | Class 1 | No | Yes |
| SU 006 | Maintenance Shop and Stairwell | Class 3 | No | Yes |
| SU 007 | Audiology, Speech Pathology | Class 3 | . No | Yes |
| *SU 008 | Ground Level Building 90 | Class 3 | No | No |
| **SU 005 | Balance of Basement in Building 90 | Class 1 | Sub-unit 501did not meet DCGL | No |
| SU 009 | Incinerator | Class 3 | No | Yes |

^{*}Area used to transport contaminated materials must be surveyed following remediation. See Table 2-1 above.

3.0 RADIONUCLIDE OF CONCERN (ROC)

The historical review of past radiological usage and radiological survey reports indicate that Strontium-90 (Sr-90) is the only isotope of concern. Sr-90 is typically present in metallic or oxide forms. It has a half-life of approximately 28 years and is a beta source. It is both a skin- and internal-dose hazard. The Site Health and Safety Plan (SSHP) provides for measures to mitigate radiological hazards.

4.0 REMEDIATION ACTIVITIES

Prior to remediation, SU001, SU002 and SU004 at the VAECC had been found to contain residual levels of Sr-90 greater than the derived concentration guideline level (DCGL) as stated in Section 5.1. These areas have undergone remediation and subsequent Final Status Survey (FSS). Pipes in SU005 were removed during remediation activities and a FSS of SU005 was subsequently performed. For the most part, remediation activities occurred prior

^{**} SU 005 reported in sub-units - Complete details in Weston 12/99

to the FSS; however, after the bulk of remediation activities were performed, additional remediation of several small areas occurred based upon scan results. Remediation did occur on a small scale in some areas while final status survey continued. As areas were remediated and the FSS began, remediation was started in other nearby areas. Control and surveillance measures were adopted to avoid the potential of cross-contamination between FSS and remediation areas. Such control and surveillance measures during remediation activities included plastic sheeting placed over walls and entry points in each room being remediated, where necessary, and a HEPA filtered air monitoring system, which provided a negative pressure atmosphere inside each room. Results of smear surveys performed during remediation activities showed no activity in excess of background. Results of external monitoring, performed using thermo luminescent dosimetry (TLDs), showed no detectable activity for shallow and extremity doses for each worker.

Total surface Sr-90 contamination monitoring was performed with a Ludlum 2224 scaler/rate –meter with Ludlum Model 43-89 alpha-beta scintillator in accordance with standard operating procedures as presented in Appendix A of the Site Safety and Health Plan (SSHP), the Radiation Protection Plan (RPP). Removable Sr-90 contamination smears were analyzed with a Ludlum Model 2929 and Model 43-10-1 sample counter.

Remedial activities were performed in order to reduce contamination to a small fraction of the 8,700 dpm/100 cm² total DCGL and 870 dpm/100 cm² transferable contamination DCGL as follows:

In SU001, mastic was sampled for asbestos content; all debris and remaining furniture were removed; contaminated concrete was removed; remaining ductwork was removed; contaminated drain lines and soil were removed; and contaminated asbestos tile in Corridor 15 was removed.

In SU002, contaminated hardware was removed; contaminated drain lines and soil were removed; the pipe under Tunnel 45 was removed; and the contaminated drain line connecting SU001 and SU002 was removed.

In SU004, the internal contents of restroom were removed and contaminated ceramic floor tiles were removed.

Materials removed during the remediation process were surveyed and segregated as necessary to ensure that materials with levels of radioactivity greater than 200 dpm/100 cm² removable activity or 1,000 dpm/100 cm² (as per NRC Regulatory Guide 1.86) were treated as contaminated waste.

5.0 FINAL STATUS SURVEY DESIGN

The FSS of the VAECC was designed and performed using MARSSIM guidance. The radionuclide of concern is Sr-90, which emits beta radiation upon undergoing radioactive decay. Contamination in the building was assumed to be at or near the surface of walls, floors and penetrations. During remediation activities, contamination penetrated some surfaces up to several centimeters. Surface scans were performed with the knowledge that residual contamination would be greatest at the outermost layers of affected surfaces. Soil below floor structures (e.g., pipes) removed during remedial activities was considered potentially contaminated and soil samples were collected at these locals for offsite laboratory Sr-90 analysis.

Radiologically impacted areas at the VAECC were divided into four Class 1 survey units (SUs 001A, 001B, 002 and 004), two Class 2 survey units (SUs 005 and 008A), and one Class 3 survey unit (SU008B). Sr-90 surface scans were performed over reasonable accessible floor areas and wall areas up to a height of 2 meters. For the purpose of this report, the phrase "reasonable accessible" is defined to mean areas not requiring disassembly of fixed items that are not being removed and in which a Ludlum 43-89 probe could fit. SU008A was originally specified as a Class 3 survey, however, scoping surveys presented data, which supported a reclassification of SU008A as a Class 2 survey unit. The methods used for selection of survey unit areas and relevant calculations (e.g., number of sample points, grid spacing) are described in Section 5.2.

Following remediation, surface scans were performed at a speed of 1 to 3 inches per second over 100% of reasonably accessible areas of the floor and of walls up to 2 meters above the floor in each survey unit. Results were recorded and locations exceeding investigation levels stated in Section 5.1 were reported to management (i.e., Stone & Webster), investigated, and, when appropriate, remediated further. Following any additional decontamination, scanning was repeated to demonstrate effectiveness of the removal actions. A scoping survey scan of some remaining areas (i.e., upper wall and ceiling) in Class 1 and certain Class 2 areas was also performed. Scan minimum detectable concentrations (Scan MDCs) are reported in Appendix C to this report.

Following surface scanning, static 1-minute measurements were performed for at least 14 systematic, pre-determined points per survey unit and recorded by the surveyor. Scans and static measurements were performed using a Ludlum Model 2221 (or Ludlum Model 2224) scaler/ratemeter coupled to a Ludlum 43-89 probe. Shielded measurements were performed by placing the detector against a wooden jig equal in length and width to the face of the detector. The wooden jig has a low background activity allowing for conservative final activity results to be reported. This shielded measurement provides a gamma background correction for the calculation of Sr-90 surface activity concentrations. It should be noted that the structures being surveyed, especially wall surveys, varied in material consistency and, therefore, in background beta activity. Since no beta surface corrections or background subtraction due to the naturally occurring beta components of the material being scanned were made, the resultant scan and static measurements are conservative. Equations for static measurement MDC calculations are reported in Appendix D to this report.

A smear survey was also performed at each static measurement point for transferable activity analysis. A Ludlum Model 2929/43-10-1 alpha/beta sample counter was used on-site to analyze smear activity. Scan and smear counting instrumentation was efficiency calibrated using a Sr-90 NIST traceable source with results reported in disintegrations per minute of Sr-90 per 100 cm².

5.1 DCGLs Established

The DCGLs for the St. Albans facility were established using the 64132 Federal Register Notice, Volume 63, No. 222, dated November 18, 1998. Weston incorporated an alteration to the DCGLs in a letter to the USACE dated May 15, 2000 and subsequently approved by the NRC in a letter to the VA dated June 20, 2000 (MADONIA). The building surface contamination investigation level presented in Table 5-1 was set by management at the onset of field activities. Table 3-1 summarizes these DCGLs.

Table 5-1 DCGLs to be Applied at VAECC

| Asotope | | (total activity)** DCGL | Fransferable Activity DCGE | Building Surface (notal activity) Investigation Level (dpm/100 cm ²)? |
|---------|----|-------------------------|-------------------------------|--|
| Sr- 90 | 11 | 8,700 | 870 | 2,000 |

^{*}dpm/100 cm²—disintegrations per minute per one hundred square centimeters

5.2 Final Status Survey Unit Classification and Calculations

A site reference coordinate system was designed to ensure all sample and measurement locations are spatially identified such that each location is reliably reproducible. Computer assisted design (CAD) was utilized to layout survey unit dimensions by rooms and to aid in the development of the FSS locations. The individual survey units were broken down based upon logical room units and initial levels of contamination.

5.2.1 Survey Unit Classification

Survey units in impacted areas under MARSSIM are broken into three classes (i.e., Class 1, 2 and 3). Impacted areas at the VAECC were divided into four Class 1 survey units (SU001A, 001B, 002 and 004), two Class 2 survey units (SU005 and 008A), and one Class 3 survey unit (SU008B). SU008A was originally specified as a Class 3 survey, however, early scoping

^{**} total activity = Gross activity

^{***}pCi/g—Picocurie per gram

surveys presented data, which supported a reclassification of SU008A as a Class 2 survey unit. A triangular grid pattern was chosen for each survey unit.

An area is classified as a Class 1 survey unit if contaminant concentrations exist above the DCGLs. Past data indicates that SU001, 002 and 004 meet this criterion and therefore these areas have been designated as Class 1 survey units. The suggested maximum survey unit size for a Class 1 survey unit is 100 m². Therefore, due to the size of SU001, it has been divided into two survey units, SU001A and SU001B.

Sampling Survey Unit Maps are presented in Appendix B to this report.

5.2.2 Survey Reference System

A reference coordinate system was used to provide a level of reproducibility consistent with the objective of the survey. A random-start triangular grid pattern was referenced to each survey unit, a random starting point selected and the starting point grid coordinates of all locations within the survey unit were identified.

5.2.3 Limits on Decision Errors

Decisions based on survey results can often be reduced to a choice between "yes" or "no," such as evaluating whether or not a survey unit meets the release criterion. When viewed in this way, two types of incorrect decisions, or decision errors, are identified:

- Type I incorrectly deciding that the answer is "yes" when the true answer is "no,"
- Type II incorrectly deciding the answer is "no" when the true answer is "yes."

The distinctions between these two types of errors are important for two reasons: (1) the consequences of making one type of error versus the other may be very different, and (2) the methods for controlling these errors are different and involve tradeoffs. For these reasons, the decision maker should specify acceptable levels for each type of decision error.

A Type I decision error occurs when the null hypothesis is rejected when it is true, and is sometimes referred to as a false positive error. The probability of making a Type I decision error, or the level of significance, is denoted by alpha (α). Alpha reflects the amount of evidence the decision maker would like to see before abandoning the null hypothesis, and is also referred to as the *size* of the test.

A Type II decision error occurs when the null hypothesis is accepted when it is false. This is sometimes referred to as a false negative error. The probability of making a Type II decision error is denoted by beta (β) . The term $(1-\beta)$ is the probability of rejecting the null hypothesis when it is false, and is also referred to as the *power* of the test.

Using MARSSIM, the following limits on α and β have been established:



- Type I error α = 0.05. This implies that 5 percent (%) of the time the SU could be released even if the release criterion is exceeded. (Results in small but increased risk to the public.)
- Type II error β = 0.05. This implies that 5% of the time even though the release criterion is not exceeded the SU will fail. (Results in unnecessary cleanup cost.)

5.2.4 Estimation of Relative Shift

The Lower Bound of the Gray Region (LBGR) is selected during the DQO process along with the target values for α and β . The width of the gray region, equal to (DCGL - LBGR), is a parameter that is central to the nonparametric tests discussed in MARSSIM. It is also referred to as the shift, Δ . The absolute size of the shift is actually of less importance than the relative shift - Δ/σ , where σ is an estimate of the standard deviation of the measured values in the survey unit. The estimated standard deviation, σ , includes both the real spatial variability in the quantity being measured, and the precision of the chosen measurement method. The relative shift, Δ/σ , is an expression of the resolution of the measurements in units of measurement uncertainty. Expressed in this way, it is easy to see that relative shifts of less than one standard deviation, $\Delta/\sigma < 1$, will be difficult to detect. On the other hand, relative shifts of more than three standard deviations, $\Delta/\sigma > 3$, are generally easier to detect. The number of measurements that will be required to achieve given error rates, α and β , depends almost entirely on the value of Δ/σ .

The minimum number of sample locations required is dependent on the distribution of site residual radionuclide concentrations relative to the DCGL and acceptable decision error limits (α and β), which are established in the previous section. The relative shift describes the relationship of site residual radionuclide concentrations to the DCGL and is calculated using the following equation, from MARSSIM.

$$\Delta / \sigma = \frac{DCGL - LBGR}{\sigma}$$

Where: DCGL = the derived concentration guideline (i.e., release limit)

LBGR = concentration at the lower bound of the gray region. The LBGR is the concentration to which the survey unit must be cleaned in order to have an acceptable probability of passing the statistical tests. The LBGR effectively becomes the survey's action level.

σ = an estimate of the standard deviation of the concentration of residual radioactivity in the survey unit (which includes real spatial variability in the concentration as well as the precision of the measurement system)

For this project, an LBGR = $\frac{1}{2}$ DCGL has been established. During project planning, it was assumed that, following remediation, Sr-90 residual activities would be significantly less than

the DCGL. If the assumed σ value is 1450 dpm/100cm² or less, the relative shift is calculated to be greater than 3. We will assume then that the σ value is, at most, 1450 dpm/100cm² and that the relative shift is at least 3. Following the FSS, data results will be reduced for each survey unit and with a standard deviation of less than 1450 dpm/100cm², the relative shift should calculate to greater than 3.

5.2.5 Number of Data Points

A statistical test may be used, if necessary to determine whether portions of the site are suitable for release for unrestricted use. The minimum number of systematic measurement locations required in each survey unit for the statistical test is determined using the following equation, from MARSSIM.

$$N = \frac{1}{2} \times \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{3(P_r - 0.5)^2}$$

Where: N = the minimum number of measurement locations per survey unit

 $Z_{I-\alpha}$ = the percentile represented by the decision error α (Type I)

 $Z_{1-\beta}$ = the percentile represented by the decision error β (Type II)

P_r = the probability that a random measurement from the survey unit exceeds a random measurement from the background reference area by less than the DCGL when the survey unit median is equal to the LBGR above background (based on relative shift)

The acceptable percentile values are $Z_{1-\alpha} = Z_{1-\beta} = 1.645$ (from Table 5.2 in MARSSIM). The relative shift is greater than 3, allowing the P_r value to be set at 1 as per MARSSIM, Section 5.5.2.3.

The Final Decommissioning Plan states eleven (11) data points per survey unit were required. However, based on MARRISM (Section 5.5.2.2), the number of sampling points should be increased by at least 20% in order to attain the desired power for statistical testing as well as to allow for any possible lost or unusable data points. This increased the number of data points to at least 14 points in each survey unit.

5.2.6 Additional Samples to Meet EMC Criterion

MARSSIM states that, for Class 1 areas, a dose area factor must also be used to evaluate the magnitude by which the concentration within a small area of elevated activity can exceed the DCGL_w while maintaining compliance with the release criterion. The following formula is listed in section 5.5.2.4 of MARSSIM for determining the necessary scan sensitivity when incorporating the area factor:

Scan MDC (required) = $(DCGL_w)$ x (Area Factor)

If the actual scan MDC is greater than the required scan MDC, additional samples are required to ensure that the dose-based criterion is satisfied.

The area factor is determined based on specific regulatory agency guidance and is some value greater than one. The calculated Scan MDC as presented in Appendix C for the plastic scintillator detector in use at the VAECC is 788 dpm/100 cm² for concrete material and 839 dpm/100 cm² for brick material. These values are well below the DCGL of 8,700 dpm/100 cm². An additional area factor multiplier would only increase required Scan MDC value. As such, the number of at least 14 samples per survey unit established in the previous section will suffice and no additional samples are required to meet the EMC criterion.

5.2.7 Grid Spacing

The grid spacing for the triangular grid is estimated as follows:

$$L = \sqrt{\frac{A}{0.866 \times n}}$$

Where: A = the surface area in the survey unit, and

n = the number of sample points per survey unit

The calculated L value for each survey unit is presented on Attachment 1 to this report.

5.3 Instrument Selection and Survey Techniques

Radiological instruments were available to scan equipment, personnel, and clothing for radiological contamination and for performing the FSS. This equipment included Geiger-Mueller detectors, beta scintillation probes, smear sample counter, a microrem meter, and other instrumentation connected to appropriate rate/scaler meters.

Scans were performed at a speed of 1 to 3 inches per second. General instrumentation survey techniques are presented in the operating procedures, which are attached as Appendix F to this report.

5.3.1 Field Instruments

A Ludlum Model 177 coupled to Ludlum Model 44-9 alpha/beta/gamma probe was used to radiologically release equipment and materials.

Ludlum Model 9 and Ludlum Model 19 meters were used to survey exposure levels at the VAECC.

A Ludlum Model 2221 scaler/ratemeter coupled to a Ludlum Model 43-89 alpha/beta scintillator probe and a Ludlum Model 2224 scaler/ratemeter coupled to a Ludlum 43-89 alpha/beta scintillator probe were used for performing surface scans.

The 4-inch cast iron pipe in the ejector pit was characterized using an AEES, Inc. PSR-4 proportional probe gas flow detector. The PSR-4 is designed to navigate multiple 90° pipe bends and traverse internal welds while maintaining a centered position. The probe utilizes P-10 gas fed through a C series combination gas and high voltage cable. The detector is covered with a single wrap of 0.8 mg/cm² mylar.

The PSR-4 (screened, ruggedized) probe uses a screen to minimize mylar window damage, and large spring-loaded rollers to guide and center the probe within the pipe. The large rollers allow for near zero insertion force while pushing the detector through the pipe. A plumber's flat snake with four-inch measurements was used to push the PSR-4 while measuring the location of the detector within the pipe. The instrument used to provide characterization data for the cast iron pipe is a detector appropriate for the energy and type of radiation to be detected. In addition, the instrument response and MDC is low enough to provide reasonable assurance that the established DCGLs levels may be achieved in the field.

The MDC expression from Table 3-1 of NUREG-1507 "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions", December 1997, based on 95 % confidence, and 1-minute count and background time is:

$$MDC = C \times \left(3 + 4.65\sqrt{B}\right)$$

Where,

C = Detector Efficiency, dpm/count

B = Background Count - 1 Minute, counts

The following table provides calculated MDCs for several background values assuming the manufacturer's efficiency of 6% for 90 Sr/ 90 Y.

| Radionuclide | Manufacturer's Detector Efficiency, (DPW/CPM) | Background, (CPM) | MDC Result (DPW/100cm²) |
|--------------|--|----------------------|----------------------------|
| Sr-90/Y-90 | 16.67 | 100 | 825 |
| Sr-90/Y-90 | 16.67 | 150 | 999 |
| Sr-90/Y-90 | 16.67 | 200 | 1146 |
| Sr-90/Y-90 | 16.67 | 250 | 1275 |

5.3.2 Smear/Air Counting Instruments

A Ludlum Model 2929/43-10-1 alpha/beta sample counter was used to perform analysis of smear and air samples.

5.3.3 Environmental Air Sampling

A LV-1 low volume air sampler coupled to an isokinetic nozzle was used for airborne particulate measurements being discharged to the environment. All ventilation air discharged to the environment passed through a HEPA filtration system for essentially 100% total particulate capture. No gas or vapor releases were caused during the remediation process.

5.4 Instrument Calibration

Current calibration records were kept on site for review and inspection (included as Appendix G to this report). The records include, at a minimum, the following:

- name of the equipment
- equipment identification (model and serial number)
- manufacturer
- date of calibration
- calibration due date

Instrumentation was maintained and calibrated to manufacturers' specifications to ensure that required traceability, sensitivity, accuracy and precision of the equipment/instruments were maintained. Instruments were calibrated at a facility possessing appropriate NRC and/or Agreement State licenses for performing calibrations using National Institutes of Standard Technology (NIST) traceable sources. Scanning and smear counting instrumentation were efficiency calibrated using a Sr-90 NIST traceable source. Daily source checks were performed for all radiological survey instrumentation used at the VAECC. Control charts and relevant data are presented in Appendix E to this report.

5.5 Operating Procedures

Standard operating procedures for radiological survey instrumentation are referenced in Section 5.3 of this report. Other operating procedures can be found in Appendix F to this report.

6.0 SURVEY RESULTS

6.1 Survey Unit 001A

A Class 1 Final Status Survey was performed in Survey Unit 001A. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 001A.

6.1.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 001A on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was identified at levels above background. Based on the beta scan results, the highest residual activity identified in Survey Unit 001A was approximately 2,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.1.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 001A ranged from 75 to 406 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.1.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 001A range from 0 to 36 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.2 Survey Unit 001B

A Class 1 Final Status Survey was performed in Survey Unit 001B. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 001B.

6.2.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 001B on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was identified at levels above background. Based on the beta scan results, the highest residual activity identified in Survey Unit 001B was approximately 4,200 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.2.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 001B ranged from 37 to 433 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.2.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 001B range from 0 to 36 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.3 Survey Unit 002

A Class 1 Final Status Survey was performed in Survey Unit 002. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 002.

6.3.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 002 on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was identified at levels above background. Based on the beta scan results, the highest residual activity identified in Survey Unit 002 was approximately 4,800 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.3.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 002 ranged from 85 to 401 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.3.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 002 range from 0 to 45 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.4 Survey Unit 004

A Class 1 Final Status Survey was performed in Survey Unit 004. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 004.

6.4.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 004 on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was identified at levels above background. Based on the beta scan results, the highest residual activity identified in Survey Unit 004 was approximately 2,200 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.4.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 004 ranged from 64 to 1,223 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.4.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 004 range from 0 to 27 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.5 Survey Unit 005

A Class 2 Final Status Survey was performed in Survey Unit 005. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 005.

6.5.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 005 on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was identified at levels above background. Based on the beta scan results, the highest residual activity identified in Survey Unit 005 was approximately 1,200 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.5.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 005 ranged from 21 to 1,661 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.5.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 005 range from 0 to 44 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.6 Survey Unit 008A

Due to initial scoping results, Survey Unit 008A was reclassified in the field to a Class 2 survey unit and subsequently surveyed as a Class 2 survey unit. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 008B.

6.6.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 008A on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was identified at levels above background. Based on the beta scan results, the highest residual activity identified in Survey Unit 008A was approximately 4,000 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.6.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 008A ranged from 150 to 3,884 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.6.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 008A range from 0 to 29 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.7 Survey Unit 008B

A Class 3 Final Status Survey was performed in Survey Unit 008B. Following are the 100% direct scan results, the direct static measurement results, and the results of any smear surveys taken in Survey Unit 008B.

6.7.1 Direct 100% Scan Results

A direct beta scan survey was performed in Survey Unit 008B on 100% of reasonably accessible floor areas and wall areas up to a height of 2 meters. Residual activity was not identified at levels significantly above background. Survey results are presented in Appendix A for reference.

6.7.2 Direct Static Measurement Results

Direct static measurements of Sr-90 surface contamination results for Survey Unit 008B ranged from 35 to 165 dpm/100 cm². These results are well below the release limit of 8,700 dpm/100 cm². Survey results are presented in Appendix A for reference.

6.7.3 Smear Survey Results

Transferable surface contamination results for Survey Unit 008B range from 0 to 13 dpm/100 cm². These results are below the transferable contamination release limit of 870 dpm/100 cm² (i.e., 10% of the 8,700 dpm/100 cm² release limit). Survey results are presented in Appendix A for reference.

6.8 Soil Analysis Survey Results

Soil samples were collected from pipe trench areas where cast iron and stainless steel piping was removed in Survey Units 001A, 001B and 005. Locations were selected for soil sampling based on proximity to pipe connection points or other potential leakage points and as per Stone & Webster guidance. In these three survey units, a potential existed for the migration of Sr-90 contamination into soil due to the cutting and removal operation of potentially contaminated pipes. The collected soil samples were sent to an off-site laboratory for Sr-90 concentration analysis. The DCGL in soil for Sr-90 is 11 pCi/g as referenced in Section 5.1. A map of soil sample locations is presented in Appendix B.

6.8.1 Survey Unit 001A Soil sample Results

Reported soil sample concentrations of Sr-90 in Survey Unit 001A range from 0.05 ± 0.39 pCi/g (MDC of 0.67 pCi/g) to 6.81 ± 0.89 pCi/g (MDC of 0.60 pCi/g). These results are well below the DCGL of 11.0 pCi/g. Soil sample results are presented in Appendix A for reference.

6.8.2 Survey Unit 001B Soil sample Results

Reported soil sample concentrations of Sr-90 in Survey Unit 001B range from 0.05 ± 0.41 pCi/g (MDC of 0.71 pCi/g) to 6.60 ± 1.40 pCi/g (MDC of 0.60 pCi/g). These results are well below the DCGL of 11.0 pCi/g. Soil sample results are presented in Appendix A for reference.

6.8.3 Survey Unit 005 Soil sample Results

Reported soil sample concentrations of Sr-90 in Survey Unit 005 range from -0.02 ± 0.35 pCi/g (MDC of 0.62 pCi/g) to 0.47 \pm 0.40 pCi/g (MDC of 0.65 pCi/g). These results are well below the DCGL of 11.0 pCi/g. Soil sample results are presented in Appendix A for reference.

6.9 Surveys in Ejector Pit Room & Drum Storage

Work was performed in the Ejector Pit Room to measure the contamination levels inside the four-inch cast iron pipe in the wall. The work area was set-up to minimize the spread of contamination on the walls and floor. Smear surveys performed after the completion of work showed all levels to be at or below background. (See Table 7.9) Also, the four radioactive waste drums kept in the closet on the top level were removed from this area and placed on a herculite lay-down area. These drums were awaiting truck transport to a disposal site. A

direct frisk of the drum storage and lay-down areas indicated no smearable contamination levels after these drums were removed from the building. (See Table 7.8)

6.10 Ejector Pit Cast Iron Pipe Characterization

This pipe is in the concrete wall of the ejector pit room. The pipe is located approximately 9 feet above the lower floor elevation in the ejector pit room on the wall opposite the room entrance. The pipe travels underground to an outside storm sewer manhole approximately 100 feet from building 90. Activities associated with the 4-inch cast iron pipe are limited to characterization of the internal surfaces of the pipe. No radioactive material was intentionally removed from the cast iron pipe inner surfaces and no volumetric samples were collected.

Based upon probe and pipe geometry, the PSR-4 probe field of view is 3.75 inches of interior pipe surface. The total interior pipe surface area is: π x 4" x 2.54 cm/in x 3.75" x 2.54 cm/in = 304 cm². The calculated efficiency for the PSR-4 probe is 4.6%. (See Attachment A) This efficiency is multiplied by the Building Surface Contamination DCGL (8700 dpm/100 cm²) to yield 400 cpm/100 cm². Since the surface area is 304 cm², the cpm value becomes 1216, (400 x 3.04). This counts per minute value of 1216 is for both Strontium-90 and the Yttrium-90 daughter. The PSR-4 probe with the Ludlum 2221 meter will provide radioactivity response readings in cpm. Therefore, the critical value for Sr-90 is 2432 cpm.

The presence of naturally occurring radon/thoron radioactivity caused much more difficulty than anticipated in trying to acquire accurate readings using the PSR-4 probe. Readings in the ejector pit area as well as in an office room in another building found radon/thoron levels to be in the range of 8000 cpm – 10,000 cpm. The combination of concrete walls and floors together with the PSR-4's thin mylar window are significant factors in these high background values. Before conducting pipe readings, the PSR-4 was taken outside to allow for "natural purging" of the detector. The count data in Attachment B describe the background readings at specific times. A significant decrease is seen from the reading @ 1240 hrs (6099 cpm) versus the value @ 1315 hrs (3051 cpm). This is a result of the probe being in the cast iron pipe and not in the ambient atmosphere where the high readings were detected.

Note: After the characterization survey was completed, the PSR-4 detector was sent back to the vendor. The vendor stated that the probe was working properly.

Survey Technique

The instrument used in the pipe characterization was calibrated to a ⁹⁰Sr source of known strength in geometry similar to the expected probe positioning within the cast iron pipe. The probe was setup in accordance with the manufacturer instructions and guidance (See Attachment C).

One-minute instrument readings were taken every 4 inches using a Ludlum 2221 scaler/ratemeter utilized in integrate mode. Four inches is consistent with the approximate field of view of the probe within the cast iron pipe. Count times were chosen to assure MDC and desired sensitivity is achieved. Results were converted to the same measurement units as the site DCGL (dpm/100cm²).

Provisions were made to measure up to fifty feet of pipe. However, several 45-degree bends and possible internal obstructions prevented measurements of the full pipe length. The total length of pipe characterized was about 20 feet from the point of entry. At selected distances, duplicate readings were taken to determine consistency of measurements.

PSR-4 / LUdlum 2221 count data

Attachment B shows the one-minute gross count data using the PSR-4/Ludlum 2221 arrangement. For Instrument readings No. 1 & 2, the net count results are computed by subtracting 6099 (background value @ 1240 hrs.) from the gross count value. For Instrument readings No. 3 thru No. 8, the net counts are computed by subtracting 3537 (background value @ 1' mark) from the gross count value. For the remaining instrument readings, the net counts are determined by subtracting 3051 (background value @ 3' mark) from the gross count value. The background readings were very high during the initial measurement process due to the concentration of natural radon/thoron daughters. An attempt was made to reduce this concentration by locating fans in the ejector pit area. However, use of this engineering control was marginally successful in reducing radon/thoron concentrations.

Duplicate readings were taken at Instrument Reading No.'s 3, 4, 9 and 36 (last four readings in Attachment B). Good correlation is noted for Readings No. 9 & 36, (985 vs. 880 and -103 vs. -103). Poor correlation is seen for the other two Readings. The poor correlation is likely due to the rapid decay in radon/thoron daughters contributing to the probe reading.

The first 45° pipe bend occurred at about six feet in. The second 45° bend was between 18.5 and 19 feet. The PSR-4 detector was removed from the pipe at this point since it could not be maneuvered any further.

Conclusion of Cast Iron Pipe Characterization

The critical value has been determined to be 2432 counts/minute value for Sr-90. All counts/minute values in Attachment B are below this number. Therefore, the contents of this cast-iron pipe do not contain radioactive material above the DCGL.

7.0 STATISTICAL EVALUATION OF FINAL STATUS SURVEY RESULTS

Statistical evaluation of final status survey data is not presented in this report due to scan, static measurement and soil sample results being well below the relevant DCGL for each result. A statistical evaluation (e.g., the Sign Test) would have been performed if some sample results were found to be greater than the relevant DCGL for each result. The ranges, averages, resulting standard deviation and relative shift calculations are included for all surface scan and static measurement results in the following tables and all results are presented in Appendix A to this report. The relative shift value with respect to FSS data results is presented for each Survey Unit at the bottom of each of the following tables. Each relative shift result is greater than 3 and, therefore, follows the assumptions made in establishing the FSS design. Previous details concerning the assumptions made for relative shift with respect to this FSS can be found in Section 5.2.4 of this report.

7.1 Data Reduction Tables

7.1.1 Table 7-1 Survey Unit 001A

| | SURVEY UNIT 001A | | |
|--------------------|--|--|--|
| | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | |
| 1A-1 | 294 | 0 | |
| 1A-2 | 208 | 0 | |
| 1A-3 | 144 | 18 | |
| 1A-4 | 278 | 0 | |
| 1A-5 | 299 | 0 | |
| 1A-6 | 176 | 0 | |
| 1A-7 | 224 | 3 | |
| 1A-8 | 272 | 36 | |
| 1A-9 | 406 | 4 | |
| 1A-10 | 304 | 0 | |
| 1A-11 | 315 | 0 | |
| 1A-12 | 337 | 0 | |
| 1A-13 | 75 | 0 | |
| 1A-14 | 128 | 0 | |
| 1A-15 | 342 | 15 | |
| 1A-16 | 326 | . 0 | |
| | | | |
| Average | 258 | 5 | |
| Standard Deviation | 90 | 10 | |
| Relative Shift | 48 | 434 | |

7.1.2 Table 7-2 Survey Unit 001B

| SURVEY UNIT 001B | | | | | | |
|---------------------------------------|---|--|--|--|--|--|
| | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | | | | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | | | | |
| 1B-1 | 433 | 36 | | | | |
| 1B - 2 | 321 | 21 | | | | |
| 1B-3 | 246 | 1 | | | | |
| 1B-4 | 337 | 0 | | | | |
| 1B-5 | 203 | 0 | | | | |
| 1B-6 | 353 | 0 | | | | |
| 1B-7 | 171 | 0 | | | | |
| 1B-8 | 208 | 0 | | | | |
| 1B-9 | 299 | 33 | | | | |
| 1B-10 | 363 | 0 | | | | |
| 1B-11 | 192 | 0 | | | | |
| 1B-12 | 278 | 0 | | | | |
| 1B-13 | 187 | 1 | | | | |
| 1B-14 | 37 | 0 | | | | |
| 1B-15 | 214 | 0 | | | | |
| 1B-16 | 128 | 6 | | | | |
| 1B-17 | 187 | 0 | | | | |
| · · · · · · · · · · · · · · · · · · · | · · · · · · · · · · · · · · · · · · · | - | | | | |
| Average | 244 | 6 | | | | |
| Standard Deviation | 98 | 12 | | | | |
| Relative Shift | 44 | 366 | | | | |

7.1.3 Table 7-3 Survey Unit 002

| SURVEY UNIT 002 | | | | | | |
|--------------------|---|--|--|--|--|--|
| • | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | | | | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | | | | |
| 2-1 | 342 | 10 | | | | |
| 2-2 | 267 | 4 | | | | |
| 2-3 | 299 | 0 | | | | |
| 2-4 | 262 | 37 | | | | |
| 2-5 | 144 | 0 | | | | |
| 2-6 | 118 | 21 | | | | |
| 2-7 | 390 | 5 | | | | |
| 2-8 | 401 | 12 | | | | |
| 2-9 | 85 | 0 | | | | |
| 2-10 | 353 | 45 | | | | |
| 2-11 | 187 | 0 | | | | |
| 2-12 | 337 | 10 | | | | |
| 2-13 | 294 | 7 | | | | |
| 2-14 | 176 | 0 | | | | |
| 2-15 | 118 | 0 | | | | |
| 2-16 | 337 | 0 | | | | |
| 2-17 | 166 | 26 | | | | |
| 2-18 | 294 | 13 | | | | |
| | | | | | | |
| Average | 254 | 11 | | | | |
| Standard Deviation | · 101 | 14 | | | | |
| Relative Shift | 43 | 322 | | | | |

7.1.4 Table 7-4 Survey Unit 004

| SU | SURVEY UNIT 004 | | | | | | |
|--------------------|--|--|--|--|--|--|--|
| | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | | | | | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | | | | | |
| 4-1 | 978 | 0 | | | | | |
| 4-2 | 791 | 8 | | | | | |
| 4-3 | 107 | 0 | | | | | |
| 4-4 | 304 | 0 | | | | | |
| 4-5 | 337 | 0 | | | | | |
| 4-6 | 288 | 27 | | | | | |
| . 4-7 | 919 | 8 | | | | | |
| 4-8 | 892 | 0 | | | | | |
| 4-9 | 214 | 0 | | | | | |
| 4-10 | 908 | 0 . | | | | | |
| 4-11 | 1026 | 0 | | | | | |
| 4-12 | 64 | 0 | | | | | |
| 4-13 | 876 | 0 | | | | | |
| 4-14 | 1223 | 0 | | | | | |
| | | | | | | | |
| Average | 638 | 3 | | | | | |
| Standard Deviation | 394 | 7 | | | | | |
| Relative Shift | 11 | 588 | | | | | |

7.1.5 Table 7-5 Survey Unit 005

| SURVEY UNIT 005 | | | | | | |
|--------------------|--|--|--|--|--|--|
| | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | | | | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | | | | |
| 5-1 | 1661 | 25 | | | | |
| 5-2 | 43 | 2 | | | | |
| 5-3 | 203 | 8 | | | | |
| 5-4 | 1512 | 44 | | | | |
| 5-5 | 1432 | 0 | | | | |
| 5-6 | 321 | 0 | | | | |
| 5-7 | 262 | 0 | | | | |
| 5-8 | 1186 | 16 | | | | |
| 5-9 | 1132 | 0 | | | | |
| 5-10 | 294 | 5 . | | | | |
| 5-11 | · 139 | 0 | | | | |
| 5-12 | 21 | 0 | | | | |
| 5-13 | 1218 | 0 | | | | |
| 5-14 | 524 | 0 | | | | |
| 5-15 | 598 | 7 | | | | |
| 5-16 | 134 | 6 | | | | |
| 5-17 | 1245 | 0 | | | | |
| | | | | | | |
| Average | 701 | 7 | | | | |
| Standard Deviation | 582 | 12 | | | | |
| Relative Shift | 7 | 365 | | | | |

| SURVEY UNIT 008A | | | | | | |
|--------------------|--|--|--|--|--|--|
| | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | | | | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | | | | |
| 8A-1 | 347 | 6 | | | | |
| 8A-2 | 230 | 13 | | | | |
| · 8A-3 | 214 | 12 | | | | |
| 8A-4 | 491 | 13 | | | | |
| 8A-5 | 481 | 22 | | | | |
| 8A-6 | 491 | 24 | | | | |
| 8A-7 | 342 | 8 | | | | |
| 8A-8 | 3884 | 10 | | | | |
| 8A-9 | 224 | 11 | | | | |
| 8A-10 | 363 | 22 | | | | |
| 8A-11 | 353 | 18 | | | | |
| 8A-12 | 214 | 6 | | | | |
| 8A-13 | 150 | 0 | | | | |
| 8A-14 | 283 | 29 | | | | |
| 8A-15 | 278 | 12 | | | | |
| | | | | | | |
| Average | 556 | 14 | | | | |
| Standard Deviation | 927 | 8 | | | | |
| Relative Shift | 5 | 567 | | | | |

7.1.7 Table 7-7 Survey Unit 008B

| SURVEY UNIT 008B | | | | | | |
|--------------------|--|------------------------------------|--|--|--|--|
| | DIRECT MEASUREMENT TOTAL SURFACE CONTAMINATION | TRANSFERABLE SURFACE CONTAMINATION | | | | |
| Sample Designation | dpm/100cm ² | dpm/100cm ² | | | | |
| 8B-1 | 72 | 0 | | | | |
| 8B-2 | 115 | 6 | | | | |
| 8B-3 | 51 | 0 | | | | |
| 8B-4 | 35 | 0 | | | | |
| 8B-5 | 78 | 1 | | | | |
| 8B-6 | 165 | 0 | | | | |
| 8B-7 | 49 | 0` | | | | |
| 8B-8 | 58 | 2 | | | | |
| 8B-9 | 51 | 13 | | | | |
| 8B-10 | 134 | 1 | | | | |
| 8B-11 | 113 | 12 | | | | |
| 8B-12 | .126 | 7 | | | | |
| 8B-13 | 136 | 0 | | | | |
| 8B-14 | 103 | 0 | | | | |
| | | | | | | |
| Average | 92 | 3 | | | | |
| Standard Deviation | 40 | 5 | | | | |
| Relative Shift | 107 | 921 | | | | |

7.1.8 Table 7.8 Survey of Drum Closet Storage Area

| Sample Number | Location | Direct Scan Total Surface Contamination (dpm/100 cm²) | Removable Surface Contamination (dpm/100 cm ²) |
|---------------|------------|---|--|
| 1 | Back Wall | 336 | 10 |
| 2 | Left Wall | 386 | 0 |
| 3 | Front Wall | 429 | 0 |
| 4 | Door | 13 | 7 |
| 5 | Floor | 205 | 0 |
| 6 | Right Wall | 327 | 0 |

Date: July 18, 2001

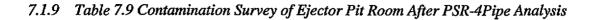
Surveyor: Steve Sagaties

Direct Scan: Instrument Used L2224; # 162426/43-89 Scintillation Probe # 171386

Instrument Efficiency: 0.336

Removable Contamination: Instrument Used L2929; # 163827

Instrument Efficiency: 0.459



| | | · | |
|---------------|--------------------------------------|--|---|
| Sample Number | Location | Direct Scan Total Surface Contamination (dpm/ 100 cm ²) | Removable Surface Contamination (dpm/ 100 cm ²) |
| 1 | Floor by Ladder | 0 | 6 |
| 2 | Center of Floor | | 18 |
| 3 | Northwest Corner of Floor | 57 | 0 |
| 4 | Front Wall: Left | | 14 |
| 5 | Front Wall: Under Pipe | | 0 |
| 6 | Front Wall: Under Pipe (By Floor) | 0 | 0 |

Date: July 18, 2001

Surveyor: Steve Sagaties

Direct Scan: Instrument Used L2224; #162426/ 43-89 Scintillation Probe #171386

Instrument Efficiency: 0.336

Removable Contamination: Instrument Used L2929; # 163827

Instrument Efficiency: 0.459

8.0 SUMMARY

Remediation activities performed at the VAECC sufficiently reduced Sr-90 residual contamination to levels below the relevant DCGLs as planned. As shown by the final status survey surface scan and static measurement results, surface contamination levels of Sr-90 activity in impacted areas of Survey Units 001A, 001B, 002, 004, 005, 008A and 008B are well below the DCGL of 8,700 dpm/100 cm². As shown by the final status survey soil sample results, soil contamination levels of Sr-90 residual activity in impacted soils of Survey Units 001A, 001B and 005 are also well below the DCGL of 11 pCi/g.

References

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Collected at DERP-FUDS Saint Albans Extended Care Center

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> Administration Extended Care Center Queens, New York. Prepared for U.S. Army Corps of Engineers, North Atlantic Division, New England District, by Roy F. Weston, Inc., Carle

Place New York. December 1999.

(Weston 2000) Final Decommissioning Plan St. Albans Veterans

> Administration, Extended Care Center Queens, New York. Prepared for U.S. Army Corps of Engineers, North Atlantic Division, New England District, by Roy F. Weston, Inc., Carle

Place New York. July 2000.

Attachment 1: Grid Spacing – L Values

ATTACHMENT 1

GRID SPACING

| SURVEY UNIT | AREA, m² | NUMBER OF DATA POINTS, n _{EA} | GRID SPACING, L, m | ROUNDED SPACING, m |
|-------------|----------|--|--------------------------|-----------------------|
| 1a | 82 | 14 | 2.6 | 2.6 |
| 1b | 105 | 14 | 2.9 | 2.9 |
| 2 | 65 | 14 | 2.3 | 2.3 |
| 4 | 36 | 14 | 1.7 | 1.7 |
| 5 | 214 | 14 | 4.2 | 4.2 |
| 8a | 187 | 14 | 3.9 | 3.8 |
| 8b | 168 | 14 | 3.7 | 3.5 |

Attachment A Determination of PSR-4 Detector Efficiency

Appendix A: Determination of PSR 4 Detector Efficiency

| Instrument reading No. | E I | | Net Counts (1 Minute) | Adjustment for measured beta dose reduction with 25 mg/cm ² plastic sheeting source holder | Measured 1 minute count rate adjustment for source counts at calibration distance of 1 inch vs detector to-surface distance of 0.75 inches to inner pipe wall in | Adjusted Net Counts (1 minute) | Adjusted Net Counts per square cm source area (cts/cm²) | Total Net Counts for area within detector "field of view" on pipe inner wall of 3.75" (CPM) | Sr-90 Source DPM for equivalent of 23.75cm2 (equivalent to 3 - 1.25" diameter sources) | |
|---------------------------|-------------|-----|--------------------------|--|--|--------------------------------------|--|---|---|----------|
| 1 | center | 254 | 191.2 | 1.16 | 1.44 | 319 | 40.30 | [| | <u> </u> |
| 2 | 1.25" left | 163 | 100.2 | 1.16 | 1.44 | 167 | 21.12 | 1 | | |
| 3 | 1.25" right | 165 | 102.2 | 1.16 | 1.44 | 170 | 21.54 | 656.00 | 14232 | 0.046 |
| 4 | 2.5" left | 72 | 9.2 | NA | NA | NA | NA | 1 | | |
| 5 | 2.5" right | 74 | 11.2 | NA | NA | NA | NA | 1 | } | ł |

| Background Start (CPM): | 62.8 |
|-------------------------|------|
| Background End (CPM): | |

| | · · · · · · · · · · · · · · · · · · · | | | Instrument: | Ludlum 2221 | Calibration Du | 12/26/2001 |
|--------------|---------------------------------------|-------|------------|-------------|---------------|----------------|------------|
| Ву: | H. W. Siegrist | Date: | 07/05/2001 | Serial No: | 81301 | | |
| Reviewed By: | | Date: | | Probe: | PSR-4 | | |
| | | | | Serial No: | 78575 16336 9 | | |

Attachment B PSR-4 Count Data in Cast Iron Pipe

| Instrument reading No. | Probe leading edge Location from Pipe Penetration Opening, inches | Gross Counts (1 Minute) | Net counts | Instrument reading No. | Probe leading edge Location from Pipe Penetration Opening, inches | Gross Counts (1 Minute) | Net counts | Instrument reading No. | Probe leading edge Location from Pipe Penetration Opening, inches | Gross Counts (1 Minute) |
|------------------------|---|----------------------------|------------|---------------------------|---|----------------------------|------------|------------------------------|---|----------------------------|
| 1 | 4 | 6173 | 74 | 51 | 204 | 2217 | -834 | | | |
| 2 | 8 | 6387 | 288 | 52 | 208 | 2081 | -970 | | | |
| 3 · | 12 | 5488 | 1951 | 53 | 212 | 2221 | -830 | | | |
| 4 | 16 | 5325 | 1788 | 54 | 216 | 1927 | -1124 | | | |
| 5 | 20 | 3720 | 183 | 55 | 220 | 2081 | -970 | | | |
| 6 | 24 | 3421 | -116 | 56 | 224 | 2061 | -990 | | | |
| 7 | 28 | 3583 | 46 | 57 | 228 | | | | | |
| . 8 | 32 | 3879 | 342 | 58 | 232 | | | | | |
| 9 | 36 | 4036 | 985 | 59 | 236 | | | | | |
| . 10 | 40 | 4058 | 1007 | 3 (QA) | 12 | 3833 | 296 | | | |
| 11 | 44 | 4326 | 1275 | 4 (QA) | . 16 | 3772 | 235 | | | |
| 12 | 48 | 4508 | 1457 | 9 (QA) | 36 | 3931 | 880 | | | |
| 13 | 52 | 4312 | 1261 | 36 (QA) | 144 | 2948 | -103 | | | |
| 14 | 56 | 4115 | 1064 | | | | | | | |
| 15 | 60 | 3726 | 675 | | | | | | | |
| 16 | 64 | 3988 | 937 | | | | | | | |
| 17 | 68 | 3924 | 873 | | | | | | | |
| 18 | 72 | 3628 | 577 | | | | | | | |
| . 19 | 76 | 4061 | 1010 | | | | | | | |
| 20 | 80 | 4315 | 1264 | | | | | | | |
| . 21 | 84 | 4156 | 1105 | | · | | | | | |
| 22 | 88 | 4160 | 1109 | | | | | | | |
| 23 | 92 | 4277 | 1226 | | | | | | | |
| 24 | 96 | 4106 | 1055 | | | | | | | |
| 25 | 100 | 3790 | 739 | | | | | | | / |
| 26 | 104 | 3451 | 400 | | | | | | | |
| 27 | 108 | 3725 | 674 | | | | | | | |
| 28 | 112 | 3186 | 135 | | | | | | | |
| 29 | 116 | 3083 | 32 | | | | | | | |
| 30 | 120 | 2978 | -73 | | | | | | | |
| 31 | 124 | 3319 | 268 | | | | | | | |
| 32 | 128 | 3407 | 356 | | | | | | | |
| 33 | 132 | 3088 | 37 | | | | | | | |
| 34 | 136 | 3076 | 25 | | | | | | | |
| 35 | 140 | 2931 | -120 | | | | | | | |
| 36 | 144 | 2948 | -103 | | | | | | | |
| 37 | 148 | 3072 | 21 | | | | | | | |
| 38 | 152 | 2854 | -197 | | | | | | | |
| 39 | 156 | 2740· | -311 | | | | | | | |
| 40 | 160 | 2545 | -506 | | | | | | | |
| 41 | 164 | 2335 | -716 | | | | • | | | |
| 42 | 168 | 2603 | -448 | | | | | | | |
| 43 | 172 | 2707 | -344 | | | | | | | |
| 44 | 176 | 2618 | -433 | | | | | | | |
| 45 | 180 | 2437 | -614 | | | | | | | |
| 46 | 184 | 2604 | -447 | | | | | | | |
| 47 | 188 | 2469 | -582 | | | | | | | |
| 48 | 192 | 2155 | -896 | | | | | | | |
| 49 | 196 | 2101 | -950 | | 1 | | | | | |
| 50 | 200 | 2130 | -921 | | 1 | | | | | |

| Background Start 1240 hrs: | 6099 | Background 1' mark: | 3537 | Instrument: | Calibration Due |
|----------------------------|-------------|---------------------|------------|-------------|-----------------|
| Background End 1440 hrs: | 2810 | Background 3' mark: | 3051 | Serial No: | |
| | | | | Probe: | |
| Surveyed By: Henry W | /. Siegrist | Date: | 07/18/2001 | Serial No: | |
| Reviewed By: | | Date: | | | |
| DIAD# | | | | | |

Attachment C PSR-4 Instrument Guidelines

Automated Engineering & Electronic Services 165 Deer Run Ridge Rd Kingston, TN 37763 (Bus) 865-367-0229 or (Fax) 865-376-0222 www.radprobe-aees.com

General Information

The PSL-4 Proportional Probe is a gas flow detector used in 4" piping systems. This design will navigate multiple 90° pipe bends, hurtle internal welds while maintaining center position. The probe has a near **Zero** insertion force with a "push" through concept, thus simplifying the survey techniques. Gas flow is fed through the cable and connector. The unit is equipped with a quick disconnect port for use with the **Model FT** insertion device (optional). Two versions are available: the **PSL** (screen less) and the **PSR** (screen ruggedized). Ruggedized units are outfitted for class level piping systems and/or harsh environments.

Concept

The PSL series of pipe probes were developed for survey of straight run pipe with (2-3) 90° bends where the pipe conditions were seamless welded pipe with welded connections. The ability to insert the probe into a length of up to 25' in steel pipe was first developed to survey electrical conduits and small air ducts at environmental remediation sites. The success of these probes was tested and found to be usable in other conditions as well. {i.e., drain line entry ports in floors and sinks, wall penetrations for electrical pipe chases, water lines with mild sediment build up, etc.}

Additionally were the observations of the accessability and limitations of the probe within certain pipe compositions. Examples are:

Seamless welded pipe defines the interior surface as having a relatively smooth inner surface. Some pipes contain an inner bead at the joint where the rolled edges meet. The probe design was able to navigate these conditions as long as the user does not attempt to rotate the probe when inserted. Tracking was observed to be straight and with minimal drag. However, some drag may be observed in pipes where the seam weld is large. At welded connections the probe was able to hurtle the interior welds bead with ease.

Electrical EMT conduits were comprised with straight pipe using compression fitting couplings and sweeping 90° bends, . Minimal restrictions were experienced at insertion depths of >50°. The use of electrical pulling soaps (used to lubricate cables during installations) creates a risk of dirt build up and may leave the pipe interior dirty. Thus some probe extractions found the probe to be covered with an oily like substance on the rollers.

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Air ventilation Ducts of 4" or smaller were observed to have directional limitations. The internal fittings of air ducts require one end of the duct pipe to be tapered in order to insert into the adjoining duct pipe. This creates a reduced chance of withdrawal of the probe when the survey is complete. Often times it was required to remove the probe at the far end and withdrawal the cable from the insertion end. These internal tapered edges create too large of a hurtle for the probe rollers. On a good note, was the ability of the probe to pass by dents and kinks in the duct surfaces.

PVC was the most limiting composition for standard probes. The probe will navigate straight runs with ease. The probes (at the joints in PVC piping) are not capable of passing over these hurtles with the use of small rollers. Larger rollers were used for applications of PVC. Probe insertion and navigating the probe through the bends was accomplished with 3/4" rollers.

Probe usage

Probe navigating is performed by use of the centering legs and a fish tape. The concept of the probe is to use the 8 spring loaded rollers to center the detector within the pipe. The rollers create a near zero friction and with the use of the fish tape, the probe is pushed into the pipe. The self-centering nature of the design will allow for the probe to orbit through the pipe. This orbital motion may be observed by installing the probe into a short piece of pipe (sized accordingly) and noticing the angles of view as the probe is varied along the pipe axis. See figure one.

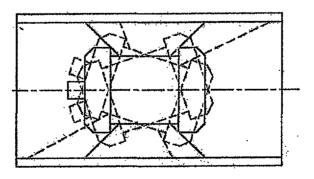


Figure 1

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This orbital motion allows the probe to conform to obsticals while it maintains a fairly constant centering position. The fields of view (angle of view) may vary during insertion. The area of view (internal surface area of the pipe) should remain consistent. The larger 3" and 4" probe tend to center lower in the pipe due to the additional weight of the probe. Future designs are being evaluated to reduce the probes weight.

Connection is as follows: connect the C series gas/HV cable to the probe and the opposite end to the gas feed connector block. The BNC connection of the connector block goes to the electronics box. Connect the P-10 gas supply to the connector block. Note.. The use of standard cable is not possible, unless they are adapted for passage P-10 gas. The quick disconnect fitting of the probe is a sealed port and will not accept gas. Connect the fish tape to this port. Wrap the coax around this fish tape as insertions begin. Wrapping the coax will reduce drag by the cable which helps to assist probe insertion.

Operating

| | Specifications | |
|---|-----------------------|-----------------------------|
| High Voltage (nominal operating) 1800 | Volts | Used with Model TR |
| Mylar Density (aluminized) 0.8 | mg/cm² (single wrap) | Transport Rig or Customer |
| Length (including connector) 4.5 | Inches | owned electronics with |
| Diameter (without centering springs)- 2.5 | Inches | Option GP-1 Gas Purge |
| Input Sensitivity Range 5-10 | Milli Volts | Fitting. |
| Nominal Efficiencies (4π) | At 3/4" Geometry | |
| TH-230 - ≈ 2.0 | % | |
| TC-99 ≈ 3.5 | % | Cable lengths range from |
| SRY-90 | ≈ 6.0 % | 5' to 50' increments. |
| PB-210 ≈ 5.5 | % | |
| Average Background 150-180 | Counts/min | Optional Model FT insertion |
| Active Area 66 | Cm ^z | Device |
| Weight 1.3 | LBS | |
| Operating Gas-P-10 | @ 50 cc/min flow rate | |

The connections on the PSL series probes are a "C" series connector and a quick disconnect fitting. The Quick Disconnect must be understood to be a connection for the fish tape only, NOT a gas connection. The P-10 gas is fed through the coax cable. Not all applications require the use of a fish tape to insert the probe. {i.e., vertical runs or pipes where gravity will assist insertion} Therefore, the design utilizes the coax to feed the gas, thus reducing the need for the fish tape in some applications.

The gas flow rate is 50 cc/min. Purge time is 30-45 minutes at 50 cc/min. The purge time may be shortened by increasing the P-10 flow rate to 100 cc/min.

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At the normal operating voltage, a random arc may occur. This may be heard audibly at times. Numerous testing efforts to prevent this occurrence found the cause to be associated to the design of the probe. The internal surface of the detector is cylindrical with the anode wires situated at 30 degree angles to the inner cylinder. The distance at the center of the anode wire is in closer geometry to the cylindrical surface than that of the two end points of the anode wire. Since the charged field developed across the anode wire is exposed to a curved geometry, the risk of random arcing is at a higher possibility at the closer geometry areas along the anode wire. The effects of these arc's were also found to have a minimal contribution to the overall counts. The effects were determined to be less than 3 additional counts per arc.

In cases where the arcing adds large amounts of counts to the display, is an indication of detector over-voltage.

The detector is covered with a .8 mg/cm/sq mylar, single wrap.

Testing the probe stability was performed over months of background count rate monitoring and efficiency testing. Numerous tests were conducted for 10 minute count runs and the averages deduced from 2 hour testing intervals. Test results show the average probe background to be 165 cpm in a 10-15 μ R background. Increases in back ground counts were observed when the probe reached a physical temperature of >95 degrees.

Plateau; high voltage adjustments may be required for large changes in elevations (atmospheric pressure). Calibration from the manufacturer is 900'. The input sensitivity is recommended between 5-10 millivolts.

Operating characteristics of the probe is a gas flow, proportional concept. The ability to retrieve alpha and beta results from proportional probes may be enhanced with the use of dual detection electronics such as the LMI 2224 rate meter scale. The dual channel 2224 produces independent alpha and beta display results at a single operating voltage. When a single channel piece of electronics is used, an operating voltage for each isotope will be required.

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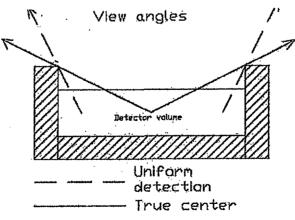
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Interpretation of data, Disclaimer

AEES Inc. developed this approach to pipe detection to satisfy a need at a remediation site, for the access to the interior surfaces of cylindrical objects only. The principles for proportional detection were applied in the design to make this effort to survey cylindrical objects possible. The interpretation of the resulting data can produce an sizable task to analyze; if not kept to the basics. The amount of possible interpretations for: detection area in cm² vs probe geometry, the detector view angles with respect to theoretical detector center, pipe surface area vs orbital angle and respective view angles and the source calibration methods has forced AEES Inc. to require the end users organization to determine the applicable factors in interpreting the resulting data.

AEES Inc. has been involved in probe manufacture for many years and has determined that several factors should be held to a basic approach.

Theoretical center of detector has a direct basis for the view angles of the probe. The angle of view will be dependent on issues like "incident angle of detection". At which point does a event go missed because the angle of the interaction to the detector surface; was to large. If a true center of the probe were used the angles of view would be large. If a uniform detection plane is used (equal detection across the internal volume of the detector) then the angles of view would be smaller. Since proportional probes poses near equal efficiencies across the face of the detectors (when properly calibrated), it can be assumed that the detection properties are as effective near the detector edges as well as the center. AEES Inc. classifies a proportional probe as having uniform detection qualities. View angles could then be smaller and more defining to areas of 100 cm².

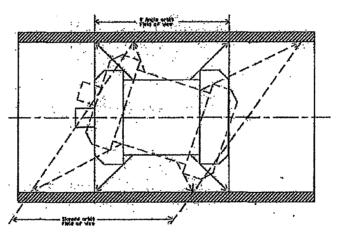


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Pipe surface area vs orbital angle and respective view angles could result in "surface area of detection" variations. AEES Inc. recommends an average value be assessed and used as a constant value.



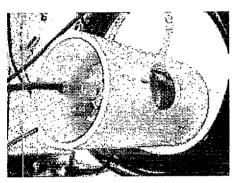
Calibration methods are defined by the end user. The availability of cylindrical sources is now becoming more addressed by source manufacturers as more probes of these types are being designed. Currently; however, they are limited and costly. Flexible sources are available from some source manufacturers. AEES has not yet found a source supplier whom can produce sources as we deem appropriate for our design; thus at present, AEES utilizes flat sources positioned in a source jig where the average surface area of the source is held at a 3/4" geometry. The reported efficiency values are determined without area correction factors.

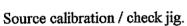
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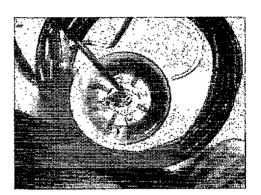
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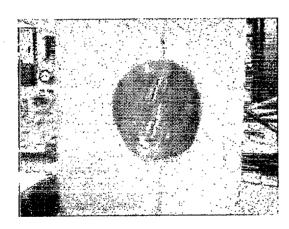
Automated Engineering & Electronic Services
165 Deer Run Ridge Rd
Kingston, TN 37763
(Bus) 865-367-0229 or (Fax) 865-376-0222
www.radprobe-aees.com

Below are some photos displaying the probe.



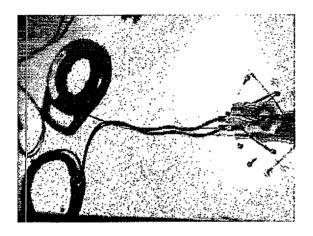


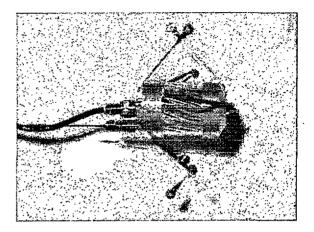




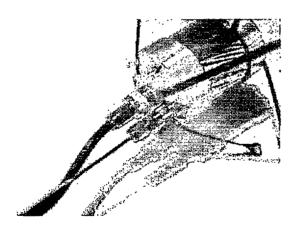
Orient the probe such that the source location is centered in the window of the probe.

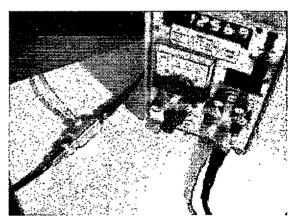
AEES, INC.
Automated Engineering & Electronic Services 165 Deer Run Ridge Rd Kingston, TN 37763 (Bus) 865-367-0229 or (Fax) 865-376-0222 www.radprobe-aees.com





Probe connection to the coax and fish tape.



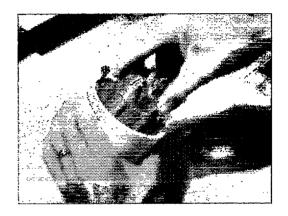


Probe connection and coax cable gas connection.

Automated Engineering & Electronic Services 165 Deer Run Ridge Rd Kingston, TN 37763 (Bus) 865-367-0229 or (Fax) 865-376-0222 www.radprobe-aees.com

Insertion method.





Grasp the four roller legs (of the connector end) with the thumb and index finger. Spring the four legs together and load them into the pipe end. Then insert the probe into the pipe. It is recommended that the coax (at least) be attached to the probe at time of insertion. In cases where the inner surface is smooth or slick, the probe may roll out of reach.

Appendix A: Survey and Soil Sample Results Data Packages

| | ST. A | BANS FINAL | STATUS | BANS FINAL STATUS SURVEY SUMMARY SHEET | RY SHEET | | |
|----------------------|----------------|---------------------------|--------------------------|--|--|-------------------------------------|---|
| | | | | DIRECT | A PART OF THE PART | | |
| | | MEASUREMENT RESULT, | JIREGI TRESULT, IS | MEASUREMENT TOTAL SR-80 SURFACE ACTIVITY | SR-90 BE RESULT | SR-90 BETA SMEAR RESULTS, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| | | Ambient | | | Backaround | Sample Count (2 | |
| Location Designation | Surface | Background ⁽¹⁾ | Count | DPM/100cm² | (cbm) | mln). | DPM/100cm ² |
| 1A-1 | Wall | 104 | 159 | 284 | 83.1 | 158 | 0 |
| 1A-2 | Wall | 94 | 133 | 208 | 83.1 | 149 | 0 |
| 1A-3 | Wall | 115 | 142 | 144 | 83.1 | 184 | 48 |
| 1A-4 | Wall | 101 | 153 | 278 | 83.1 | 142 | 0 |
| 1 A- 5 | Wall | 106 | 162 | 299 | 83.1 | 162 | 0 |
| 1A-6 | Floor | 88 | 131 | 176 | 83.1 | 156 | 0 |
| · 1A-7 | Wall | 112 | 154 | 224 | 83.1 | 169 | 3 |
| 1A-8 | Wall | 106 | 157 | 272 | 83.1 | 201 | 36 |
| 1A-9 | Floor | 114 | 190 | 406 | 83.1 | 170 | 4 |
| 1A-10 | Floor | 112 | 169 | 304 | 83.1 | 153 | 0 |
| 1A-11 | Wall | 101 | 160 | 315 | 83.1 | 165 | 0 |
| 1A-12 | Wall | 88 | 161 | 337 | 83.1 | 141 | 0 |
| 1A-13 | Floor | 103 | 117 | 75 | 83.1 | 155 | 0 |
| 1A-14 | Wall | 121 | 145 | 128 | 83.1 | 162 | 0 |
| 1A-15 | Wall | 97 | 181 | 342 | 83.1 | 181 | 15 |
| 1A-16 | Wall | 8 | 160 | 326 | 83.1 | 143 | 0 |
| Coto | 1/6/14 | | - | | | | |
| Care | | | | | | | |
| Suiveyor. | EGRECAGO YOUNG | | | | | | |

(1) Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2221 serial # 161581 / 43-89 scintillation probe # 0508 Instrument Efficiency: 0.1872

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322 Instrument Efficiency: 0.486

Removable Contamination;

| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|----------------------|---|
| 1A-1 | High Level Lab northwest comer on wall 0.48 meters above floor |
| 1A-2 | High Level Lab west wali 0.61 meters above floor |
| 1A-3 | High Level Lab west wall 0.61 meters above floor |
| 1A-4 | High Level Lab north wall 1.78 meters above floor |
| 1A-5 | High Level Lab south wall 0.3 meters above floor |
| 1A-6 | High Level Lab floor west side |
| 1A-7 | High Level Lab northeast corner on partition between high & low level labs 0.48 meters above floo |
| 1A-8 | High Level Lab south wall 1.6 meters above floor |
| 1A-9 | High Level Lab floor south side |
| 1A-10 | High Level Lab floor north side |
| 1A-11 | High Level Lab east partition between high & low level labs 1.78 meters above floor |
| 1A-12 | High Level Lab south wall 0.3 meters above floor |
| 1A-13 | Low Level Lab floor east side |
| 1A-14 | Low Level Lab west partition wall between high & low level labs 0.48 meters above floor |
| 1A-15 | Low Level Lab east partition wall between low level lab & counting room 1.0 meters above floor |
| 1A-16 | Low Level lab north wall 1.78 meters above floor |

| <u> </u> | SURVEY | NIT 1A (High Le | vel and Lo | w Level Labs & isotopo | Storage Are | a) | | | |
|--|--------------------------|--|------------|---|----------------------------------|-----------------|------------|--|---|
| 100 TO 10 | | 1 MINUTE DIRECT MEASUREMENT RESULT, COUNTS | | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | REMENT SR-90 SR-90 BETA SMEAR | | l . | | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/1 09cm² | Background (cpm) | Sample Count (2 | DPM/100cm² | | |
| 1A-5XD | Wall | 153 | 233 | 352 | 82.65 | 179 | 14 | | |
| 1A-9XD | Floor (Soil) | 215 | 284 | 303 | 82.65 | 185 | 20 | | |
| 1A-15XD | Walt | 179 | 222 | 189 | 82.65 | 143 | 0 . | | |
| Date: Surveyor: | 01/16/01 Edmond Young | | | | | | | | |

Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

| TE DIRECT MENT RESUL DUNTS 1 | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY DPM/100cm ² 433 321 246 337 203 353 171 208 | RESULT Background (cpm) 83.2 83.2 83.2 83.2 83.2 83.2 83.2 83.2 | ETA SMEAR FS, COUNTS Sample Count (2 min) 201 187 167 165 145 159 | TRANSFERABLE SR-90 SURFACE ACTIVITY DPM/100cm ² 36 21 1 0 0 0 |
|--|---|---|---|---|
| d(1) Count 186 161 158 179 136 168 144 153 | 433 321 246 337 203 353 171 | (cpm) 83.2 83.2 83.2 83.2 83.2 83.2 83.2 | min) 201 187 167 165 145 | 36 21 1 0 |
| 161 158 179 136 168 144 153 | 321 246 337 203 353 171 | 83.2 83.2 83.2 83.2 83.2 83.2 | 187 167 165 145 159 | 21 1 0 0 |
| 158 179 136 168 144 153 | 246 337 203 353 171 | 83.2 83.2 83.2 83.2 83.2 | 167 165 145 159 | 21 1 0 0 |
| 179 136 168 144 153 | 337 203 353 171 | 83.2 83.2 83.2 83.2 | 165 145 159 | 1 0 0 |
| 136 168 144 153 | 203 353 171 | 83,2 83.2 83.2 | 145 159 | 0 |
| 168 144 153 | 353 171 | 83.2 83.2 | 145 159 | |
| 144 153 | 171 | 83.2 | 159 | |
| 153 | | 83.2 | | |
| | 208 | | 132 | 0 |
| 150 | | 83.2 | 142 | 0 |
| | 299 | 83.2 | 198 | 33 |
| 195 | 363 | 83.2 | 139 | 0 |
| 144 | 192 | 83.2 | 141 | 0 |
| 167 | 278 | | | Ô |
| 142 | 187 | 83.2 | | 1 |
| 101 | 37 | | | 0 |
| 147 | 214 | | | Ď |
| 139 | 128 | 83.2 | | 6 |
| 119 | 187 | 83.2 | 159 | 0 |
| | 142 101 147 139 | 142 187 101 37 147 214 139 128 | 167 278 83.2 142 187 83.2 101 37 83.2 147 214 83.2 139 128 83.2 | 167 278 83.2 153 142 187 83.2 167 101 37 83.2 156 147 214 83.2 152 139 128 83.2 172 |

Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2221 serial # 161581 / 43-89 scintillation probe # 0508

Instrument Efficiency: 0.1872

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.486

| • | | 1 | ì | | | | |
|----------------------|---------|--|-------|--|-------------------------------------|-------------------------|---|
| | | 1 MINUTE DIRECT MEASUREMENT RESULT, COUNTS | | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | SR-90 BETA SMEAR RESULTS, COUNTS | | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Amblent Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² |
| 1B-6XD | Floor | . 166 | 272 | 466 | 82.65 | 153 | 0 |
| 1B-15XD | Floor | 155 | 235 | 352 | 82.65 | 160 | 0 |
| 1B-17XD | Wall | 158 | 167 | 40 | 82.65 | 162 | 0 |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency:

0.2275

Removable Contamination:

instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.486

| LOCATION | |
|-------------|--|
| DESIGNATION | DESCRIPTION OF LOCATION |
| | |
| 18-1 | Corridor 15 floor near entrance from corridor 45 |
| 1B-2 | Corridor 15 north wall (near entrance from corridor 45) 1.65 meters above floor |
| 18-3 | Corridor 15 south wall 0.4 meters above floor |
| 18-4 | Corridor 15 north wall 0.2 meters above floor |
| 18-5 | Corridor 15 south wall 1.85 meters above floor |
| 1B-6 | Corridor 15 floor |
| 18-7 | On south side of partition wall between counting room & low level lab 1.04 meters above floor |
| 1B-8 | Corridor 15 north wall 1.65 meters above floor |
| 18-9 | Corridor 15 south wall 0.4 meters above floor |
| 1B-10 | Counting room floor southwest comer |
| 1B-11 | Counting room floor northwest corner 0.18 meters from partition wall |
| 1B-12 | On east side (narrow portion bet, corridor & counting room) of corridor 15 north wall 0.2 meters above floor |
| 1B-13 | Corridor 15 southeast corner on south wall 1.85 meters above floor |
| 1B-14 | Corridor 15 floor washroom (formerly w/sink) |
| 1B-15 | Counting room floor east side |
| 1B-16 | Counting room northeast corner on north wall 0.76 meter above floor |
| 18-17 | Counting room south wall next to entrance between counting room & corridor 15, 1,65 meters above floor |
| | |

| | | SURVE | Y UNIT 2 (| Ejector Pit room) | | | |
|----------------------|-----------------------------------|--------------------------------------|---------------------|------------------------|--------------|--|---|
| | | 1 MINUTE D MEASUREMEN COUN | DIRECT T RESULT, | DIRECT MEASUREMENT | | ETA SMEAR S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Amblent Background ⁽¹⁾ | Count | DPM/100cm ² | | Sample Count (2 min) | DPM/100cm ² |
| 2-1 | Fioor | 116 | 180 | 342 | 82.5 | 175 | 10 |
| 2-2 | Wall | 110 | 160 | 267 | 82.5 | 169 | 4 |
| 2-3 | Wali | 109 | 165 | 299 | 82.5 | 164 | C |
| 2-4 | Wall | 107 | 156 | 262 | 82.5 | 201 | 37 |
| 2-5 | Floor | 110 | 137 | 144 | 82.5 | 141 | 0 |
| 2-6 | Floor | 104 | 126 | 118 | 82.5 | 185 | 21 |
| 2-7 | Wall | 116 | 189 | 390 | 82.5 | 170 | 5 |
| 2-8 | Fioor | 115 | 190 | 401 | 82.5 | 177 | 12 |
| | Underside of | | | | | | |
| 2-9 | Entry Level Floor | | 125 | <u>8</u> 5 | 82.5 | 134 | . 0 |
| 2-10 | Wall | 114 | 180 | 353 | 82.5 | 209 | 45 |
| 2-11 | Floor | 101 | 136 | 187 | 82.5 | 125 | 0 |
| 2-12 | Floor | 98 | 161 | 337 | 82.5 | 175 | 10 |
| 2-13 | Floor · | 105 | 160 | 294 | 82.5 | 172 | 7 |
| 2-14 | Wall | 118 | 151 | 176 | 82.5 | 153 | 0 |
| 2-15 | Underside of Entry Level Floor | 108 | 130 | 118 | en r | | _ |
| 2-16 | Wall | 102 | 165 | 337 | 82.5 | 157 | 0 |
| 2-17 | Wall | 110 | 141 | 186 | 82.5 | 165 | 0. |
| 2-18 | Wali | 105 | 160 | 294 | 82.5 82.5 | 190 178 | 26 13 |
| | | | | | UE.U | 1/6 | 18 |
| Date | | , | | | · | | |
| Surveyor | Edmund Young | | | | | | ·· |

⁽f) Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: 1,2221 serial # 161581 / 43-89 scintillation probe # 0508

Instrument Efficiency: 0.1872

Removable Contamination:

Instrument Used: 12929 serial # 163627 / 43-10-1 alpha beta sample counter # 171322 Instrument Efficiency: 0.488

| | | SURVE | Y UNIT 2 | /EY REPLICATE S (Ejector Pit room) | | VIIII | |
|----------------------|--------------|--------------------------------------|---------------|---|---------------------|-------------------------|---|
| | | 1 MINUTE D MEASUREI RESULT, CO | IRECT MENT | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | RESULT | ETA SMEAR S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Amblent Background ⁽¹⁾ | Count. | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² |
| . 2-6XD | Floor | 159 | 206 | 207 | 82.65 | 178 | . 13 |
| 2-8XD | Floor | 180 | 293 | 497 | 82.65 | 173 | 8 |
| 2-10XD | Wall | 158 | 227 | 303 | 82.65 | 148 | 0 |
| Date: | 01/16/01 | | | | | | |
| Surveyor | Edmond Young | | | , | | | |

Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.488

| CCARON | |
|------------------|--|
| DESIGNATION | DESCRIPTION OF LOCATION |
| 2-1 | Ejector Pit lower level west wall 1.78 meters above floor |
| 2-2 | Ejector Pit tower level northwest comer on west wall 1.78 meters above floor |
| 2.3 | Elector Pit entry level floor on west wall 1.78 meters above floor |
| 2-4 | Ejector Pit tower level southwest comer of south wall 1.85 meters above floor |
| 2-5 | Ejector Pit lower level southwest comer of floor |
| 2-6 | Elector Pit lower level west side of floor |
| 2-7 | Ejector Pit lower level northwest comer on north well 0.89 meters above floor |
| , 2 8 | Ejector Pit entry level floor next to west wall on floor |
| 2-9 | Ejector Pit lower level underside of entry level floor 1.58 meters from north wall |
| 2-10 | Ejector Plt lower level south wall 0.70 meters above floor |
| 2-11 | Ejector Pit lower level east side of floor |
| 2-12 | Ejector Pit lower level northeast comer of floor |
| 2-13 | Ejector Pit entry level floor next to railing on floor |
| 2-14 | Ejector Pit entry level floor on north wall 0.13 meters above floor |
| 2-15 | Ejector Pit lower level underside of entry level floor 0.43 meters from north well |
| 2-16 | Ejector Pit fower level southeast comer on east wall 1.28 meters above floor |
| 2-17 | Ejector Pit lower level east wall 1.28 meters above floor |
| 2-18 | Elector Pit entry level floor on east wall 1.98 moters, show floor |

| | | SUI | RVEY UNIT 4 | SURVEY SUMN (Men's Tollet) | - | | |
|---|--------------|--|-------------|---|--------------------|---|------------------------|
| | | 1 MINUTE DIRECT MEASUREMENT RESULT, COUNTS | | MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | SR-90 BI RESULT | TRANSFERABLE SR-90 SURFACE ACTIVITY | |
| Location Designation | Surface | Amblent Background ⁽¹⁾ | Count | D PM/100 cm ² | | Sample Count (2 min) | DPM/100cm ² |
| <u>4-1 · </u> | West Wall | 140 | 323 | 978 | 83 | 166 | 0 |
| 4-2 | West Wall | 149 | 297 | 791 | 83 | 174 | 8 |
| 4-3 | West Wall | 134 | 154 | 107 | 83 | 156 | 0 |
| 4-4 | West Floor | 128 | 185 | 304 | 83 | 148 | 0 |
| 4-5 | West Floor | 137 | 200 | 337 | 83 | 124 | 0 |
| 4-6 | North Wall | 136 | 190 | 288 | 83 | 192 | 27 |
| 4-7 | South Wall | 128 | 300 | 919 | 83 | 174 | 8 |
| 4-8 | East Wall | 131 | 298 | 892 | 83 | 154 | 0 |
| 4-9 | North Floor | 134 | 174 | 214 | 83 | 166 | 0 |
| 4-10 | North Wall | 142 | 312 | 908 | 83 | 160 | 0. |
| 4-11 | South Wall | 124 | 316 | 1026 | 83 | 160 | 0 |
| 4-12 | East Wall | 131 | 143 | 64 | 83 | 134 | 0 |
| 4-13 | East Wall | 128 | 292 | 876 | 83 | 136 | 0 |
| 4-14 | East Wall | 130 | 359 | 1223 | 83 | . 160 | 0 |
| Date: | 12/07/00 | | · | |] | | |
| Surveyor: | Edmond Young | | | | • | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2221 serial # 161581 / 43-89 scintillation probe # 0508

Instrument Efficiency:

0.1872

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

0.485

| | ST. ALBANS | | | EY REPLICATE | SUMMARY | SHEET | ······································ |
|----------------------|------------|--------------------------------------|-------------|---|------------------|-------------------------|---|
| ····· | | SUR | EVEY UNIT 4 | (Men's Toilet) | | - | |
| · . | | 1 MINUTE D MEASUREMEN' COUNT | TRESULT, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | ITA SMEAR S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Amblent Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² |
| 4-4XD | West Floor | . 197 | 258 | 268 | 82.65 | 153 | 0 |
| 4-6XD | North Wall | 199 | 271 | 316 | 82.65 | 151 | 2 |
| . 4-14XD | East Wall | 216 | 401 | . 813 | 82.65 | 168 | 3 |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Date: 01/16/01 Surveyor: Edmond Young

Direct Scan:

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0,486

| LOCATION | |
|-------------|--|
| DESIGNATION | DESCRIPTION OF LOCATION |
| 4-1 | Southwest corner of west wall 0.94 meters above floor |
| 4-2 | Middle of west wall 0.94 meters above floor |
| 4-3 | Northwest comer of west wall 0.94 meters above floor |
| 44 | Floor south side near entrance |
| 4-5 | Floor north side |
| 4-6 | Northwest comer of north wall 0.41 meters above floor |
| 4-7 | Southeast comer on east wall of entrance 0.34 meters above floor |
| 4-8 | Northeast comer on east well of entrance 0.34 meters above floor |
| 4-9 | Floor near north wall |
| 4-10 | North wall 1.26 meters above floor |
| 4-11 | South well next to former stall area 1.04 meters above floor |
| 4-12 | East wall of entrance 1.81 meters above floor |
| 4-13 | East wall of former stall area 0.15 meters above floor |
| 4-14 | East wall of former stall area 1.62 meters above floor |
| 4-15 | Ceiling ventilation grate west side |
| 4-16 | Ceiling ventilation grate east side |
| | |

| SURVEY | UNIT 5 (Corrido | r 45, Treatment L | Jnit & Ass | ociated Equipment Ro | om, and Foye | r at Foot of Stairs | |
|--------------------------|------------------|--------------------------------------|---------------|---|-------------------------------------|-------------------------|---|
| | | 1 MINUTE D MEASUREI RESULT, CO | IRECT MENT | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | SR-90 BETA SMEAR RESULTS, COUNTS | | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/180cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm² |
| 5-1 | Wall (1/10/01) | 120 | 431 | 1661 | 80.45 | -185 | 25 |
| 5-2 · | Wall (1/10/01) | 115 | 123 | 43 | 80.45 | 163 | 2 |
| 5-3 | Floor (1/10/01) | 108 | 146 | 203 | 80.45 | 169 | 8 |
| 5-4 | Wali (1/10/01) | 112 | 395 | 1512 | 80.45 | 204 | 44 |
| 5-5 | Wall (1/10/01) | 119 | 387 | 1432 | 80.45 | 141 | 0 |
| 5-6 | Floor (1/10/01) | 103 | 163 | 321 | 80.45 | 159 | 0 |
| 5-7 | Floor (1/12/01) | 115 | 164 | 262 | 82.5 | 150 | 0 |
| 5-8 | Wall (1/12/01) | 120 | 342 | 1186 | 82.5 | 181 | 16 |
| 5-9 | Wall (1/12/01) | 118 | 330 | 1132 | . 82.5 | 147 | . 0 |
| 5-10 | Wali (12/27/00) | . 116 | 171 | 294 | 81.3 | 167 | 5 |
| 5-11 | Floor (12/27/00) | 108 | 134 | 139 | 81.3 | 158 | 0 |
| 5-12 | Floor (1/12/01) | 98 | 102 | 21 | 82.5 | 150 | 0 |
| 5-13 | Wali (1/12/01) | 124 | 352 | 1218 | 82.5 | 165 | 0 |
| 5-14 | Wall (12/27/00) | 105 | 203 | 524 | 81.3 | 152 | 0 |
| 5-15 | Floor (12/27/00) | 103 | 215 | 598 | 81.3 | 169 | 7 |
| 5-16 | Floor (1/12/01) | 111 | 136 | · 134 | 82.5 | 171 | 6 |
| 5-17 | Wall (1/12/01) | 116 | 349 | 1245 | 82.5 | 165 | 0 |
| Date: | 12/27/00, 1/10 | /01, & 1/12/01 | | | | | |
| Surveyor: | Edmond Young | | | | | | · |
| (i) | Background mea | surement performe | d using a w | poden shield (i.e., result rep | presents only ga | mma component) | |
| Direct Scan: | | Instrument Used: | L2221 seria | 1#161581 / 43-89 scintilla | tion probe # 050 | <u> </u> | |
| | Ins | trument Efficiency: | 0.1872 | | pr | Ĭ | |
| Removable Contamination: | | Instrument Used: | | | | | |
| | Ins | trument Efficiency: | 0.486 | T | | | |

| SURVEY L | NIT 5 (Corrido | r 45, Treatment U | init & Asso | ciated Equipment Roo | n, and Foyer | at Foot of Stairs | |
|----------------------|----------------|--------------------------------------|----------------|---|--------------|------------------------|---|
| | | 1 MINUTE D MEASUREMENT COUNT | T RESULT, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | ETA SMEAR 3, COUNTS | TRANSFERABLI SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | | Sample Count (2) | DPM/100cm² |
| 5-3XD | Floor | 196 | 220 | 105 | 82.65 | 147 | 0 |
| 5-6XD | Floor | 170 | 209 | 171 | 82.65 | 173 | <u>8</u> |
| 5-8XD | Wall | 271 | 550 | 1226 | 82.65 | 147 | Ö |
| Date: | 01/16/01 | | | | | | |
| Surveyor: | Edmond Young | | - | | | | <u> </u> |

Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

| I OCATION | |
|-------------|--|
| DESIGNATION | DESCRIPTION OF LOCATION |
| | |
| 5-1 | Comidor South Wall opposite entrance to lab |
| 5-2 | Not accessible - use door to lab entrance 0.59 meters above right hand lower comer of door |
| 5-3 | Corridor 45 floor |
| 5-4 | Corridor South Wall next to ejector pit entrance |
| 5-5 | Corridor North Wall opposite ejector pit entrance |
| 9-5 | Corridor 45 floor |
| 2-7 | Foyer floor next to shield wall outside entrance to x-ray treatment room |
| 5-8 | X-ray treatment room west wall 0.81 meters above floor |
| 5-9 | X-ray treatment room south wall 1.5 meters above southwest comer of floor |
| 5-10 | X-ray control room north wall 0.15 meters above floor |
| 5-11 | X-ray control room floor |
| 5-12 | X-ray treatment room floor |
| 5-13 | X-ray treatment room north wall 0.5 meters above floor |
| 5-14 | X-ray control room south wall 1.85 meters above southeast comer of floor |
| 5-15 | X-ray control room floor |
| 5-16 | X-ray treatment room floor |
| 5-17 | X-ray treatment room south wall 1.5 meters above southeast comer of floor |
| | |

| | | URVEY UNIT 8A | (Drum Sto | rage Above Machine I | łoom) | | |
|----------------------|--------------|--------------------------------------|-----------|---|---|-------------------------|---|
| | · | 1 MINUTE D MEASUREMENT COUNT | result, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | ETA SMEAR S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Ambient Background ^(f) | Count | DPM/100cm ² | | Sample Count (2 min) | DPM/100cm ² |
| 8A-1 | Wall | 178 | 243 | 347 | 79.55 | 165 | 6 |
| 8A-2 | Wall | 179 | 222 | 230 | 79.55 | 172 | 13 |
| 8A-3 | Wall | 138 | 178 | 214 | 79.55 | 171 | 12 |
| 8A-4 | Wall | 183 | 275 | 491 | 79.55 | 172 | 13 |
| 8A-5 | Floor | 160 | 250 | 481 | 79.55 | 180 | 22 |
| 8A-6 | Floor | 124 | 216 | 491 | 79.55 | 182 | 24 |
| 8A-7 | Wall | 150 | 214 | 342 | 79.55 | 167 | 8 |
| 8-A8 | Floor | 126 | 853 | 3884 | 79.55 | 169 | 10 |
| 8A-9 | · Floor | 120 | 162 | 224 | 79.55 | 170 | 11 |
| 8A-10 | Floor | 118 | 186 | 363 | 79.55 | 180 | 22 |
| 8A-11 | Wali | 187 | 253 | 353 | 79.55 | 177 | 18 |
| 8A-12 | Wall | . 190 | 230 | 214 | 79.55 | 165 | 6 |
| 8A-13 | Wall | 132 | 160 | 150 | 79.55 | 147 | 0 |
| 8A-14 | Wali | 182 | 235 | 283 | 79.55 | 187 | 29 |
| 8A-15 | Wall | 188 | . 240 | 278 | 79.55 | 171 | 12 |
| Date: | 1/25/01 | | | | *************************************** | | |
| Surveyor: | Edmund Young | | | | | <u> </u> | |

(1) Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan;

Instrument Used: L2221 serial # 161581 / 43-89 scintillation probe # 508

Instrument Efficiency: 0.1872

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322 Instrument Efficiency: 0.486

| | ST. AL | BANS FINAL | STATUS | SURVEY SUMMA | RY SHEET | | |
|----------------------|--------------|--------------------------------------|-----------|---|---------------------|-------------------------|---|
| | | URVEY UNIT 8A | (Drum Sto | rage Above Machine F | Room) | | |
| | | 1 MINUTE D MEASUREMENT COUNT | result, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | ETA SMEAR 'S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm² | Background (cpm) | Sample Count (2 min) | |
| 8A-9XD | Floor | 124 | 188 | 281 | 79.55 | 160 | 1 |
| 8A-10XD | Floor | 161 | 205 | 193 | 79.55 | 165 | 6 |
| 8A-13XD | Wall | 150 | 190 | 176 | 79.55 | 172 | 13 |
| Date: | 1/26/01 | | | | | | |
| Surveyor: | Edmund Young | | | | | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2221 serial # 162420 / 43-89 scintillation probe # 171381

Instrument Efficiency: 0.2275

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322 Instrument Efficiency:

0.486

| LOCATION | |
|-------------|--|
| DESIGNATION | DESCRIPTION OF LOCATION |
| 8A-1 | X-ray shield wall outside surface |
| 8A-2 | X-ray shield wall outside surface |
| 8A-3 | X-ray shield wall outside surface |
| 8A-4 | North wall 0.9 meters above floor in northeast corner |
| 8A-5 | East floor next to X-ray shield wall |
| 8A-6 | Southeast comer on floor near-wall |
| 8A-7 | South wall 1.73 meters above floor |
| 8A-8 | North portion of floor 1.0 meter from wall |
| 8A-9 | Centler of room on floor |
| 8A-10 | South portion of floor near wall |
| 8A-11 | Wall on south side of room behind stairs to lower level 0.9 meter above floor. |
| 8A-12 | Wall on east side stairs to lower level, north corner 0.33 meter above floor |
| 8A-13 | Wall on east side stairs to lower level, south corner 0.33 meter above floor |
| 8A-14 | South wall 0.26 meters above floor |
| 8A-15 | Wall in southwest corner of room 1.15 meters above floor |
| | |

| | | SURVEY UNI | r 8B (Radi | laterial Storage Area) | , | | |
|-----------------------|-------------------|-----------------------------------|------------|---|---------|-----------------------|---|
| | | 1 MINUTE D MEASUREMEN COUNT | T RESULT, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | TA SMEAR S, COUNTS | TRANSFERABLI SR-90 SURFACE ACTIVITY |
| Lacation Mantagastics | | Ambient | | | | Sample Count | |
| Location Designation | Surface | Background ⁽¹⁾ | Count | DPM/100cm ² | (cpm) | (2 min) | DPM/100cm ² |
| <u>86-1</u> | Wali | 124 | 159 | 72 | 79.55 · | 150 | 0 |
| 8B-2 | Floor | 131 | 187 | 115 | 79.55 | 165 | 6 |
| 8B-3 | Floor | 149 | 174 | 51 | 79.55 | 141 | 0 |
| 8B-4 | Floor | 157 | 174 | 35 | 79.55 | 132 | 0 |
| 8B-5 | Wall | 165 | 203 | 78 | 79.55 | 160 | 1 |
| 8B-6 | Floor | 129 | 209 | 165 | 79.55 | 150 | 0 |
| 8B-7 | Floor | 155 | 179 | 49 | 79.55 | 155 | 0 |
| 8B-8 | Floor | 164 | 192 | 58 | 79.55 | 161 | 2 |
| 8B-9 | Floor | 152 | 177 | 51 | 79.55 | 172 | 13 |
| 8B-10 | Wali | 162 | 227 | 134 | 79.55 | 160 | 1 |
| 8B-11 | Floor | 130 | 185 | 113 | 79.55 | 171 | 12 |
| 8B-12 | Floor | 141 | 202 | 126 | 79.55 | 166 | 7 |
| 8B-13 | Floor | 132 | 198 | 136 | 79.55 | 153 | 0 |
| 8B-14 | Wall | 175 | 225 | 103 | 79.55 | 155 | Ö |
| Date | : 1/25/2001 (scan |) and 1/26/01 (smear | •} | | | | |
| | Edmund Young | | | | | | |

(1) Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2221 serial # 161581 / 43-89 scintillation probe # 0508

Instrument Efficiency: 0.1872

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha bata sample counter # 171322

Instrument Efficiency: 0.486

| | I. ALDANS | | | EY REPLICATE S Material Storage Area | | SHEE! | |
|----------------------|--|--------------------------------------|----------|---|-------------------|---|------------------------|
| | 1 MINUTE DIRECT MEASUREMENT RESULT, COUNTS | | | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | SR-90 B RESULT | TRANSFERABLE SR-90 SURFACE ACTIVITY | |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DFM/100cm ² |
| 8B-1XD | Wall | 182 | 203 | 92 | 79.55 | 167 | 8 |
| 8B-3XD | Floor | 167 | 196 | 127 | 79.55 | 141 | 0 |
| 8B-8XD | Floor | 172 | 210 | 167 | 79.55 | 156 | 00 |
| Date: | 1/26/01 | | <u> </u> | | | | |
| Surveyor: | Edmund Young | | | | | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Direct Scan:

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.486

| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|-------------------------|---|
| | |
| 8B-1 | North wall 1.85 meters above floor in northeast comer |
| · 8B-2 | Northeast side of floor near doorway |
| 8B-3 | East side of floor next to wall |
| 8B-4 | Southeast side of floor near doorway |
| 8B-5 | On south wall 1.86 meters above the floor |
| 9-B8 | North portion of floor next to wall |
| 7-88 | North middle section of floor |
| 8B-8 | South middle section of floor |
| 6-88 | South portion of floor near wall |
| BB-10 | North wall 1.66 meters above floor in northwest comer |
| 8B-11 | Northwest side of floor near wall |
| 8B-12 | West side of floor near wall |
| 8B-13 | Southwest side of floor near wall |
| 8B-14 | On south wall 1.84 meters above the floor |
| | |



STL St. Louis 13715 Rider Trail North Earth City, MO 63045

Tel 314 298 8566 Fax 314 298 8757 www.stf-inc.com

ANALYTICAL REPORT

PROJECT NO. VA

St. Albans

Lot #: F1A080114

Tim Taylor

Stone & Webster Engineering Co 245 Summer Street Boston, MA 02210

SEVERN TRENT LABORATORIES, INC.

Ron Martino Project Manager

February 5, 2001

Case Narrative LOT NUMBER: F1A080114

This report contains the analytical results for the 23 samples received under chain of custody by STL St. Louis on January 8, 2001. These samples are associated with your St. Albans project.

All applicable quality control procedures met method-specified acceptance criteria.

This report is incomplete without the case narrative. All results are based upon sample as received, wet weight, unless noted otherwise.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperatures of samples on receipt.

There were no anomalies with this analysis.

METHODS SUMMARY

F1A080114

PARAMETER ANALYTICAL PREPARATION METHOD METHOD

STRONTIUM 90 Sr90-Y90 cal DOE 7500-SR MOD

References:

DOE

"DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F1A080114

| | | AT HENCE CAMPLE TO | SAMPLED DATE | SAMP TIME |
|-------|---------|--------------------|-----------------|--------------|
| WO # | SAMPLE# | CLIENT SAMPLE ID | <u> </u> | |
| DTCWS | 001 | SA5SS301XX | 01/03/01 | |
| DTCW8 | 002 | SA5SS302XX | 01/03/01 | |
| DTCW9 | 003 | SA5SS303XX | 01/03/01 | |
| DTCXA | 004 | SA5SS302XD | 01/03/01 | |
| DTCXC | 005 | SA1SS312XX | 01/03/01 | |
| DTCXD | 006 | SA1SS313XX | 01/03/01 | |
| DTCXE | 007 | SAISS314XX | 01/03/01 | |
| DTCXF | 008 | SA1SS315XX | 01/03/01 | |
| DTCXG | 009 | SAISS314XD | 01/03/01 | |
| DTCXH | | SA1SS301XX | 01/03/01 | |
| DTCXJ | | SA1SS302XX | 01/03/01 | |
| DTCXK | | SA1SS303XX | 01/03/01 | |
| DTCXL | = | SA1SS304XX | 01/03/01 | |
| DTCXM | | SA1SS305XX | 01/03/01 | |
| DTCXN | | SA1SS306XX | 01/03/01 | |
| DTCXP | | SA1SS307XX | 01/03/01 | |
| DTCXQ | | SA1SS308XX | 01/03/01 | |
| DTCXR | | SA1SS309XX | 01/03/01 | |
| DTCXV | – – | SAISS310XX | 01/03/01 | |
| DTCXW | | SA1SS311XX | 01/03/01 | |
| DTCXO | | SAISS301XD | 01/03/01 | |
| DTCX1 | | SA1SS309XD | 01/03/01 | 15:00 |
| DTCX1 | | SAISS311XD | 01/03/01 | 15:00 |
| | | | | |

NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: SA5SS301XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-001

Work Order: DTCW5

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

01/08/01 0910

| . Parameter | Result | Qual | Total Uncert. (2 gt/-) | MDC | Prep Date | Analysis Date | Batch # | Yld & |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | ρÇ | i/g | 7500-S | R MOD | | |
| Strontium 90 | -0.02 | ប | 0.35 | 0.62 | 01/23/01 | 01/31/01 | 1023234 | 100 |

NOTE (S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

Result is less than the sample detection limit.

Client Sample ID: SA5SS302XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-002

Work Order: DTCW8 SOLID Matrix:

Date Collected: 01/03/01 1500 01/08/01 0910 Date Received:

| Paramater | Result | Qual | Total Uncert. (2 g+/-) | | MDC | Prep Date | Analysia Date | Batch # | Yld * |
|---------------|-----------------|------|------------------------------|-------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | | pCi/g | | 7500~SI | R MOD | | |
| Strontium 90 | 0.04 | U | 0.42 | | 0.72 | 01/23/01 | 01/31/01 | 1023234 | 100 |

Client Sample ID: SA5SS303XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-003

Work Order: DTCW9

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|------------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 0.47 | U | 0.40 | 0.65 | 01/23/0 | 1 01/31/01 | 1023234 | 100 |

NOTE (S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

Result is less than the sample detection limit.

Client Sample ID: SA5SS302XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-004

DTCXA Work Order:

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | p | Ci/g | 7500- | SR MOD | | |
| Strontium 90 | -0.07 | U | 0.31 | 0.54 | 01/23/0 | 01 01/31/01 | 1023234 | 100 |

NOTE (S)

Data are incomplete without the case narrative. MDC is determined by instrument performance only. Bold results are greater than the MDC

Result is less than the sample detection limit.

Client Sample ID: SA1SS312XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-005

Work Order: DTCXC

Matrix:

SOLID

Date Collected: 01/03/01

1500

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date Ba | atch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|---------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 1.27 | | 0.47 | 0.59 | 01/23/ | 01/31/01 10 | 23234 | 100 |

Client Sample ID: SA1SS313XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-006

Work Order: DTCXD

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

SOLID Matrix:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysia Date | Batch # | Yld # |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC. | i/g | 7500~ | SR MOD | | |
| Strontium 90 | 0.33 | ប | 0.36 | 0.60 | 01/23/0 | 1 01/31/01 | 1023234 | 100 |

Client Sample ID: SA1SS314XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-007

Work Order: DTCXE

Matrix:

SOLID

Date Collected: 01/03/01 1500 Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|--|------|------------------------------|------|--------------|------------------|-----------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | P | Ci/g | 7500- | SR MOD | | |
| Strontium 90 | 2.14 | | 0.59 | 0.57 | 01/23/0 | 01/31/0 | L 1023234 | 100 |
| | The second secon | | | | | | | |

Client Sample ID: SAISS315XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-008

DTCXF

Work Order: Matrix:

SOLID

Date Collected: 01/03/01 1500 Date Received:

| Par ame ter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Data | Batch # | Yld & | |
|--|-------------------------|------|------------------------------|---------------|---------------------------|-------------------|---------|-------|--|
| THE RESERVE THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER. | DOE 7500-SR MOD 0.05 | U | 0.41 | pCi/g 0.71 | 7500-8 01/23/01 | R MOD 01/31/01 | 1023234 | 100 | |

Client Sample ID: SA1SS314XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-009

Work Order: DTCXG Matrix:

SOLID

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 gt/-) | MDC | Prep Date | Analysis Date Ba | tch # | Yld % |
|---------------|-----------------|------|------------------------------|-----|--------------|---------------------|-------|-------|
| SR-90 BY GFPC | OOE 7500-SR MOD | | рÇ | i/g | 7500- | SR MOD | | |
| Strontium 90 | 5.6 | | 1.4 | 0.6 | 01/23/0 | 01/31/01 102 | 23234 | 100 |

Client Sample ID: SA1SS301XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-010

Work Order: DTCXH Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Data | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|-------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | | pCi/g | 7500- | er mod | | |
| Strontium 90 | 2.07 | | 0,47 | 0.66 | 01/23/0 | 1 01/31/01 | 1023234 | 100 |

Client Sample ID: SA1SS302XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-011

Work Order: DTCXJ Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 0.20 | υ | 0.39 | 0.66 | 01/23/0 | 01/31/01 | 1023234 | 97 |

NOTE (S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only. Bold results are greater than the MDC

Result is less than the sample detection limit.

Client Sample ID: SA1SS303XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-012

DTCXK Work Order:

Date Collected: 01/03/01 1500 01/08/01 0910 Date Received:

SOLID Matrix:

| Parame te r | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Data | Analysis Date B | atch # | Yld % |
|--------------------|-----------------|------|------------------------------|-------|--------------|--------------------|--------|-------|
| | DOE 7500-SR MOD | | | pCi/g | 7500- | SR MOD | | |
| Strontium 90 | 1.84 | | 0.56 | 0.62 | 01/23/0 | 01/31/011 | 023234 | 100 |

Client Sample ID: SA1SS303XX DUP

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-012X

DTCXK Work Order:

SOLID Matrix:

Date Collected: 01/03/01 1500

01/08/01 0910 Date Received:

| Result | · Qual | Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld 4 | k . |
|-----------------|-----------------|---------------------|--|--|---|---------------------------|--|---|
| DOE 7500-SR MOD | | PC | i/g | 7500- | SR MOD | | | |
| 1.76 | | 0.54 | 0.61 | 01/23/0 | 1 01/31/01 | 1023234 | 100 | |
| | DOE 7500-SR MOD | DOE 7500-SR MOD | Result Qual (2 g+/-) DOE 7500-SR MOD PC | Uncert. Result Qual (2 g+/-) MDC | No. No. | Uncert. Prep Analysis | Uncert. Prep Analysis Date Date Date Batch # | Result Qual (2 g+/-) MDC Date Date Batch # Yld 9 DOE 7500-SR MOD PCi/g 7500-SR MOD |

Client Sample ID: SA1SS304XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-013

Work Order: DTCXL Matrix: SOLID

Date Received:

Date Collected: 01/03/01 1500

| : Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date Bato | h# | Yld % |
|----------------|-----------------|------|------------------------------|------|--------------|-----------------------|-----|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | L/g | 7500- | SR MOD | | |
| strontium 90 | 2.34 | | 0.60 | 0.51 | 01/24/0 | 02/01/01 1024: | 214 | 89 |

Client Sample ID: SAISS305XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-014

DTCXM

Work Order: Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date B | atch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500-5 | ER MOD | | |
| Strontium 90 | 0.98 | | 0.42 | 0.57 | 01/24/0 | 1 02/01/01 10 | 24214 | 80 |

Client Sample ID: SA1SS306XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-015

Work Order: DTCXN Matrix: SOLID

N Date Received

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | МОС | Prep Date | Analysis Date | Batch # | X1d % |
|---------------|-----------------|------|------------------------------|------|--------------|-----------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | | | SR MOD 01 02/01/01 | 1004014 | 79 |
| Strontium 90 | 0.68 | _ | 0,39 | 0.59 | 01/24/0 | 1 02/01/01 | 1024214 | . y |

Client Sample ID: SA1SS307XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-016

Work Order: DTCXP

SOLID Matrix:

Date Collected: 01/03/01 1500

Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | мос | Prep Date | Analysis Date B | atch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pCi | ·/g | 7500- | SR MOD | | • |
| Strontium 90 | 0.72 | | 0.42 | 0.64 | 01/24/0 | 1 02/01/01 10 | 24214 | 79 |

Client Sample ID: SA1SS308XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-017

Work Order: DTCXQ

SOLID Matrix:

Date Collected: 01/03/01 1500 01/08/01 0910 Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date B | atch # | Yld 4 |
|---------------|-----------------|------|------------------------------|------|--------------|--------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | ρq | :i/g | 7500- | BR MOD | | 1 |
| Strontium 90 | 1.69 | | 0,48 | 0.47 | 01/24/0 | 1 02/01/01 10 | 024214 | 90 |

Client Sample ID: SA1SS309XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID: F1A080114-018

Work Order: Matrix:

DTCXR

SOLID

Date Collected: 01/03/01 Date Received:

01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 o+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld t |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|-----------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | p | Ci/g | 7500- | SR MOD | | |
| Strontium 90 | 6.81 | | 0.89 | 0.60 | 01/24/0 | 02/02/01 | . 1024214 | . 88 |

NOTE (S)

Data are incomplete without the case narrative. MDC is determined by instrument performance only. Bold results are greater than the MDC

Client Sample ID: SA1SS310XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-019

Work Order: DTCXV

Matrix: SOLID

Date Collected: 01/03/01 1500

Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % | |
|---------------|-----------------|------|------------------------------|------|--------------|------------------|---------|-------|--|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | | |
| Strontium 90 | 4.23 | | 0.95 | 0.56 | 01/24/ | 01 02/02/01 | 1024214 | 89 | |

Client Sample ID: SA1SS311XX

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-020

Work Order: DTCXW

Matrix:

SOLID

Date Collected: 01/03/01 1500

Date Received:

01/08/01 0910

| Parameter . | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld & |
|---------------|-----------------|------|------------------------------|-----|--------------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 4.6 | | 1.0 | 0.6 | 01/24/0 | 02/01/01 | 1024214 | 74 |

Client Sample ID: SA1SS301XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-021

Work Order: DTCX0 Matrix:

SOLID

Date Collected: 01/03/01 1500 01/08/01 0910 Date Received:

| Parameter | Result | Qual | Total Uncert. (2 g+/-) | MDC | Prep | Analysis Date | Batch # | Yld # |
|---------------|-----------------|------|------------------------------|------|---------|------------------|---------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 0.05 | U | 0.39 | 0.67 | 01/24/0 | 02/01/0 | 1024214 | 71 |

Client Sample ID: SA1SS309XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-022

Work Order: DTCX1

Matrix: SOLID

Date Collected: 01/03/01 1500 Date Received: 01/08/01 0910

| Parameter | Result | Qual | Total Uncert. (2 gt/-) | MDC | Prep Date | Analysis Dat a E | atch # | Yld % |
|---------------|-----------------|------|------------------------------|------|--------------|----------------------------|--------|-------|
| SR-90 BY GFPC | DOE 7500-SR MOD | | pC | i/g | 7500- | SR MOD | | |
| Strontium 90 | 3.27 | | 0.81 | 0.63 | 01/24/ | 01 02/01/011 | 024214 | 79 |

Client Sample ID: SA1SS311XD

Quanterra, Inc. - Radiochemistry

Lab Sample ID:F1A080114-023

Date Collected: 01/03/01

Work Order: DTCX2 Matrix:

SOLID

1500 01/08/01 0910 Date Received:

| | Parameter | Result | Qual | Total Uncert. (2 g+/-) | МОС | Prep Date | Analysis Date | Batch # | Yld # |
|-----|---------------|-----------------|------|------------------------------|-------|--------------|------------------|---------|-------|
| . • | SR-90 BY GFPC | DOE 7500-SR MOD | | 1 | pCi/g | 7500- | SR MOD | | |
| ٠ | Strontium 90 | 1.03 | | 0.40 | 0.52 | 01/24/0 | 02/01/01 | 1024214 | 86 |

METHOD BLANK REPORT

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F1A080114

Matrix:

SOLID

| | | | Total | | | Lab Sample ID | | | |
|-------------------------------|--------------------------|------|---------------------|---------------------|--------------|------------------|-------------------------------|----------|--|
| Parameter . | Result | Qual | Uncert. (2 g+/-) | мос | Prep Date | Analysis Date | Batch # | Yld % | |
| SR-90 BY GFPC Strontium 90 | DOE 7500-SR MOD -0.05 | Ü | pCi/g 0.35 | 7500-SR MOD 0.61 | 01/23/01 | | 30000-234 1023234 | 100 | |
| SR-90 BY GFPC Strontium 90 | DOE 7500-SR MOD -0.11 | บ | pCi/g | 7500-SR MOD 0.75 | 01/24/01 | | 400 00-2 14 1024214 | 88 88 | |

NOTE (S)

)ata are incomplete without the case narrative.

MDC is determined using instrument performance only Bold results are greater than the MDC

U Result is less than the sample detection limit.

DUPLICATE EVALUATION REPORT

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F1A080114

Work Order #:

Matrix:

DTAC SOLID Date Sampled:

01/02/00

Date Received: 01/05/01

| , | | | | Total | • | | Total | QC Sample ID | | | |
|---------------|-----|------------------|-----------|----------------------|-----------------|---------------------|---------------------|--------------|----------|---------|--|
| Parameter | | SAMPLE Rosult | | Uncert. (2 a +/-) | a Yld | DUPLICATE Result | Uncert. (2 σ+/-) | % Yld | Pr | ecision | |
| SR-90 BY GFPC | DOE | 7500-SR | pCi | /g | 7500-8R | MOD | | | F1A05020 | 6-007 | |
| Strontium 90 | | -0.05 Batcl | υ . #: | 0.34 1024214 | 87 (Sample) | 0.16 U 1024214 | 0.34 (Duplicate) | 90 | 36 | 7 %RPD | |
| SR-90 BY GFPC | DOE | 7500-SR | pCi | /g | 7500-SR | MOD | | | F1A08011 | 4-012 | |
| Strontium 90 | | 1.84 Batcl | . #: | 0.56 1023234 | 100 {Sample} | 1.76 1023234 | 0.54 (Duplicate) | 100 | . 4 | \$RPD | |

NOTE (S)

Data are incomplete without the case narrative. Calculations are performed before rounding to avoid round-off error in calculated results

Result is less than the sample detection limit.

Laboratory Control Sample Report

Quanterra, Inc. - Radiochemistry

Client Lot ID:

F1A080114

Matrix:

SOLID

| • | | | | Total | | | Lab S | ample ID |
|---------------|-----|--------------|---------|---------------------|--------------|-------|-------|----------------------|
| arameter | | Spike Amount | Result | Uncert, (2 g+/-) | MDC | % Yld | % Rec | QC Control Limits |
| SR-90 BY GFPC | DOE | 7500-SR MOD | pCi/g | | 7500-SR MOD | | F1A23 | 0000-234C |
| Strontium 90 | 202 | 9.83 | 5.8 | 1.2 | 0.6 | 100 | 59 | 49 - 126 |
| SEFOREE SO | | Batch #: | 1023234 | | AnalysisDate | 01/3 | 1/01 | |
| SR-90 BY GFPC | DOE | 7500-SR MOD | pCi/g | | 7500-SR MOD | | F1A24 | 0000-214C |
| Strontium 90 | | 9.83 | 11.4 | 2.4 | 0.8 | 76 | 116 | 49126 |
| SCIONCIAM 50 | | Batch #: | 1024214 | | AnalysisDate | 02/0 | 2/01 | |

Appendix B: Survey and Soil Sample Location Maps

| | | • | 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - | - |
|---------------------------------------|--|--|---|----------------|
| • | | • | | |
| | | | • | |
| · · · · · · · · · · · · · · · · · · · | SURVEY UNIT 1A (High Level and Low Level Labs & Isoto | oe Storage Area) | | |
| SOIL SAMPLE DESIGNATION | COLLECTION LOCATION DESCRIPTION | Sr-90 ACTIVITY CONCENTRATION (pCi/g) | TOTAL UNCERTAINTY +/- 2 o (pCi/g) | MDC (pCi/g) |
| 04400004VV | Chairles and vising transh helpsy high level lab sink | 1.07 | 0.47 | 0.66 |
| SA1SS301XX SA1SS302XX | Stainless steel piping trench below high level lab sink Stainless steel piping trench under high level lab fume hood drain north end | 0.20 | 0.39 | 0.66 |
| | Stainless steel piping trench under high level lab fume hood drain routh end | 1.84 | 0.56 | 0.62 |
| SA1SS303XX | Stainless steel piping trench below low level lab sink northwest corner | 2.34 | 0.60 | 0.51 |
| SA1SS304XX SA1SS305XX | Stainless steel piping trench below UST area | 0.98 | 0.42 | 0.57 |
| SA1SS306XX | Stainless steel piping trench junction of low level sink and UST drain lines | 0.68 | 0.39 | 0.59 |
| \$A1\$\$307XX | Stainless steel piping trench below low level lab sink northeast corner | 0.72 | 0.42 | 0.64 |
| SA1SS308XX | Stainless steel pipe trench beneath low level lab cabinet area | 1.69 | 0.48 | 0.47 |
| SA1SS309XX | Cast Iron piping trench beneath emergency shower drain area | 6.81 | 0.89 | 0.60 |
| SA1SS310XX | Stainless steel/cast iron common trench approximately 4 ft east of emergency shower drain | 4.23 | 0.95 | 0.56 |
| SA1SS311XX | Stainless steel/cast iron common trench approximately 8 ft east of emergency shower drain | 4.60 | 1.00 | 0.60 |
| SA1SS301XD | Stainless steel piping trench below high level lab sink - Duplicate | 0.05 | 0.39 | 0.67 |
| \$A1SS309XD | Cast Iron piping trench beneath emergency shower drain area - Duplicate | 3.27 | 0.81 | 0.63 |
| SA1SS311XD | Stainless steel/cast iron common trench approximately 8 ft east of emergency shower drain | 1.03 | 0.40 | 0,52 |

| | SOIL SAMPLE | |
|-------------|-------------|---|
| | | |
| Map Locator | DESIGNATION | COLLECTION LOCATION DESCRIPTION |
| A | SA1SS301XX | Stainless steel piping trench below high level lab sink |
| В | SA1SS302XX | Stainless steel piping trench under high level lab fume hood drain north end |
| С | SA1SS303XX | Stainless steel piping trench under high level lab fume hood drain south end |
| D | SA1SS304XX | Stainless steel piping trench below low level lab sink northwest corner |
| Ε . | SA1SS305XX | Stainless steel piping trench below UST area |
| F | SA1SS306XX | Stainless steel piping trench junction of low level sink and UST drain lines |
| G · | SA1SS307XX | Stainless steel piping trench below low level lab sink northeast corner |
| Н | SA1SS308XX | Stainless steel pipe trench beneath low level lab cabinet area |
| l l | SA1SS309XX | Cast Iron piping trench beneath emergency shower drain area |
| J | SA1SS310XX | Stainless steel/cast iron common trench approximately 4 ft east of emergency shower drain |
| K | SA1SS311XX | Stainless steel/cast iron common trench approximately 8 ft east of emergency shower drain |
| L | SA1SS301XD | Stainless steel piping trench below high level lab sink - Duplicate |
| М | SA1SS309XD | Cast Iron piping trench beneath emergency shower drain area - Duplicate |
| N | SA1SS311XD | Stainless steel/cast iron common trench approximately 8 ft east of emergency shower drain |

÷.

| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|----------------------|--|
| 1A-1 | High Level Lab northwest corner on wall 0.48 meters above floor |
| 1A-2 | High Level Lab west wall 0.61 meters above floor |
| 1A-3 | High Level Lab west wall 0.61 meters above floor |
| 1A-4 | High Level Lab north wall 1.78 meters above floor |
| 1A-5 | High Level Lab south wall 0.3 meters above floor |
| 1A-6 | High Level Lab floor west side |
| 1A-7 | High Level Lab northeast corner on partition between high & low level labs 0.48 meters above floor |
| 1A-8 | High Level Lab south wall 1.6 meters above floor |
| 1A-9 | High Level Lab floor south side |
| 1A-10 | High Level Lab floor north side |
| 1A-11 | High Level Lab east partition between high & low level labs 1.78 meters above floor |
| 1A-12 | High Level Lab south wall 0.3 meters above floor |
| 1A-13 | Low Level Lab floor east side |
| 1A-14 | Low Level Lab west partition wall between high & low level labs 0.48 meters above floor |
| 1A-15 | Low Level Lab east partition wall between low level lab & counting room 1.0 meters above floor |
| 1A-16 | Low Level lab north wall 1.78 meters above floor |

| | ST. ALBANS FINAL STATUS SURVEY REPLICATE SUMMARY SHEET | | | | | | | | | |
|----------------------|--|--------------------------------------|------------|------------------------|---------------------|---|------------------------|--|--|--|
| | SURVEY (| JNIT 1A (High Le | vel and Lo | w Level Labs & Isotope | Storage Are | a) | | | | |
| | DIRECT 1 MINUTE DIRECT MEASUREMENT | | | | | TRANSFERABLE SR-90 SURFACE ACTIVITY | | | | |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² | | | |
| 1A-5XD | Wall | 153 | 233 | 352 | 82.65 | 179 | 14 | | | |
| 1A-9XD | Floor (Soil) | 215 | 284 | 303 | 82.65 | 185 | 20 | | | |
| 1A-15XD | · Wall_ | 179 | 222 | 189 | 82.65 | 143 | 0 | | | |
| Date: Surveyor: | | | | | | | | | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

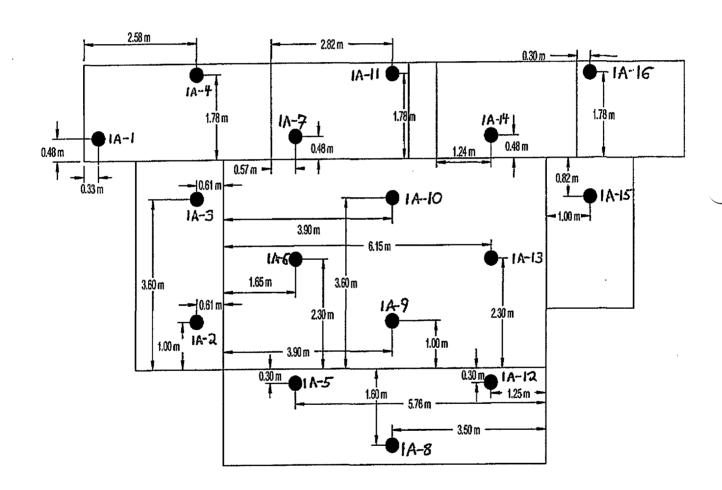
Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.486

HIGH LEVEL AND LOW LEVEL LABS & ISOTOPE STORAGE AREA

Survey Unit 1A



| SURVEY UNIT 1B (Counting Room, Wash Room & Corridor 15) | | | | | | | | |
|---|----------------------------|--|--|--|--|--|--|--|
| Map Locator | SOIL SAMPLE DESIGNATION | COLLECTION LOCATION DESCRIPTION | | | | | | |
| 0 | SA1SS312XX | Stainless steel/cast iron common trench approximately 12 ft east of emergency shower drain | | | | | | |
| P | SA1SS313XX | Stainless steel/cast iron common trench crossing corridor 15 ramp north side | | | | | | |
| Q | SA1SS314XX | Stainless steel/cast iron common trench crossing corridor 15 ramp south side | | | | | | |
| R | SA1SS315XX | Cast iron common trench piping trench beneath distillation sink area in closet | | | | | | |
| S | SA1SS314XD | Stainless steel/cast iron common trench crossing corridor 15 ramp south side - Duplicate | | | | | | |

TOTAL

UNCERTAINTY +/- 2

σ (pCl/g)

0.47

0.36

0.59

0.41

MDC

(pCl/g)

0.59

0.60

0.57

0.71

0.60

Sr-90 ACTIVITY

CONCENTRATION

(pCl/g)

1.27

0.33

2.14

0.05

SURVEY UNIT 1B (Counting Room, Wash Room & Corridor 15)

COLLECTION LOCATION DESCRIPTION

Stainless steel/cast Iron common trench approximately 12 ft east of emergency shower drain

Stainless steel/cast from common trench crossing corridor 15 ramp south side - Duplicate

Stainless steel/cast iron common trench crossing corridor 15 ramp north side

Stainless steel/cast iron common trench crossing corridor 15 ramp south side

Cast Iron common trench piping trench beneath distillation sink area in closet

SOIL SAMPLE

DESIGNATION

SA1SS312XX

SA1SS313XX

SA1SS314XX

SA1SS315XX

SA1SS314XD

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| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|----------------------|--|
| | DECOMPTION OF LOCATION |
| 1B-1 | Corridor 15 floor near entrance from corridor 45 |
| 1B-2 | Corridor 15 north wall (near entrance from corridor 45) 1.65 meters above floor |
| 1B-3 | Corridor 15 south wall 0.4 meters above floor |
| 1B-4 | Corridor 15 north wall 0.2 meters above floor |
| 1B-5 | Corridor 15 south wall 1.85 meters above floor |
| 1B-6 | Corridor 15 floor |
| 1B-7 | On south side of partition wall between counting room & low level lab 1.04 meters above floor |
| 1B-8 | Corridor 15 north wall 1.65 meters above floor |
| 1B-9 | Corridor 15 south wall 0.4 meters above floor |
| 1B-10 | Counting room floor southwest corner |
| 1B-11 | Counting room floor northwest corner 0.18 meters from partition wall |
| 1B-12 | On east side (narrow portion bet. corridor & counting room) of corridor 15 north wall 0.2 meters above floor |
| 1B-13 | Corridor 15 southeast corner on south wall 1.85 meters above floor |
| 1B-14 | Corridor 15 floor washroom (formerly w/sink) |
| 1B-15 | Counting room floor east side |
| 1B-16 | Counting room northeast corner on north wall 0.76 meter above floor |
| 1B-17 | Counting room south wall next to entrance between counting room & corridor 15, 1.65 meters above floor |

| | SUR | VEY UNIT 1B (C | ounting Ro | om, Wash Room & Co | rridor 15) | | | |
|----------------------|--------------|---------------------------------------|------------|--|---------------------|----------------------|---|--|
| | | 1 MINUTE D MEASUREMEN COUNT | T RESULT, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | | TRANSFERABLI SR-90 SURFACI ACTIVITY | |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² | |
| 1B-6XD | Floor | 166 | 272 | 466 | 82.65 | 153 | 0 | |
| 1B-15XD | Floor | 155 | 235 | 352 | 82.65 | 160 | 0 | |
| 1B-17XD | Wall | 158 | 167 | 40 | 82,65 | 162 | 0 | |
| Date: | 01/16/01 | | | | | | | |
| Cuntovon | Edmond Young | · · · · · · · · · · · · · · · · · · · | | | | | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

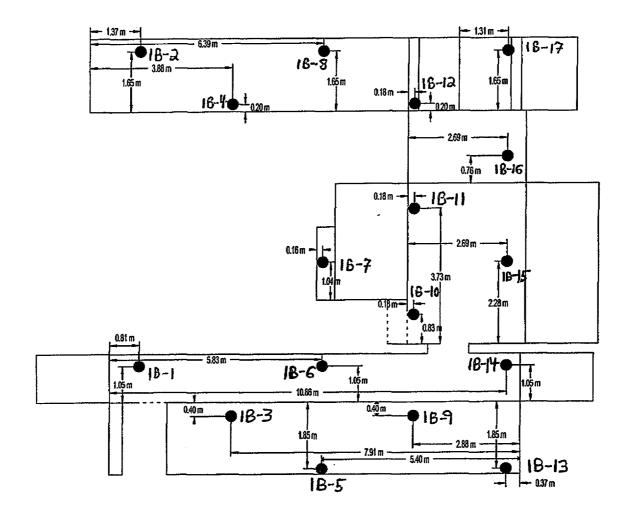
Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

COUNTING ROOM, WASH ROOM & CORRIDOR 15

Survey Unit 1B



| LOCATION | |
|-------------|--|
| DESIGNATION | DESCRIPTION OF LOCATION |
| 2-1 | Ejector Pit lower level west wall 1.78 meters above floor |
| 2-2 | Ejector Pit lower level west wall 1.76 meters above floor |
| 2-3 | |
| 2-3 | Ejector Pit entry level floor on west wall 1.78 meters above floor Ejector Pit lower level southwest corner of south wall 1.85 meters above floor |
| 2-5 | Ejector Pit lower level southwest corner of south wait 1.65 meters above hoor |
| 2-5 2-6 | |
| 2-6 2-7 | Ejector Pit lower level west side of floor |
| <u> </u> | Ejector Pit lower level northwest corner on north wall 0.89 meters above floor |
| | |
| 2-8 | Ejector Pit entry level floor next to west wall on floor |
| 2-9 | Ejector Pit lower level underside of entry level floor 1.58 meters from north wall |
| 2-10 | Ejector Pit lower level south wall 0.70 meters above floor |
| 2-11 | Ejector Pit lower level east side of floor |
| 2-12 | Ejector Pit lower level northeast corner of floor |
| 2-13 | Ejector Pit entry level floor next to railing on floor |
| | |
| | |
| 2-14 | Ejector Pit entry level floor on north wall 0.13 meters above floor |
| 2-15 | Ejector Pit lower level underside of entry level floor 0.43 meters from north wall |
| 2-16 | Ejector Pit lower level southeast corner on east wall 1.28 meters above floor |
| 2-17 | Ejector Pit lower level east wall 1.28 meters above floor |
| 2-18 | Ejector Pit entry level floor on east wall 1.28 meters above floor |

| ST. ALBANS FINAL STATUS SURVEY REPLICATE SUMMARY SHEET SURVEY UNIT 2 (Ejector Pit room) | | | | | | | | | |
|---|--------------|--------------------------------------|-------|---|------------------|-------------------------|---|--|--|
| | | 1 MINUTE D MEASUREM RESULT, CO | MENT | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | ETA SMEAR S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY | | |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² | | |
| 2-6XD | Floor | 159 | 206 | 207 | 82.65 | 178 | 13 | | |
| 2-8XD | Floor | 180 | 293 | 497 | 82.65 | 173 | 8 | | |
| 2-10XD | Wall | 158 | 227 | 303 | 82.65 | 148 | 0 | | |
| Date: | 01/16/01 | | | | | | | | |
| Surveyor. | Edmond Young | | | | | | | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

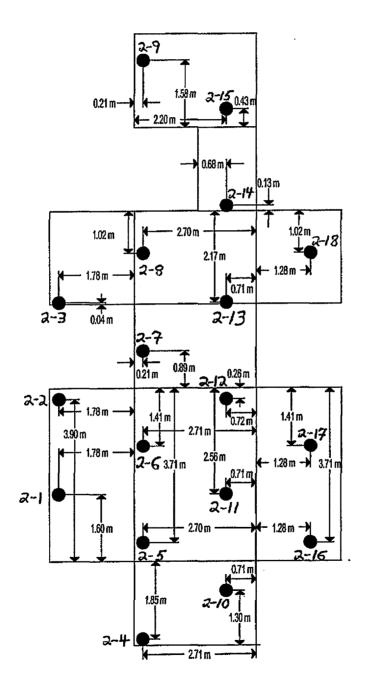
Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.486

FIGURE 6-7 EJECTOR PIT ROOM

Survey Unit 2



| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|----------------------|---|
| 4-1 | Southwest corner of west wall 0.94 meters above floor |
| 4-2 | Middle of west wall 0.94 meters above floor |
| 4-3 | Northwest corner of west wall 0.94 meters above floor |
| 4-4 | Floor south side near entrance |
| 4-5 | Floor north side |
| 4-6 | Northwest corner of north wall 0.41 meters above floor |
| 4-7 | Southeast corner on east wall of entrance 0.34 meters above floor |
| 4-8_ | Northeast corner on east wall of entrance 0.34 meters above floor |
| 4-9 | Floor near north wall |
| 4-10 | North wall 1.26 meters above floor |
| 4-11 | South wall next to former stall area 1.04 meters above floor |
| 4-12 | East wall of entrance 1.81 meters above floor |
| 4-13 | East wall of former stall area 0.15 meters above floor |
| 4-14 | East wall of former stall area 1.62 meters above floor |
| 4-15 | Ceiling ventilation grate west side |
| 4-16 | Ceiling ventilation grate east side |

| | ST. ALBANS | | | EY REPLICATE | SUMMARY | SHEET | | |
|----------------------|------------|--------------------------------------|------------|---|---|-------------------------|---|--|
| | | SUR | VEY UNIT 4 | (Men's Toilet) | | ···· | | |
| | | . 1 MINUTE D MEASUREMENT COUNT | result, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | SUREMENT AL SR-90 JRFACE SR-90 BETA SMEAR | | TRANSFERABLE SR-90 SURFACE ACTIVITY | |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² | |
| 4-4XD | West Floor | 197 | 258 | 268 | 82.65 | 153 | 0 | |
| 4-6XD | North Wall | 199 | 271 | 316 | 82.65 | 151 | 0 | |
| 4-14XD | East Wall | 216 | 401 | 813 | 82.65 | 168 | 3 | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Date:

01/16/01

Surveyor: Edmond Young

Direct Scan:

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency:

0.2275

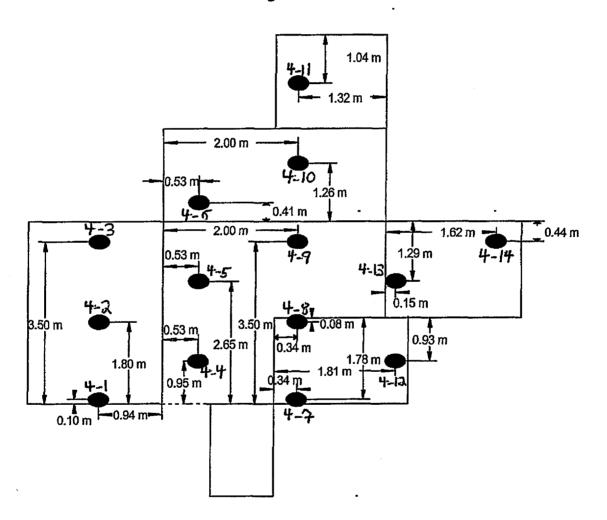
Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

0.486

Survey Unit 4



| LOCATION DESIGNATION | DESCRIPTION OF LOCATION | | | | | | | |
|----------------------|---|--|--|--|--|--|--|--|
| 5-1 | Corridor South Wall opposite entrance to lab | | | | | | | |
| 5-2 | Not accessible - use door to lab entrance 0.59 meters above right hand lower corner of door | | | | | | | |
| <u>5-3</u> | Corridor 45 floor | | | | | | | |
| 5-4 | Corridor South Wall next to ejector pit entrance | | | | | | | |
| 5-5 | Corridor North Wall opposite ejector pit entrance | | | | | | | |
| 5-6 | Corridor 45 floor | | | | | | | |
| 5-7 | Foyer floor next to shield wall outside entrance to x-ray treatment room | | | | | | | |
| 5-8 | X-ray treatment room west wall 0.81 meters above floor | | | | | | | |
| 5-9 | X-ray treatment room south wall 1.5 meters above southwest corner of floor | | | | | | | |
| 5-10 | X-ray control room north wall 0.15 meters above floor | | | | | | | |
| 5-11 | X-ray control room floor | | | | | | | |
| 5-12 | X-ray treatment room floor | | | | | | | |
| 5-13 | X-ray treatment room north wall 0.5 meters above floor | | | | | | | |
| 5-14 | X-ray control room south wall 1.85 meters above southeast corner of floor | | | | | | | |
| 5-15 | X-ray control room floor | | | | | | | |
| 5-16 | X-ray treatment room floor | | | | | | | |
| 5-17 | X-ray treatment room south wall 1.5 meters above southeast corner of floor | | | | | | | |

| | | | | EY REPLICATE SU | | | |
|--|--------------|--------------------------------------|-------|------------------------|-------------------------------------|----------------------|---|
| DIRECT 1 MINUTE DIRECT MEASUREMENT RESULT, TOTAL SR- COUNTS SURFACE ACT | | | | | SR-90 BETA SMEAR RESULTS, COUNTS | | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | | Sample Count (2 min) | DPM/100cm ² |
| 5-3XD | Floor | 196 | 220 | 105 | 82.65 | 147 | 0 |
| 5-6XD | Floor | 170 | 209 | 171 | 82.65 | 173 | 8 |
| 5-8XD | Wall | 271 | 550 | 1226 | 82.65 | 147 | 0 |
| Date: | 01/16/01 | | | | | | |
| Surveyor: | Edmond Young | | | | | | ······································ |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency:

0.2275

Removable Contamination;

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

0.486

| SURVEY UNIT 5 (Corridor 45, Treatment Unit and Associated Equipment Room, and Foyer at Foot of Stairs) | | | | | | |
|--|-------------|--|--|--|--|--|
| | SOIL SAMPLE | | | | | |
| Map Locator | DESIGNATION | COLLECTION LOCATION DESCRIPTION | | | | |
| T SA5SS301XX | | Stainless steel/cast iron common trench crossing corridor 45 north side | | | | |
| U SA5SS302XX | | Stainless steel/cast iron common trench crossing corridor 45 center | | | | |
| V SA5SS303XX | | Stainless steel/cast iron common trench crossing corridor 45 south side | | | | |
| W SA5SS302XD | | Stainless steel/cast iron common trench crossing corridor 45 center - Duplicate Sample | | | | |

(

.

SURVEY UNIT 5 (Corridor 45, Treatment Unit and Associated Equipment Room, and Foyer at Foot of Stairs)

COLLECTION LOCATION DESCRIPTION

Stainless steel/cast iron common trench crossing corridor 45 center - Duplicate Sample

Stainless steel/cast iron common trench crossing comidor 45 north side

Stainless steel/cast iron common trench crossing corridor 45 south side

Stainless steel/cast iron common trench crossing corridor 45 center

SOIL SAMPLE

DESIGNATION

SA5SS301XX

SA5SS302XX

SA5SS303XX

SA5SS302XD

Sr-90 ACTIVITY

CONCENTRATION

(pCi/g)

-0.02

0.04

0.47

-0.07

TOTAL UNCERTAINTY +/- 2

σ (pClig)

0.35

0.42

0.40

0.31

MDC

(pCl/g)

0.62

0.72

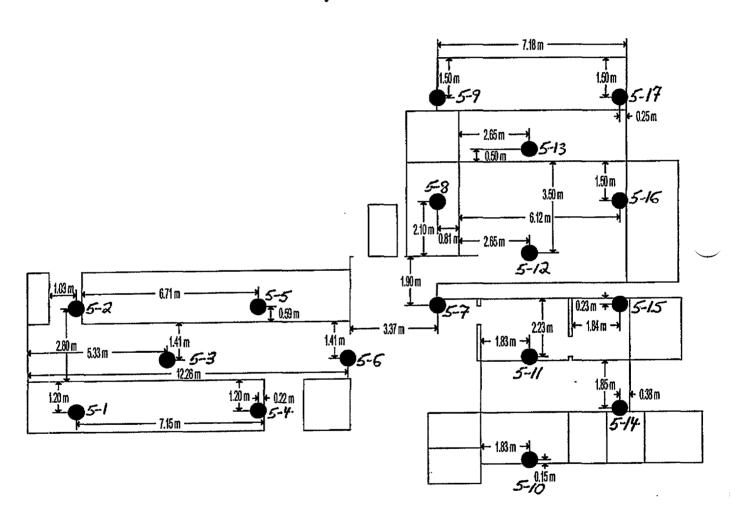
0.65

0.54

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| 3200 |

FIGURE 6-4 CORRIDOR 45, TREATMENT UNIT AND ASSOCIATED EQUIPMENT ROOM, AND FOYER AT FOOT OF STAIRS

Survey Unit 5



| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|----------------------|---|
| 8A-1 | X-ray shield wall outside surface |
| 8A-2 | X-ray shield wall outside surface |
| 8A-3 | X-ray shield wall outside surface |
| 8A-4 | North wall 0.9 meters above floor in northeast corner |
| 8A-5 | East floor next to X-ray shield wall |
| 8A-6 | Southeast corner on floor near wall |
| 8A-7 | South wall 1.73 meters above floor |
| 8A-8 | North portion of floor 1.0 meter from wall |
| 8A-9 | Center of room on floor |
| 8A-10 | South portion of floor near wall |
| .8A-11 | Wall on south side of room behind stairs to lower level 0.9 meter above floor |
| 8A-12 | Wall on east side stairs to lower level, north corner 0.33 meter above floor |
| 8A-13 | Wall on east side stairs to lower level, south corner 0.33 meter above floor |
| 8A-14 | South wall 0.26 meters above floor |
| 8A-15 | Wall in southwest corner of room 1.15 meters above floor |

| | S | SURVEY UNIT 8A | (Drum Sto | rage Above Machine F | Room) | | |
|----------------------|------------|--|-----------|------------------------|------------------|----------------------|---|
| | | 1 MINUTE DIRECT MEASUREMENT RESULT, COUNTS | | DIRECT MEASUREMENT | SR-90 BETA SMEAR | | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| Location Decignation | Cuntana | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | = | Sample Count (2 min) | DPM/100cm ² |
| Location Designation | Surface | | Count | | (cpm) | <u> </u> | DPIN/100CIII |
| 8A-9XD | Floor | 124 | 188 | 281 | 79.55 | 160 | 1 |
| 8A-10XD | Floor | 161 | 205 | 193 | 79.55 | 165 | 6 |
| 8A-13XD | Wall | 150 | 190 | 176 | 79.55 | 172 | 13 |
| Date: | 01/26/2001 | | | | | | |
| | | | | | | | |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # 171381

Instrument Efficiency: 0.2275

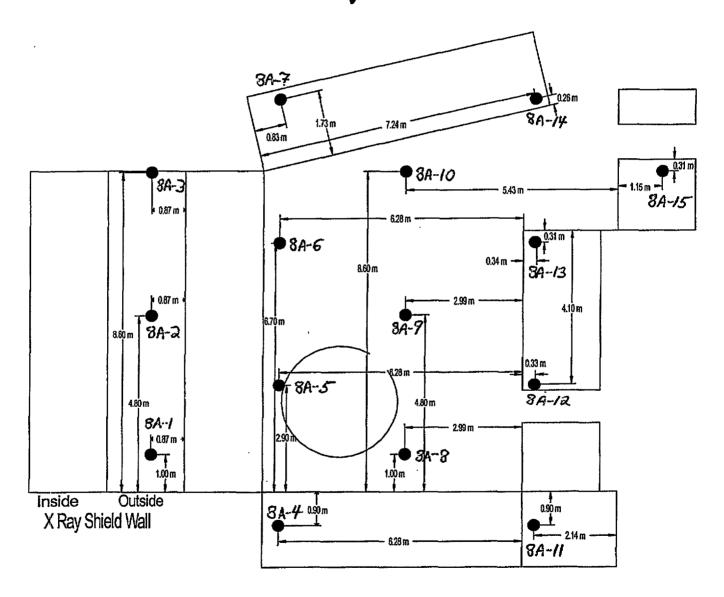
Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency:

SECONDARY RADMATERIAL STORAGE AREA ABOVE X-RAY MACHINE

Survey Unit 8A



| LOCATION DESIGNATION | DESCRIPTION OF LOCATION |
|-------------------------|--|
| | |
| 8B-1 | North wall 1.65 meters above floor in northeast corner |
| 8B-2 | Northeast side of floor near doorway |
| 8B-3 | East side of floor next to wall |
| 8B-4 | Southeast side of floor near doorway |
| 8B-5 | On south wall 1.86 meters above the floor |
| 8B-6 | North portion of floor next to wall |
| 8B-7 | North middle section of floor |
| 8 B- 8 | South middle section of floor |
| 8B-9 | South portion of floor near wall |
| 8B-10 | North wall 1.66 meters above floor in northwest corner |
| 8B-11 | Northwest side of floor near wall |
| 8B-12 | West side of floor near wall |
| 8B-13 | Southwest side of floor near wall |
| 8B-14 | On south wall 1.84 meters above the floor |
| | |

| | | | 11 00 | Material Storage Area | <u>, </u> | | |
|---------------------|---------|--------------------------------------|---------|---|--|------------------------|---|
| | | 1 MINUTE DI MEASUREMENT COUNT | RESULT, | DIRECT MEASUREMENT TOTAL SR-90 SURFACE ACTIVITY | | ETA SMEAR S, COUNTS | TRANSFERABLE SR-90 SURFACE ACTIVITY |
| ocation Designation | Surface | Ambient Background ⁽¹⁾ | Count | DPM/100cm ² | Background (cpm) | Sample Count (2 min) | DPM/100cm ² |
| 8B-1XD | . Wall | 182 | 203 | 92 | 79.55 | 167 | 8 |
| 8B-3XD | Floor | 167 | 196 | 127 | 79.55 | 141 | 0 |
| 8B-8XD | Floor | 172 | 210 | 167 | 79.55 | 156 | 0 |

⁽¹⁾ Background measurement performed using a wooden shield (i.e., result represents only gamma component)

Instrument Used: L2224 serial # 162420 / 43-89 scintillation probe # PR-171381

Instrument Efficiency: 0.2275

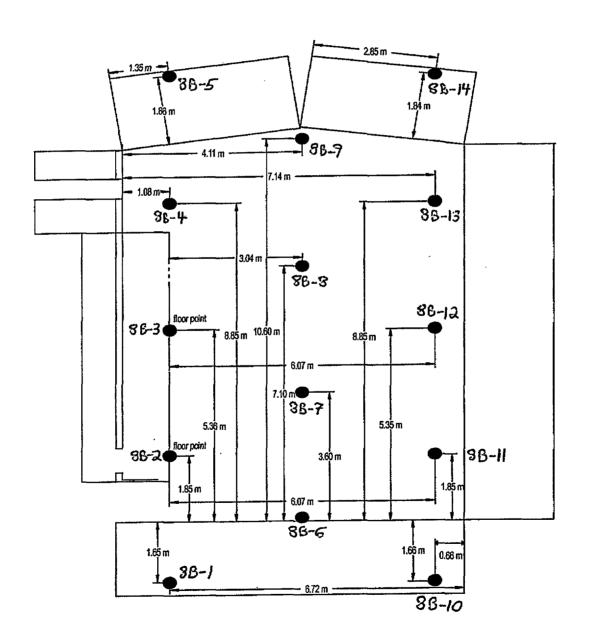
Removable Contamination:

Instrument Used: L2929 serial # 163827 / 43-10-1 alpha beta sample counter # 171322

Instrument Efficiency: 0.486

RADMATERIAL STORAGE AREA

Survey Unit 8B



Appendix C:
Scan MDC Calculations

1.0 INTRODUCTION

Cabrera Services, Inc. (CABRERA) will perform a Final Status Survey (FSS) of select buildings on the St. Albans Veterans Administration Extended Care Center Facility (VAECC) property located in Queens, New York. The FSS is designed in accordance with guidance from the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). The number of samples required per survey unit depends upon the scan sensitivity or scan minimum detectable concentration of the instrumentation used and is a critical factor in developing FSS design. The scan MDC can be estimated by using the methodology in MARSSIM Section 6.7.2.1. This document provides the technical basis for estimating the scan MDC for beta radiation using a Ludlum Model 43-89 detector or equivalent coupled to a ratemeter. The type of ratemeter used has no bearing on calculating scan MDC.

1.1 Objective

The specific objective of this technical memorandum is to estimate the scan MDC of a plastic scintillator to measure beta emitters on selected structural materials in the buildings on the VAECC property during remedial and FSS activities. This is accomplished utilizing the methodology and approach documented in MARSSIM (Section 6.7.2.1) for scanning of beta emitters. It is important to note that this document is solely to be used to estimate scan MDC prior to conducting surveys on the VAECC property.

2.0 ESTIMATION OF MINIMUM DETECTABLE COUNT RATE (MDCR)

The MDCR is dependent upon several factors including surveyor performance, instrument sensitivity, distribution of contamination, etc.

2.1 Determination of Number of Source Counts

The MDCR is calculated by obtaining the minimum detectable number of source counts (S_i) in a given time interval, i. S_i is calculated by using equation 6-8 in MARSSIM as:

$$S_i = d' \sqrt{b_i}$$

where, d' = is the detectability value associated with the desired performance selected from Table 6-5 in MARSSIM

 $b_i = background counts$

The number of background counts will fluctuate with the type of structural material due to the varying concentration of naturally occurring radioactive material present. A government subcontractor performed a radiation survey of buildings in Maywood, New Jersey in March of 1998 (USACE 1998). During that effort, a local fire station and Building #52 were used to obtain expected background responses from concrete, concrete block, and brick. The average and maximum count rates for each of these materials, as determined during the 1998 survey, are listed in Table 1. The listed values are assumed to be representative of background count

rates that will be observed during the FSS of the VAECC building. Based upon manufacture specifications for both of these instrument types, it is also assumed that the response of the Ludlum Model 43-89 will be comparable to that of the Eberline AB-100 used during the 1998 survey.

Table 1. Average and Maximum Background Count Rates for Select Material from 1998 Survey.

| | Material | | | |
|--------------------------------|----------|----------------|----------------|---------------|
| | Brick | Concrete Block | Concrete Floor | Concrete Wall |
| Average Count Rate (cpm) | 606 | 387 | 341 | 365 |
| Maximum Count Rate (cpm) | 822 | 514 | 549 | 537 |

Since the average and the maximum count rates for each of the concrete materials are similar in value, it is assumed that any concrete material will exhibit approximately the same background count rate. Therefore, an MDCR is calculated for brick and concrete only and the MDCR for concrete will be applied to concrete floors, concrete walls, concrete block, etc. To be conservative, the maximum background count rate for the two materials is chosen as the expected background count rate (822 cpm for brick and 549 cpm for concrete). This is considered conservative because it will result in a higher scan MDC.

It is assumed that during a typical scanning survey an elevated source of radioactivity will remain under the probe for one second. The width of the detector is 10 cm. This corresponds to a scan speed of 10 cm per second. Therefore, the number of background counts in the observation interval of one second when scanning concrete material is calculated as:

$$b_i = (549 \text{ cpm} \left(\frac{1 \text{sec.}}{60 \frac{\text{sec.}}{\text{min}}} \right) = 9.15 \text{ counts}$$

The value of d' is selected from Table 6.5 in MARSSIM and is based upon the acceptable true and corresponding false positive proportions or rates during scanning. For example, if a 95% confidence level is placed on the ability to correctly detect the presence of radioactivity above background, then there is only a 5% chance that radioactivity above background will be missed. Further, if a 25% confidence level is placed on falsely identifying areas as containing radioactivity above background, then 75% of the time areas not containing radioactivity above background will be correctly determined as background. For the purposes of the FSS work plan, a 95% confidence level will be used for correctly detecting the presence of radioactivity, with an allowance for 25% false positive detection. The value for d' in Table 6-5 of

MARSSIM for these confidence levels is 2.32. Therefore, the minimum number of source counts, when scanning concrete material, is calculated as:

$$S_t = 2.32 \sqrt{9.15} = 7.02$$
 counts

2.2 Calculation of MDCR

The MDCR is calculated by using equation 6-9 in MARSSIM.

$$MDCR = S_i \frac{60}{i}$$

When a scanning survey is performed, the surveyor will investigate potential locations that exhibit elevated count rates to determine if the location contains radioactivity above background. It is assumed that a surveyor typically stops the probe over a suspect location for four seconds before making a decision as to whether or not radioactivity above background is present. Therefore, when scanning concrete material, the MDCR is calculated as:

MDCR =
$$(7.02 \text{ cpm}) \left(\frac{60 \text{ sec.}}{4 \text{ sec.}} \right) = 105.3 \text{ cpm}$$

3.0 ESTIMATION OF SCAN MDC

The scan MDC is determined from the Minimum Detectable Count Rate (MDCR), by applying necessary conversion factors that account for surveyor performance, detector efficiency, probe area, etc. The scan MDC is calculated by using equation 6-10 in MARSSIM as:

Scan MDC =
$$\frac{\text{MDCR}}{\sqrt{p} \in_{j} \in_{s}} \frac{\text{probe area}}{100 \text{ cm}^{2}}$$

where, MDCR = minimum detectable count rate

 $\varepsilon_i = instrument$ efficiency

 $\varepsilon_{\rm s} = {\rm surface\ efficiency}$

p = surveyor efficiency,

The Nuclear Regulatory Commission publication NUREG-1507 recommends surveyor efficiency values between 0.75 and 0.5. To be conservative, 0.5 is chosen. Ludlum Measurements, Incorporated lists the efficiency for the Model 44-116 probe for Tc-99 as 15%, which is the value used in the following calculation. The listed efficiency for the Model 43-89 for Sr-90 is 16%, which would cause a slightly conservative result. This efficiency is assumed as the combined surface and instrument efficiency listed above. The probe area of

the Model 43-89 is 126 square centimeters. The Scan MDC for concrete material is thus calculated as:

Scan MDC =
$$\frac{105.3 \text{ cpm}}{\sqrt{0.5} \left(0.15 \frac{\text{c}}{\text{d}} \left(\frac{126 \text{ cm}^2}{100 \text{ cm}^2}\right)\right)}$$
 = 788 dpm

Having a percentage of false positives does not require sampling, but rather further investigation by either slowing the scan speed in the location of interest or performing an integrated count. A higher false positive value is actually conservative because background locations are investigated as though they contained residual radioactivity. The ramification of increasing the false positive proportion is that survey scanning time is slightly increased.

The above calculation was repeated for calculation of the scan MDC for brick material. However, due to the greater background count rate exhibited from brick, a false positive proportion of 35% must be used to achieve the DCGL of 855 dpm and 60% in order to achieve the DCGL of 590 dpm when surveying brick material.

4.0 SUMMARY

Using MARSSIM methodology, the calculated scan MDCs for a 43-89 scintillation detector employed for this radiological survey is:

- For concrete material, the scan MDC is 788 dpm/100cm² when using a 25% false positive and a 95% correct detection. When the false positive is adjusted to 50%, a scan MDC of 557 dpm/100cm² is achieved.
- For Brick material, the scan MDC is 839 dpm/100cm² when using a 35% false positive and a 95% correct detection. When the false positive is adjusted to 60%, a scan MDC of 573 dpm/100cm² is achieved.

Appendix D:

Static Measurement MDC Calculations

1.0 INTRODUCTION

The St. Albans Veterans Administration Extended Care Center (VAECC) housed a nuclear medicine operation at the facility. This facility had laboratory research performed under an NRC "Possession Only" byproduct materials license during the 1960s. Several areas of the facility have elevated levels of Sr-90 surface contamination and volumetric material concentrations. The facility will be decommissioned which will entail the use of field health physics instruments.

1.1 OBJECTIVE

The objective of this technical memorandum is to calculate the minimum detectable concentration (MDC) for the health physics field instrument(s) used during cleanup. The contaminant of concern (COC), Sr-90, is used for the MDC calculations.

2.0 MINIMUM DETECTABLE CONCENTRATION

The detection limits for field survey instruments are an important criterion to assure that proper instrumentation is chosen for the field measurements to be taken. The MDC is the minimum activity concentration, at a given confidence level, that the instrument is able to detect. It is dependent upon the instrument efficiency, the background, and count time of the sample and background.

There are numerous MDC expressions (NRC 1997a) and (NRC 1997b) that may be utilized. This technical memorandum utilizes the more recent expressions presented in Table 3.1 of (NRC 1997a) and Equation 6-7 of (NRC 1997b). The MDC formulas listed from Brodsky & Gallaghar and by Strom & Stansbury in (NRC 1997a) are equivalent and simplify to the former expression when the background count time and the sample count time are equal to 1 minute. Equation 6-7 of (NRC 1997b) has a separate term, C, showing more clearly the detector efficiency variable and other factors used to convert MDC counts to concentration. This expression, with a 1 minute field background and sample count time is used as the basis for all calculations in this memorandum.

3.0 MINIMUM DETECTABLE CONCENTRATION CALCULATION

3.1 Minimum Detectable Concentration Expression

The MDC expression from (NRC 1997b) based on 95 % confidence, and 1minute count and background time is:

$$MDC = C \times \left(3 + 4.65\sqrt{B}\right)$$

Where,

C = Detector Efficiency, dpm/count

B = Background Count - 1 Minute, counts

3.2 Detection Equipment

A gas proportional counter such as the Eberline 43-68 or equivalent provides a highly sensitive detector for detecting beta emissions. The manufacturer provides a beta efficiency of 0.30 counts per disintegration for Sr-90/Y-90. This is similar to the gas proportional detector efficiency for Sr-90/Y-90 listed in (NRC 1997a) of 0.34 counts per disintegration.

Background is a variable in the MDC expression. Manufacturer data indicates a "typical" background for a gas proportional detector of 350 counts per minute when detecting beta. Data from (NRC 1997a) shows a similar background of 354 counts per minute for the gas proportional detector when detecting beta. This background is based upon an ambient gamma background of approximately $10~\mu\text{R/hr}$.

A gas proportional detector will normally provide a greater efficiency for detection of beta radiation and therefore a lower MDA than other field instruments. However, these instruments will also have a higher background due to ambient gamma background. Additionally, these detectors are required to have a counting gas (P-10) that requires supply lines from the gas supply to the detector. This may become unwieldy in the field.

An alternative is to utilize a scintillation detector that requires no special counting gas and provides field flexibility with lower background contribution. Manufacturer data indicates a "typical" background for a beta scintillation detector of 300 -350 counts per minute. The efficiency for such detectors is 0.20 counts per disintegration for Sr-90/Y-90.

Since the surface being measured is concrete in a below grade level basement facility, the detector background will depend significantly on the beta and gamma background at the site. Constituents in the concrete such as aggregate may change the background substantially. Data is presented in an MDC table to illustrate the variability of MDC with background.

3.3 Results

3.1.1 Surface MDC

Table 1 lists the MDC values for a gas proportional detector in terms of disintegrations per 100 cm² and pCi per 100 cm² based on background rates varying from 350 to 1000 counts per minute. Table 2 lists the corresponding MDC values for a PhoSwich scintillation detector.

3.1.2 Estimated Volumetric MDC

Assume the surface is contaminated to a depth in excess of the maximum range of a Y-90 beta particle in concrete (0.468 cm max range; RAD 1970) having a density of 2.35 g/cm³. It is further assumed that 100% of the beta particles originating from a depth of less than 0.0468 cm (one-tenth of the maximum range of the Y-90 beta) below the concrete surface and that are emitted in the direction of the detector are detected. None of the beta particles emanating from a location deeper than 0.0468 cm from the surface of the concrete reach the detector. Assuming

uniform distribution of any contamination in this thin slab of "near surface" concrete and adjusting for the density of concrete (2.35 g/cm³) results in a total mass of contaminated concrete of:

$$100 \text{ cm}^2 \text{ x } 0.047 \text{ cm x } 2.35 \text{ g/cm}^3 = 11 \text{ g}$$

A simplified estimate of the volumetric concentration activity MDA may be made by dividing the areal concentration MDA by this thin section of concrete representing one tenth of the maximum range of Y-90 beta particles in the concrete. Table 3 lists this estimate of volumetric concentration activity as a function of background and detector.

4.0 CONCLUSION

A gas proportional detector is expected to have a field MDC of 300 dpm/100 cm² at typical background levels as provided by the equipment manufacturer.

A beta scintillation detector is expected to have a field MDC of 418 dpm/100cm² at typical background levels as provided by the equipment manufacturer.

Field MDCs for Sr-90/Y-90 are expected to range from 300 to 750 dpm/100cm² depending upon the detector and background rates experienced in the field. The corresponding estimated field volumetric MDCs are expected to range from 11 to 31 pCi/g.

<u>TABLE 1</u>

MDC VERSUS BACKGROUND FOR GAS PROPORTIONAL DETECTOR

| Efficiency Factor, C (DPM/Count) | Background, B (Counts) | MDC Result (DPM/100 cm²) | MDC Result (pCl/100 cm²) |
|--|---------------------------|-----------------------------|-----------------------------|
| 3.33 | 350 | 300 | 135 |
| 3.33 | 400 | 320 | 144 |
| 3.33 | 500 | 356 | 160 |
| 3.33 | 600 | 389 | 175 |
| 3.33 | 700 | 420 | 189 |
| 3.33 | 800 | 448 | 202 |
| 3.33 | 900 | 475 | 214 |
| 3.33 | . 1000 | 500 | 225 |

TABLE 2

MDC VERSUS BACKGROUND FOR BETA

SCINTILLATION DETECTOR

| Efficiency Factor, C (DPM/Count) | Background, B (Counts) | MDC Result (DPM/100 cm ²) | MDC Result (pCl/100 cm²) |
|--|---------------------------|--|-----------------------------|
| 5 | 300 | 418 | 188 |
| 5 | 400 | 480 | 216 |
| 5 | 500 | 535 | 241 |
| 5 | .600 | 585 | 263 |
| 5 | 700 | 630 | 284 |
| 5 | ¹ 800 | 673 | 303 |
| 5 | 900 | 713 | 321 |
| 5 | 1000 | 750 | 338 |

TABLE 3
ESTIMATED VOLUMETRIC MDC VERSUS BACKGROUND FOR
GAS PROPORTIONAL AND BETA SCINTILLATION DETECTORS

| Background, B (Counts) | ~Volumetric MDC Gas Proportional, pCi/g | ~Volumetric MDC Beta Scintillation, pCi/g |
|---------------------------|--|---|
| 300 | . 11 | 17 |
| 350 | 12 | 18 |
| 400 | 13 | 20 |
| 500 | 15 | 22 |
| 600 | 16 | 24 |
| 700 | 17 | 26 |
| 800 | 18 | 28 |
| 900 | · 19 | 29 |
| 1000 | 20 | 3 1 |

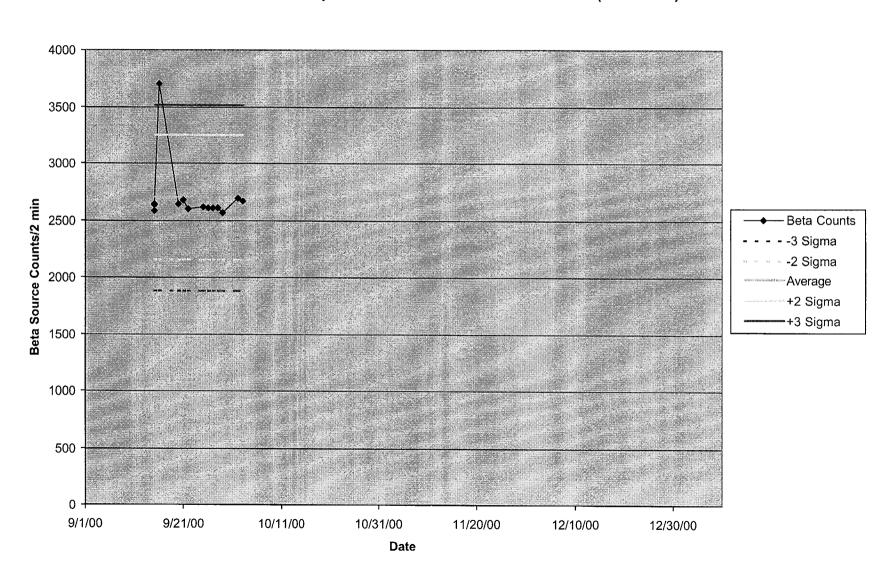
REFERENCES

NRC 1997a NUREG-1507 "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions", December 1997

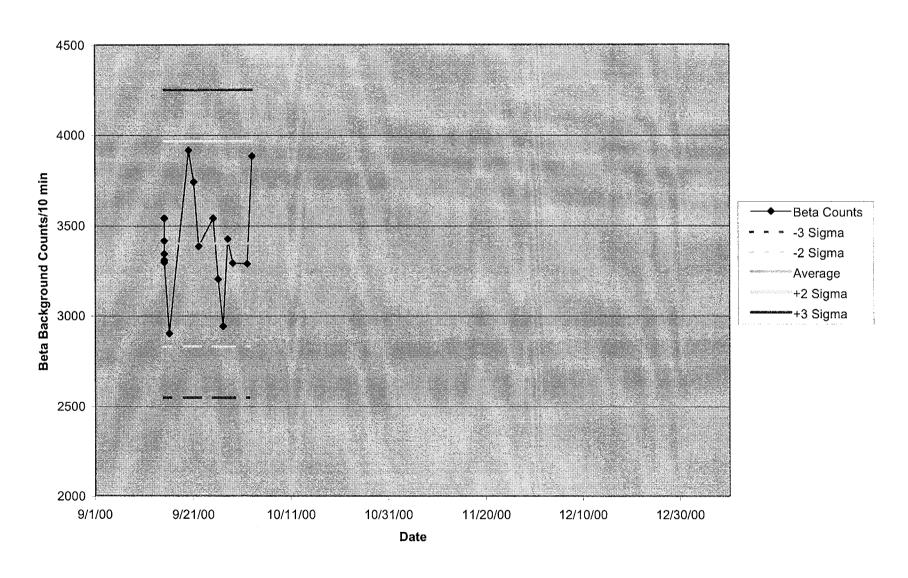
NRC 1997b NUREG-1575 "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)", December 1997

RAD 1970 Radiological Health Handbook, Revised Edition, January 1970

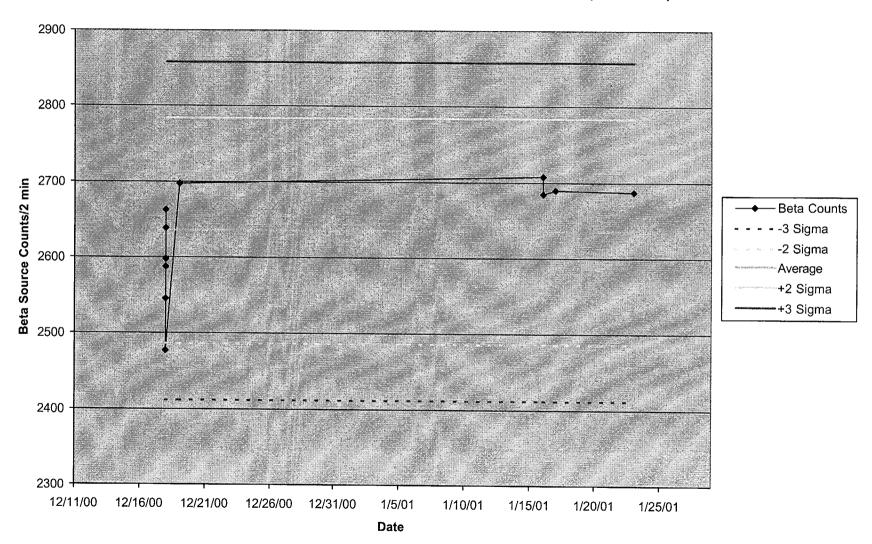
Beta Source Response Control Chart for Ludlum 2221 (SN161581)



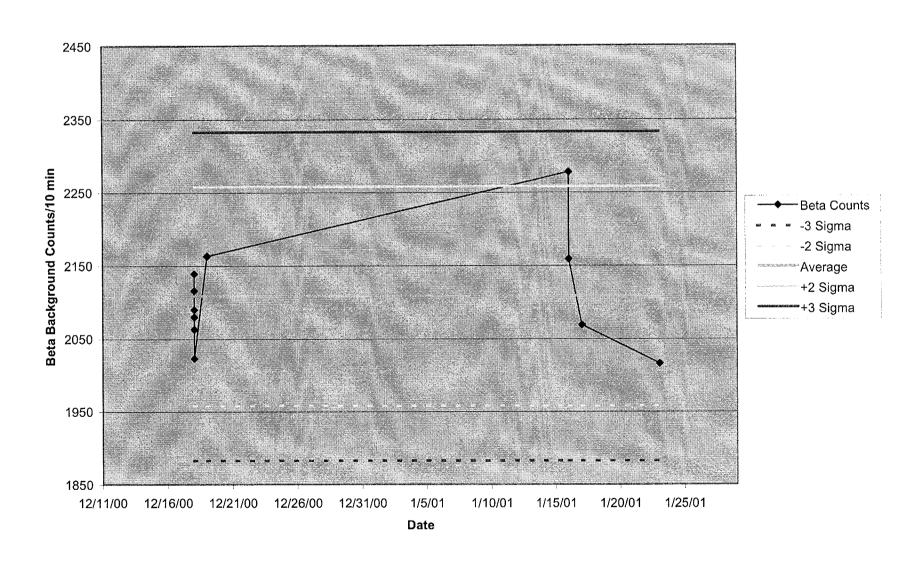
Beta Background Control Chart for Ludlum 2221 (SN161581)



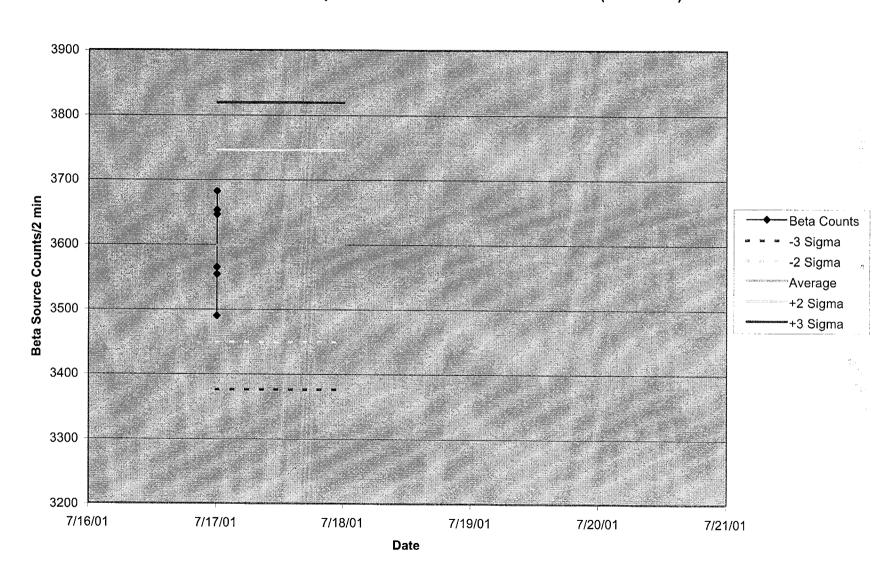
Beta Source Response Control Chart for Ludlum 2224 (SN162420)



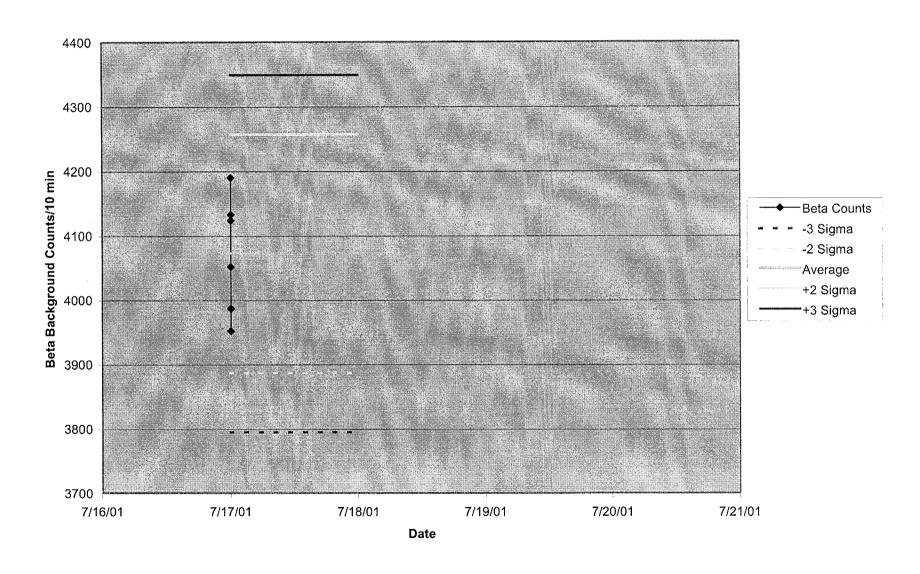
Beta Background Control Chart for Ludium 2224 (SN162420)



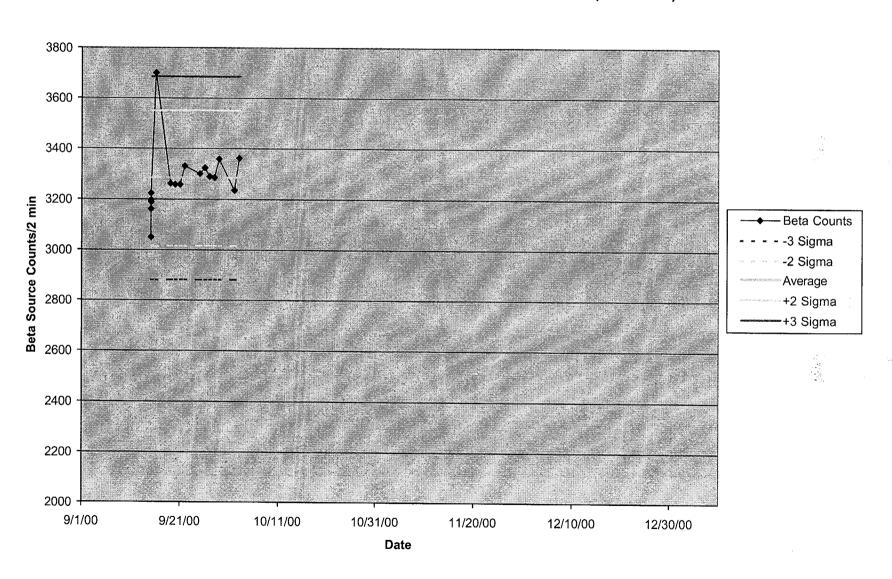
Beta Source Response Control Chart for Ludlum 2224 (SN162426)



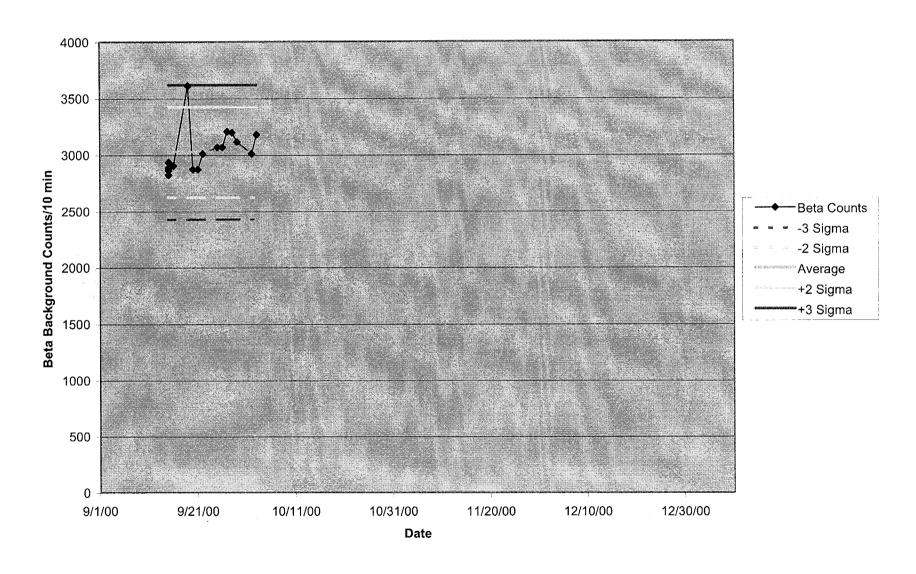
Beta Background Control Chart for Ludium 2224 (SN162426)



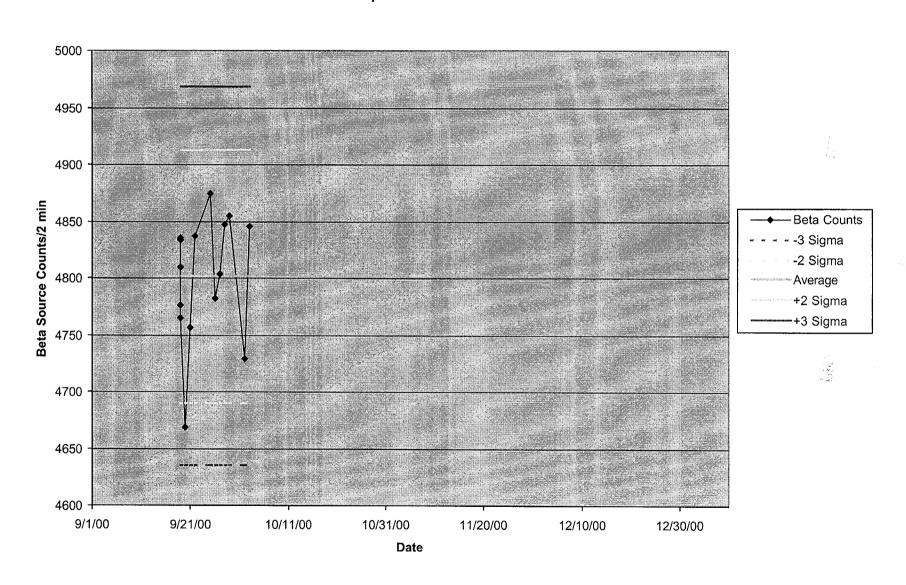
Beta Source Response Control Chart for Ludlum 2221 (SN163673)



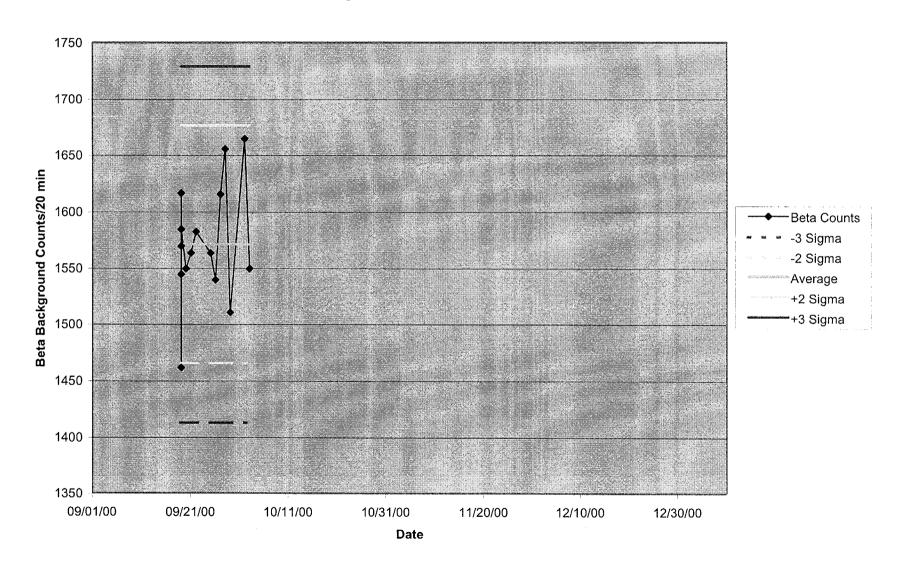
Beta Background Control Chart for Ludlum 2221 (SN163673)



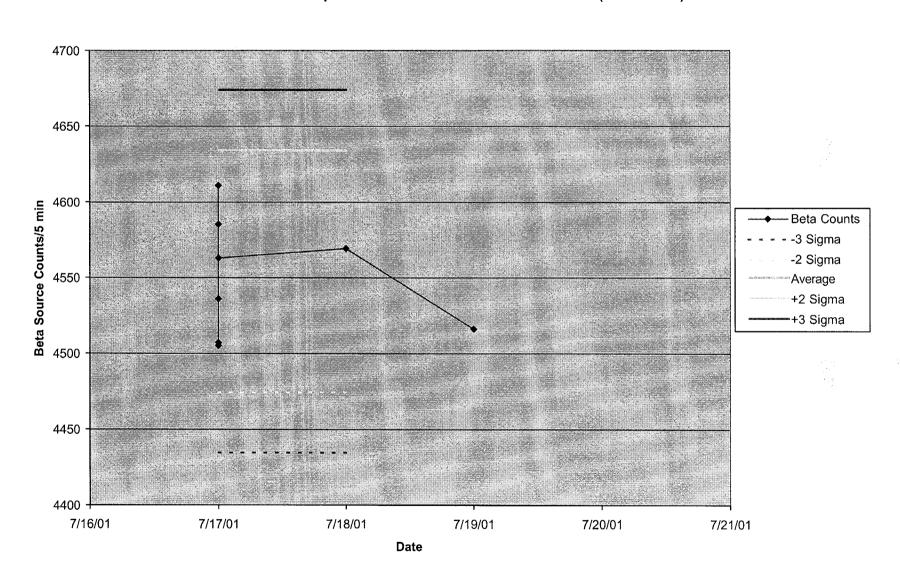
Beta Source Response Control Chart for Ludlum 2929



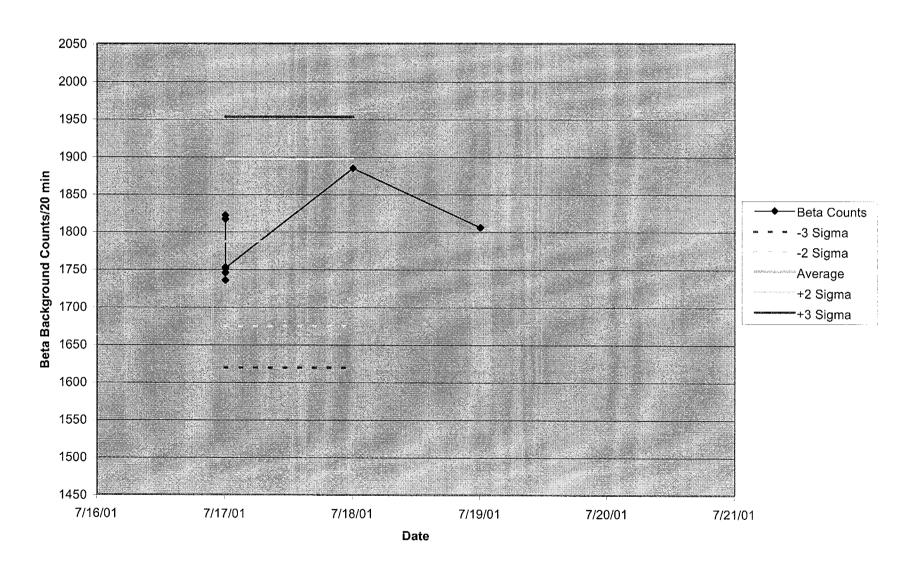
Beta Background Control Chart for Ludlum 2929



Beta Source Response Control Chart for Ludlum 2929 (SN 171590)



Beta Background Control Chart for Ludlum 2929 (SN 171590)



Appendix F:
Operating Procedures

1.0 PURPOSE

This procedure provides the methods Cabrera Services, Inc. (CABRERA) uses in operation of air samplers and calculation of radioactive particulate activity in air sample. This procedure describes the methods used to calculate Derived Air Concentration (DAC) DAC-hour exposures to workers. Adherence to this procedure will provide reasonable assurance that the surveys performed have accurate and reproducible results.

2.0 APPLICABILITY

This procedure will be used by CABRERA personnel to operate air samplers during surveys and work activities at the St. Albans VAECC facilities, calculate, and record DAC-Hour exposures to workers. Air samples are performed when the average beta contamination on facility surfaces, equipment and waste packages exceed the contamination limits specified in Table 1 of the Radiation Protection Program (RPP) and included as Appendix A of the HASP. Air monitoring shall be performed in areas where there exists potential to exceed 10 percent of any DAC.

🕹 3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

Not Applicable

3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 Air samplers should only be operated in temperatures between -4° F to 122° F.
 - 3.3.2 Air sampler inspections shall be performed by qualified Health Physics personnel.

4.0 REFERENCES

| • | HASP | Safety and Health Program (Radiation Safety Program) |
|---|----------------|--|
| • | OP-001 | Radiological Surveys |
| • | OP-021 | Alpha-Beta Sample Counting Instrumentation |
| • | Reg Guide 8.25 | Air sampling in the Workplace |
| • | NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.
- 5.2 Smear Sample Survey A survey technique using filter paper smears to determine quantities of alpha and beta emitting radioactive material which can be removed from facility surfaces and waste packages.
- 5.3 Air Sample Survey A survey technique which collects particulates from a known volume of air and determines the concentrations of radioactive materials associated with the airborne particulates.
- Annual Limit on Intake (ALI) The annual limit on intake (ALI) of radioactive materials is the smaller amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year (40 hours per week for 50 weeks) that would result in a committed effective dose equivalent (CEDE) of 5 rem or a committed dose equivalent (CDE) of 50 rems to any individual organ or tissue.
- 5.5 Derived Air Concentration (DAC) Derived air concentration is the concentration of a given radionuclide in air which, if breathed by "reference man" for a working year (40 hours per week for 50 weeks) under the conditions of light work (inhalation rate of 1.2 cubic meters of air per hour), results in an air intake of one ALI.
- 5.6 DAC-Hour The product of the concentration of radioactive material in air (expressed as a multiple of the derived air concentration for each nuclide) and the time of exposure to that nuclide, in hours, 2000 DAC-Hours represents one ALI.
- 5.7 Airborne Radioactivity Area A room, enclosure or area in which the radioactive material is dispersed in the form of dusts, fumes, mists, particulates, vapors and the concentration of the dispersed radioactive materials in excess of:
 - 5.7.1 The derived air concentrations (DAC's) specified in Table 1, column 3 of Appendix B, Title 10 Part 20 of the Code of Federal Regulations, or
 - 5.7.2 Concentrations such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week, an intake of 0.6 percent on the annual limit on intake (ALI) or 12 DAC-hrs.

- 5.8 Effluent Monitoring A process, by which discharge of effluents to the environment of isotopes listed in, CFR Title 10 Part 20 Appendix B Table 2 column 1, is measured.
 - 5.8.1 The limit for Sr-90 is 6E-12 uCi/cc
 - 5.8.2 Monitoring of effluent discharge must be continuous during operation of the system

6.0 EQUIPMENT

6.1 Air sampling equipment will be selected for the type of analysis specified in the HASP. All samplers will be properly calibrated and the calibrations current.

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of air sampling and air sampling analysis are familiar with this procedure, adequately trained with the specific instrument being used to perform surveys.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for monitoring compliance with this procedure and training personnel in the use of the air sampling and air sampling analysis. The RSO can also assist in the interpretation of the results obtained during surveys.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT performing air sampling analysis are responsible for knowing and complying with this procedure.

8.0 INSTRUCTIONS

- 8.1 Initial Preparation
 - 8.1.1 Select the air sampler to be used for the type of sample to be used and verify that the instrument has a currently valid calibration. If the work area contains radioiodine or tritium, contact the radiation safety officer for special sampling procedures before proceeding.

- 8.1.1.1 Area air samples are normally collected with a low volume air sampler having normal airflow of 1 CFM to 5 CFM.
- 8.1.1.2 Breathing zone air samples are normally collected using lapel air samplers, which have a normal airflow of 1 to 5 liters per minute.
- 8.1.1.3 Effluent samples are normally collected using in-line isokinetic sampling systems that match duct airflow speed with sample line speed.
- 8.1.1.4 All air sampling devices shall be calibrated to ensure accurate sample volumes are collected. The frequency of calibration shall not exceed one (1) year.
- 8.1.2 Attach the air sampling head to the intake of the low volume sample pump, to the tygon tubing of the Lapel sampler, or to the sampling system of the effluent discharge system.
- 8.1.3 Obtain the filter paper to be used in the sample and mark the backside of the filter with a unique number, which will represent the sample. During the collection and handling of air sample filter papers, caution must be used to prevent the samples from being contaminated by other radioactive materials.
- 8.1.4 Place the filter paper in the holder and position the sampler as indicated below.
 - 8.1.4.1 Area air samples are collected by placing the sample head at a distance of 3 to 6 feet above the floor and as close to the work area as practical. If there is airflow in the work area, the sampler should be placed "down wind" of the area where workers will be resuspending radioactive particulates into the workers atmosphere.
 - 8.1.4.2 Lapel air samples are collected from workers breathing zone. The sample head is attached to the shoulder of the worker with the sample head facing forward. The tygon tubing connecting the sample head to the pump is run down the back of the worker with the sample pump attached to the workers belt.
 - 8.1.4.3 Inline air samples are collected from exhaust system/vent systems. The sample head is placed between the sample probe and the sample pump in a smooth path without obstruction. Airflow should be matched to the flow in the system being sampled.

8.2 Collecting the sample

- 8.2.1 When the sample head is in position, start the sample pump and adjust the flow rate to the highest flow rate, which can be maintained without flow rate fluctuations or, in the case of effluent sampling, adjust to that specified by special instructions.
- 8.2.2 Record the time the sample was started and the initial flow rate of the sample pump on Form OP-002-01, Air Sample Data Sheet. Record the following effluent sampling data: System description, Flow rate in LPM, Time and date start on Form OP-002-04
- 8.2.3 If possible, identify the radionuclides, which will be encountered in the work area and record the radionuclides along with the DAC for each radionuclide in the space provided on the Air Sample Data sheet. If a mixture of radionuclides is present, the DAC used in the calculations of DAC-Hours will be the most restrictive concentration.
- 8.2.4 Collect the sample for the maximum time possible, which represents the exposure encountered by the worker.
- 8.2.5 At the end of the collection period, note the flow rate of the sample pump and record this flow rate and the time, which the sampling stopped on the Air Sample Data sheet.
- 8.2.6 Effluent sampling must be in progress any time the system is operating. Any time a sampler is found to be non-operational during system operation contact the RSO or duly authorized representative. Record the time the sample system was stopped and calculate the total volume of air sampled on the Air Sample Data Sheet.
- **CAUTION:** Be sure not to remove activity from the sample surface. Handle the filter with care.
 - 8.2.7 Remove the sample filter and place the filter in an individual envelope or poly bag to ensure no possibility of contamination by other sources of radioactivity.
 - 8.2.8 Record the names of workers who were in the area and the time spent in the work area on the Air Sample Data sheet.
 - 8.2.9 Determine the average sample flow rate by adding the initial sample flow rate and the final sample flow rate and dividing by 2. Record the average flow sample flow rate in the space provided on the Air Sample Data sheet.

- 8.2.10 Calculate the total air volume sampled by multiplying the average flow rate in cubic centimeters per minute by the total minutes the sampler operated using the indicated spaces on the Air Sample Data sheet.
- 8.3 Determining minimum detectable activity (MDA) During calculations or air concentrations in the following sections, the MDA for each analysis is calculated to determine the statistical significance of the calculated air concentrations.
 - 8.3.1 For each air concentration calculation (alpha and beta) in the following sections, calculate the MDA using the following formula:

MDA in
$$\mu Ci/cm^3 = \frac{\frac{k_a^2}{T_{s+b}} + 2\left[k_a\right]\sqrt{\frac{R_b}{T_b} + \frac{R_b}{T_{s+b}}}}{(2.22 \times 10^6)(E)(V)}$$

Where:

E = Counter efficiency in CPM/DPM

R_b = Background Count Rate in CPM

T_b = Background Counting Time in Minutes

T_{s+b} = Sample Counting Time in Minutes

V = Sample Volume in cm³

2.22X10⁶ = Disintergrations per minute per microCurie (DPM/uCi)

 $k_{\alpha} = 1.645$ for a confidence level of 95% and 1.96 for a confidence level of 99%

- 8.3.2 If the MDA is larger than 10% of the Derived Air Concentration, recount the background for a longer time and/or increase the sample count time to lower the MDA. (The maximum count time should not exceed 1 hour for background and 30 minutes for the sample). Enter the MDA for each air concentration calculated in the space provided on the Air Sample Data sheet.
- 8.3.3 When calculating MDA for Effluent air analyses use a minimum of four (4) hours. MDA must be less than the limit listed in 10 CFR 20 Appendix B Table 2 Column 1 (insoluble). If this value (6E-12 for Sr-

- 90) is exceeded contact the RSO or duly appointed representative.
- 8.4 Initial Air Sample Analysis The initial analysis of air sample provides the air concentrations for short-lived radionuclides and a first estimate of the long-lived air concentrations. In situations where there is a potential for worker intakes to exceed 40 DAC-Hours in a week or if the radionuclides of interest are short-lived, air samples should be available before work resumes the following day.
 - 8.4.1 Air particulate samples are to be analyzed as a minimum for gross alpha and gross beta activity using a Ludlum Model 2929 Dual Channel Scaler or equivalent.
 - 8.4.2 Place the air sample collection media in the sample counter with the upstream collection side toward the detector. Count the air sample and calculate the sample activity and record results on appropriate form(s).
 - 8.4.3 Record the alpha and beta sample DPM results in the Air Sample Data sheet.
 - 8.4.4 Calculate the alpha and beta air concentrations using the following formula. Adjustment due to alpha self absorption are made as appropriate.

Air Concentration
$$(\mu Ci/cc) = \frac{\alpha \text{ or } \beta \text{ DPM}}{(2.22 \times 10^6 \text{ DPM} / \mu Ci)(SampleVolume(cm}^3))}$$

- 8.4.5 Enter the alpha and beta air concentrations on the Air Sample Data sheet in the space provided for the initial air concentrations.
- NOTE: If the air sample concentration is greater than 10% of the DAC value, notify the RSO or duly authorized representative for further instructions.
 - 8.4.6 If the air concentration is less than 10 percent of the most restrictive DAC, no further analysis of the air sample is required. If the air concentration exceeds 10% of the DAC concentration, proceed with the analysis in section 8.5.
 - 8.5 Air sample analysis for long-lived radionuclides This analysis allows for decay of naturally occurring radionuclides and provides for correcting air concentrations for naturally occurring radionuclides.
 - 8.5.1 Air particulate samples are analyzed following 12 hour decay, and again at 72 hours if necessary to allow for decay of radon, for gross

- alpha and gross beta using a Ludlum Model 2929 Dual Channel Scaler or equivalent.
- 8.5.2 Place the air sample in the sample counter with the collection side toward the detector. Count the air sample and calculate the sample activity and record results on appropriate form(s).
- 8.5.3 Record the alpha and beta sample DPM results in the Air Sample Data sheet.
- 8.5.4 Calculate the alpha and beta air concentrations using the following formula. Adjustments due to self absorption are made as appropriate.

Air Concentration
$$(\mu Ci/cc) = \frac{\alpha \text{ or } \beta DPM}{(2.22 \times 10^6 DPM / \mu Ci)(Sample Volume(cm^3))}$$

- 8.5.5 Enter the alpha and beta air concentrations on the Air Sample Data sheet in the space provided for the 12-hour decay concentrations. If the 12-hour decay air concentrations is below 10% of the DAC no further analysis is required.
- 8.5.6 If the 12-hour air concentration is above 10% percent of the DAC value, recount the air sample following 72 hours of decay from the time the sample was stopped. Calculate the air concentration using the formula in step 8.5.4 and record the air concentrations in the space provided for the 72-hour decay air concentration on the Air Sample Data sheet. If the 72-hour air concentration is below 10% of the DAC value, no further analysis is required.
- 8.5.7 If the air concentrations exceed 10% of the DAC values, notify the RSO or duly authorized representative for further instructions. Save the air sample for possible further analysis. For air samples, which exceed 10% of the DAC values, an exposure is assigned to the workers residing in the area where the sample was taken.

- 8.6 Assignment of DAC-Hour exposures to workers
 - 8.6.1 For air samples which exceed 10% of the DAC values, calculate the workers DAC-Hour exposure using the following formula:

Exposure in DAC-Hours =
$$\frac{A \times B}{C}$$

Where:

A = Area or Lapel air sample concentration in uCi/cm³

B = Hours worker was in the calculated air concentration

C = DAC air concentration in uCi/cm^3 from regulatory reference.

- 8.6.2 Enter the DAC-Hour exposure on the column provided on the Air Sample Data sheet. If respiratory protection was used during the exposure period, contact the RSO or duly authorized representative for the protection factor used to adjust DAC-Hour exposure.
- 8.7 Effluent Air Discharge Calculation
 - 8.7.1 Calculate the discharge concentration using the following formula:

Air Concentration
$$(\mu Ci/cc) = \frac{DPM}{(2.22 \times 10^6 \ DPM/ \mu Ci)(Sample Volume(cm^3))}$$

Record the value on the Data sheet and inform the RSO or his duly authorized representative if the value exceeds, either the value listed in 10 CFR 20 Appendix B Table 2 Column 1. (This value is 6E-12 for Sr-90), Or greater than the MDA for the measurement.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The alpha and beta counter used to count air samples will be calibrated daily when in with a known radioactive source with activity traceable to the National Institute of Standards and Technology (NIST).
- 9.2 Records
 - 9.2.1 Documented information shall be legibly written in ink.

- 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The health physics technician performing air sampling and analysis shall ensure that this procedure is the most current and approved revision.
- 9.2.4 The health physics technician performing air sampling and analysis shall review all applicable forms for accuracy and completeness.
- 9.2.5 Entries on and any other pertinent forms must be dated and initialed by the health physics technician performing the air sampling and analysis to be valid.
- 9.2.6 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

| OP-002-01 | Air Sample Data Sheet |
|-----------|--------------------------------|
| OP-002-02 | Daily Air Sample Record |
| OP-002-03 | Contamination Limits |
| OP-002-04 | Effluent Air Sample Data Sheet |

OP-002-01 Air Sample Data Sheet

| Sample # | · | Date | | |
|------------------------------|-----------|---------------|-------------|---------------|
| Description: | | | | |
| Radionuclides: | D/ | AC value: | | |
| | D/ | AC value: | | |
| | D/ | AC value: | | |
| Initial sample flow rate: | Time san | npler on: | | |
| Final sample flow rate: | Time san | pler off: | | |
| Average sample flow rate: | | | | |
| Total sample volume: | | | | |
| Initial Air Concentration: | | | | |
| Alpha = | uCi a/cm³ | Reta ≃ | μCi β/cm³ | |
| MDA = | - | - | μCi β/cm³ | |
| WDA | μοι ωσιι | WDA 4 | μοι prem | |
| | | | | |
| | | | | |
| 12 Hour Decay Air Concentrat | | | | |
| Alpha = | | Beta ≈ | μCi β/cm³ | |
| MDA = | μCi α/cm³ | MDA = | μCi β/cm³ | |
| | | | | |
| | | | | |
| 72 Hour Decay Concentration: | : | | | |
| Alpha = | μCi α/cm³ | Beta = | μCl β/cm³ | |
| MDA = | μCi α/cm³ | MDA = | μCi β/cm³ | |
| | | | | |
| | | | | |
| | | | | |
| Performed By: | | Date: | | |
| | | | | |
| OP-002 | CA | DDEDA SEDIACI | e INC | PACE 11 OF 14 |

OP-002-02 Daily Air Sample Record

| Worker Name | Sample Date | Final Count Date | Time in | Time out | Total time (Hrs.) | Concentration (uCi/cm³) | DAC-Hour Exposure |
|-------------|----------------|------------------------|------------|-------------|-------------------------|-------------------------|----------------------|
| | | | | | | | |
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OP-002-03 Contamination Limits from Table 1 of RPM

| RADIONUGLIDE | CONTA | LE SURFACE MINATION 100 GM ²) |
|---|-----------|---|
| | REMOVABLE | FIXED + REMOVABLE |
| Transuranics, Ra-226, Ra-228, Th-230, Pa-231, Ac-227, I-125, I-129 | 20 | 100 |
| Th-Natural, Th-232, Sr-90, Ra-223 Ra-224, U-232, I-126, I-131, I-133 | 200 | 1000 |
| U-Natural, U-235, U-238, and associated Decay products | 1000 | 5000 |
| Beta-Gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. | 1000 | 5000 |

OP-002-04 **Effluent Air Sample Data Sheet**

| Sample # | Date | |
|--------------------------|--|---------------------------------|
| Description: | | |
| Radionuclides: | Effluent Air Limit: | |
| Radionuclides: | Effluent Air Limit: | |
| Sample flow rate: | Time sampler on: | |
| Sample flow rate: | Time sampler off: | |
| Total sample time: | hours | |
| Sample Flow Rate in Lite | ers/min X time in minutes = Total sample volume: | Liters X 1000 = cm ³ |
| Air Concentration: | | |
| | | |
| | | |
| A in Consontrator (| DPM | |
| AirConcentration | $(\mu Ci/cc) = \frac{DPM}{(2.22 \times 10^6 \ DPM/ \ \mu Ci)(Sample)}$ | Volune(cm³)) |

Activity = $\mu \text{Ci } \beta / \text{cm}^3$ MDA = $\mu \text{Ci } \beta / \text{cm}^3$

Permits

1.0 PURPOSE

This procedure describes the circumstances when a Radiation Work Permit (RWP) is required on Cabrera Services Inc. (CABRERA) Projects and addresses the requirements for planning, developing, issuing, using, modifying and terminating RWP's. The RWP provides a complete document addressing existing radiological conditions, work scope, radiological limitations, specific protective requirements, ALARA considerations and instructions to radiation workers. Adherence to this procedure will provide reasonable assurance that personnel exposures will be below specified limits, personnel will remain free of contamination and radioactive material contamination will not be spread beyond the designated contamination area location.

2.0 APPLICABILITY

This procedure will be used at the discretion of the Health Physics Technician or Project Manager to initiate an RWP prior to jobs where CABRERA personnel enter areas where; contamination is present above the limits specified in the Radiation Safety Program (RSP), when radiation exposure rates classify the work area as a radiation area, when air concentrations could exceed 10% of the Derived Air Concentration (DAC). This procedure describes the radiological surveys required to generate an RWP and provides guidelines to specific protective measures required based upon the radiological conditions in the work area.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

- 3.1 Precautions
 - 3.1.1 No work shall be performed involving radioactive material without initiation of an RWP unless otherwise directed by the RSO or duly authorized representative.
- 3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 All work activities performed under this procedure shall be in accordance with Specific Project Health and Safety Plan (HASP) and its RSP.

- 3.3.2 The RWP requirements may be upgraded by the RSO or duly authorized representative. RWP requirements may not be downgraded except as described in paragraph 8.3.
- 3.3.3 Whenever practical, airborne radioactivity shall be controlled by the use of engineering controls. Engineering controls include, but <u>are not</u> limited to, decontamination, HEPA vacuums, ventilation, and containment.
- 3.3.4 A control point shall be set up at the discretion of the RSO or duly authorized representative at the location of entrance/exit to a contaminated area. At this control point, anyone exiting the contaminated area shall frisk all materials, including hands and feet, and notify the HPT if activities are above the levels presented in Table I of the Radiation Safety Program.

4.0 REFERENCES

| • | HASP | Safety and Health Program (Radiation Safety Program) |
|---|--------|--|
| • | OP-001 | Radiological Surveys |
| • | OP-002 | Air Sampling and Analysis |
| • | OP-019 | Radiological Posting |
| • | OP-020 | Operation of Contamination Survey Meters |
| • | OP-021 | Alpha-Beta Counting Instrumentation |
| • | OP-022 | Operation of Ionization Chambers |
| • | OP-023 | Operation of Micro-R Meters |
| | | |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Airborne Radioactivity Area A room, enclosure or area in which radioactive material is dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases and the concentration of the dispersed radioactive material is in excess of:
 - 5.1.1 The derived air concentrations (DAC's) specified in Table 1, column3 of Appendix B, Title 10 Part 20 of the Code of Federal Regulations.
 - 5.1.2 Concentrations such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week, an intake of 0.6% of the annual limit on intake (ALI) or 12 DAC-hours.

- 5.2 Contaminated Area –A restricted area that has radioactive materials above the limits specified in the Final Decommissioning Plan in the form of dusts, particulates, and sorbed contaminants that could adhere to personnel clothing and skin while working in the area.
- 5.3 Radiation Area Any area accessible to personnel in which there exists ionizing radiation at dose rates such that an individual could receive a deep dose equivalent in excess of 5 millirems in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.
- 5.4 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.5 Personnel Survey A survey with radiation detection instrumentation that measures the amount of radioactive materials on personnel clothing or skin surfaces.
- 5.6 Lens Dose Equivalent (LDE) Exposure to the lens of the eye taken as the dose equivalent at a tissue depth of 0.3 centimeters.
- 5.7 Shallow Dose Equivalent (SDE) External exposure of the skin or extremity taken at a tissue depth of 0.007 cm and averaged over an area of 1 cm².
- 5.8 Total Effective Dose Equivalent (TEDE) TEDE is the sum of the deep dose equivalent (external dose) and the committed effective dose equivalent (internal dose).
- 5.9 Total Organ Dose Equivalent (TODE) TODE is the sum of the external component (deep dose equivalent) and the internal component (committed dose equivalent to an organ or tissue).

6.0 EQUIPMENT

None Required

7.0 RESPONSIBILITES

7.1 Project Manager (PM) - The PM is responsible for ensuring that all necessary personnel are familiar with this procedure, adequately trained in the used of the procedure, and have access to a copy of this procedure.

- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for monitoring compliance with this procedure and training of personnel working with this procedure. The RSO ensures the HPT are qualified by training and experience to perform the requirements of this procedure. The RSO is responsible for issue, control, and termination of RWP's.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT are responsible for performing the necessary surveys in support of RWP's, and job coverage of RWP's. The HPT has the responsibility to stop work if any unsafe condition exists in the work area, non-compliance with procedural requirements occurs, or significant changes in radiological conditions occur.
- 7.5 Radiation Workers Radiation Workers are responsible to read, understand, sign, and comply with the provisions of the RWP.

8.0 INSTRUCTIONS

- 8.1 Conditions Requiring an RWP
 - 8.1.1 Work involving radioactive material shall require a RWP unless otherwise directed by the RSO or duly authorized representative.
 - 8.1.2 Listed below are examples of jobs that require a RWP. If there is any question whether a job requires a RWP, the final determination will be made by the RSO or duly authorized representative.
 - 8.1.2.1 Work on or with material having total fixed activity in excess of 1000 dpm/100 cm² β , γ and/or 100 dpm/100 cm² α .
 - 8.1.2.2 Work on or with material having loose surface activity in excess of 20 dpm/100 cm² α and/or 200 dpm/100 cm² β , γ to 1000 dpm/100cm² β , γ depending on the nuclide(s) present.
 - 8.1.2.3 Filter changeouts of contaminated or potentially contaminated systems (i.e., Pre-filter, HEPA filters).

- 8.1.2.4 Work on any contaminated or potentially contaminated ventilation system where the integrity of the system may be breached or the interior accessed.
- 8.1.2.5 When air operated tools are to be used in a manner that is likely to generate airborne contamination.
- 8.1.2.6 Any job requiring welding, grinding or burning on contaminated material or equipment.
- 8.1.2.7 Work in a posted Airborne Radioactivity Area.
- 8.1.2.8 Work in a posted Radiation Area.
- 8.1.2.9 Work in a posted Contaminated Area.
- 8.1.3 Direct surveillance by qualified RSO or duly authorized representative may be used in lieu of a RWP in an emergency situation. The RSO or duly authorized representative have the authority to direct all matters associated with radiation protection and shall specify the radiological requirements to control personnel exposure to radiation.

8.2 RWP Initiation

- 8.2.1 RWPs are initiated by the cognizant individual responsible for the task. The initiator shall complete the location of work, detailed description of work, and job supervisor on Attachment 1. A RWP addition sheet (AP-012-02) shall be used as needed and attached to the RWP.
- 8.2.2 Work to be performed shall be clearly described.
- 8.2.3 The RSO or duly authorized representative shall approve the RWP. The RWP will not be approved unless the detailed description of work can be clearly understood.
- 8.2.4 The RSO or duly authorized representative may request that a detailed procedure be prepared if, in his/her opinion, the description of the work to be performed is unclear or the safety risks are considered to be high.
- 8.2.5 RWP numbers consist of the project name and a year prefix followed by the next available sequential number. Record the RWP number

- in the RWP Log sheet (AP- 012- 03) with a brief description of the description of work and on AP-012- 01 in the RWP "No." box.
- 8.2.6 The RSO or duly authorized representative shall complete the summary of radiological conditions and required radiological control sections of AP-012-01. Historical and/or pre-job surveys should be used for the radiological condition section.
- 8.2.7 The RSO or duly authorized representative shall review and approve the RWP prior to implementation.
- 8.2.8 An RWP may remain in effect for the duration of the job. However, RWPs authorizing work for periods anticipated to be greater than one month should be reviewed and re-authorized on a monthly basis.

8.3 RWP Implementation

- 8.3.1 Individuals authorized to work on the RWP shall print and sign their name on the original copy of the RWP, indicating that they have read and understand the RWP requirements. The RSO or duly authorized representative is responsible for ensuring the proper implementation of the RWP.
- 8.3.2 A copy of the RWP should be kept at the job site.
- 8.3.3 Individuals may be added to a non-terminated RWP by the HPT and are required to sign both the original and working copy.
- 8.3.4 Changes made to a non-terminated RWP shall be authorized by the by the RSO or duly authorized representative. The changes shall be made to both the original and the job site copy.
 - 8.3.4.1 Initial and date any changes made.
- 8.3.5 If the scope of worker conditions (scope of work or radiological conditions) are significantly different than those expected when the RWP was generated, the RWP shall be terminated and a new one issued.

8.4 RWP Termination

8.4.1 A RWP may be terminated by the RSO or duly authorized representative for any of the following reasons:

- 8.4.1.1 Work is complete
- 8.4.1.2 Work scope or radiological conditions significantly different from the RWP.
- 8.4.1.3 At the discretion of the RSO or duly authorized representative.
- 8.4.2 The terminated RWP package shall consist of the following:
 - Pre-job survey(s) and/or historical information
 - Post-job survey (if applicable)
 - All copies of the RWP
 - Copies of air sample results from individuals working under the RWP (if applicable).
- 8.4.3 The RWP package shall be reviewed and terminated by the RSO or duly authorized representative.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 Individual(s) working under a RWP shall be trained in the requirements of this procedure.
 - 9.1.2 Individual(s) working under a RWP shall ensure that this procedure and associated attachments are the most current revision.
 - 9.1.3 Information documented on any of the attachments shall be legibly written in ink. Drawing a line through the error and initialing the change shall make any corrections.
 - 9.1.4 The terminated RWP package shall be kept by the RSO or duly authorized representative for future review.
- 9.2 Records
 - 9.2.1 Records of work performed under a RWP and records directly related to the RWP shall be kept by the RSO or duly authorized representative.

Permits

9.2.2 The original copy of the RWP shall be kept by the RSO or duly authorized representative.

10.0 ATTACHMENTS

AP-012-01 Radiation Work Permit

AP-012-02 Additional RWP Sign-In Sheet

AP-012-03 Radiation Work Permit Log

Page 9 of 11

AP-012

| ST | . ALBANS PROJ | | -012-01 DIATION WORK PER | EMIT |
|-----------------------|--------------------|----------|----------------------------------|-----------------------------|
| Job Supervisor | | Date | | No. |
| Location of Work : | | | | <u> </u> |
| Description of Work: | · | | | |
| Becompacing, trong. | | | | |
| : | SUMMARY (| F RADIO | LOGICAL CONDITIONS | |
| Location | Contamination | | Radiation Levels | Airborne Concentrations |
| | | | | |
| | | | | |
| | - BEOLUBEI | 2 545/61 | 001041-00117701-0 | |
| | REQUIRE | RADIOL | OGICAL CONTROLS | |
| Coveralls Hood | | | Glove Liners Plastic Shoe Covers | Lapel Air Sampler |
| Surgeons | Can | | Rubber Shoe Covers | Lab Coat Pre-Job Meeting |
| Surgeons | | | Tape Gloves to Sleeves | Continuous HP |
| 1 | | | Tupo Ciordo to Ciceroo | Coverage |
| Rubber G | oves | | Plastic Suit | TLD |
| | adiation Worker(s) | | | |
| SPECIAL INSTRUCTIONS | | | | |
| | | | · | |
| | | | | |
| SIGNATURE INDICATES T | HAT YOU HAVE RE | | UNDERSTAND THE RADIO | OLOGICAL CONDITIONS AND |
| Name | Signature | | Name | Signature |
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| | | | | <u> </u> |
| APPROVED BY: | | | DATE | : |
| REAPPROVED BY: | | | | <u> </u> |
| RWP TERMINATED BY: | | | DATE | <u>:</u> |
| | | | | |

Cabrera Services, Inc.

| AP-012-02 ST. ALBANS PROJECT RADIATION WORK PERMIT ADDITION SHEET - RWP # | | | | |
|---|-----------|------|-----------|--|
| NAME | SIGNATURE | NAME | SIGNATURE | |
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| Reviewed By: | Date: _ | |
|--------------|------------------------|---------------|
| AP-012 | Cabrera Services, Inc. | Page 10 of 11 |

AP-012-03

| | RADIATION WORK PERMIT LOG SHEET | | | | |
|-------------|--|-------------|---------------------------------------|--|--|
| RWP # | General Description | Date Issued | Date Terminated | | |
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| AP-012 | Cabrera Services, Inc. | Page 11 of 11 |

1.0 PURPOSE

This procedure provides instructions for monitoring personnel for exposure to radiation in the workplace. Adherence to this procedure will provide reasonable assurance that exposures to radiation will be properly monitored enabling exposure to be controlled to As Low As Reasonably Achievable (ALARA).

2.0 APPLICABILITY

External radiation monitoring shall be conducted when it is likely that an adult will exceed 10% of the annual limits listed in 10 CFR 1201(a) or at a more conservative limit chosen by the RSO or duly authorized representative.

This procedure will be used for monitoring of all personnel for exposure to radiation. Monitoring will be provided as described in the site specific work plan for the job to be accomplished.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

Not Applicable

3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 Site Registration Form
 - 3.3.1.1 All new personnel and visitors required to enter a RCA must complete a Site Registration Form (AP-008-01) prior to starting work at a facility.
 - 3.3.1.2 Completed Site Registration Form will be retained with the individual personnel exposure file. Site Registration Forms for CABRERA personnel will be updated annually or earlier if existing information is known to be incorrect.
 - 3.3.2 Occupational Radiation Exposure History
 - 3.3.2.1 An NRC Form 4 or equivalent must be completed by each individual and reviewed by the RSO or duly authorized representative prior to the individual being permitted to work

in a radiological controlled area (RCA) where a dose of more than 25 mrem could be received.

3.3.3 Dosimetry Assignment

- 3.3.3.1 The Thermoluminescent Dosimeter (TLD) badge number, name, social security number, whether or not a worker has a completed NRC Form 4 or equivalent, the monitoring period (date from...to) and the individuals date of birth shall be recorded on OP-008-01, for each individual monitored on a project. The original form will be maintained as a permanent record of the project monitoring. A copy will be maintained in the CABRERA, East Hartford office.
- 3.3.4 Occupational Exposure Limits & Administrative Control Levels.
 - 3.3.4.1 Nuclear Regulatory Commission limits per calendar year:

| • | Whole Body (TEDE) | 5 Rem |
|-----------|--|----------|
| • | Lens Dose Equivalent (LDE) | 15 Rem |
| • | Shallow Dose Equivalent (SDE) (Skin or Extremity) | 50 Rem |
| • | Organ Dose (CDE) | 50 Rem |
| 3.3.4.2 A | Administrative Control Levels (per quarter) | |
| • | Whole Body (TEDE) | 1.25 Rem |
| • | Lens Dose Equivalent (LDE) | 3.75 Rem |
| • | Shallow Dose Equivalent (SDE) (Skin or Extremity) | 12.5 Rem |
| • | Organ Dose (CDE) | 12.5 Rem |
| | | |

3.3.4.3 Only the CABRERA RSO or duly authorized representative shall authorize exposure above the Quarterly Administrative Control Levels.

3.3.5 Radiological Control Areas

3.3.5.1 An RCA is considered to be any portion of a facility, plant, vehicle or project for which restrictions apply for purposes of occupational radiation exposure control. Radiation

exposures received within the boundary of a restricted area are occupational exposures. As described in the applicable Project Detail Work Procedure, RCAs will be established to provide the specific radiological controls necessary for the completion of the work scope and the protection of all project personnel. The following guidelines apply:

- 3.3.5.2 An RCA is always located within a restricted area as defined by 10 CFR 20. Each radiation area, high radiation area, airborne radioactivity area and contaminated area shall be contained within an RCA.
- 3.3.5.3 Personnel and casual visitors within an RCA will be provided with appropriate dosimetry and monitored for radiation exposure when appropriate.
- 3.3.6 Radiation Work Permits
 - 3.3.6.1 Personnel working in an RCA must be assigned to a specific RWP applicable to the job being performed.
 - 3.3.6.2 Direct Reading Dosimeters will not be required at the St. Albans VAECC.
- 3.3.7 Occupational Radiation Exposure History Request
 - 3.3.7.1 An Occupational Radiation Exposure Request, AP-008-05 will be completed for all personnel for whom permanent exposure results have been obtained. Copies of this letter will be sent to the individual, and maintained in the individual's personnel exposure file by the CABRERA Radiation Safety Office, East Hartford.
 - 3.3.7.2 Any time CABRERA is required to report an individual's exposure to the Nuclear Regulatory Commission or other regulatory agency, a copy of the report will be sent to the individual.
- 3.3.8 Project Records / Documentation
 - 3.3.8.1 Upon completion of the project, it will be the responsibility of the RFS or designee to forward all project records, logs, and communications regarding personnel exposure, exposure records, dosimetry records, and all other pertinent information about personnel dosimetry and individual radiation protection for RSO or duly authorized

representative review, and filing in anticipation of NRC review.

4.0 REFERENCES

| | HASP | Safety and Health Program (Radiation Safety Program) |
|---|------|--|
| • | HASP | Safety and nealth Program (National Calculation |

- AP-012 Radiation Work Permits
- OP-001 Radiation and Contamination Surveys
- AP-009 Training Program

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Monitoring Measurement of radiation exposure to evaluate potential dose equivalent to the individual.
- 5.2 Dosimetry Devices worn on the body (TLD) to measure the radiation dose received by the exposed individual.
- 5.3 Dose The deposition of energy in matter. Equivalent to the radiation dose times the quality factor for the type of radiation.
- 5.4 Quality Factor The factor, which is radiation dependent and identifies the relative biological effectiveness of a radiation type and energy. The quality factor is multiplied times the Dose to yield the Dose Equivalent.
- 5.5 TEDE The Total Effective Dose Equivalent The sum of the Deep Dose Equivalent (external dose) and the Committed Effective Dose Equivalent (internal dose).
- 5.6 CDE Committed Dose Equivalent The dose equivalent to organs or tissues that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.
- 5.7 CEDE Committed Effective Dose Equivalent The sum of the products of all organs or tissues with CDE and their respective weighting factors.
- 5.8 SDE Shallow Dose Equivalent Applies to the skin and to any extremity, it is used for external radiation which cause primary energy deposition in the first 0.007 cm of tissue averaged over one square centimeter.
- 5.9 LDE- Eye Dose Equivalent The dose delivered to the lens of the eye at a tissue depth of 0.3 centimeters.

- 5.10 DDE Deep Dose Equivalent The dose equivalent delivered by external radiation to tissue at a depth of 1 centimeter.
- 5.11 TLD Thermoluminescent Dosimeter A device which provides passive measurement of DDE, SDE, and/or LDE.

6.0 EQUIPMENT

None

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) The PM is responsible for ensuring that personnel assigned the tasks using radioactive or hazardous materials are properly trained in their use and the necessity that they be monitored for exposure to radiations and hazardous materials as described in the site specific work plan.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of personal monitoring devices for radiation and hazardous materials.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT are responsible for performing the surveys described in the site specific work plan and ensuring the proper use of monitoring devices by workers.
- 7.5 Workers All personnel are required to wear their dosimerty as required by the RWP and to maintain their exposure to radiation ALARA.

8.0 INSTRUCTIONS

- 8.1 Radiation Dosimetry TLD
 - 8.1.1 At a minimum, TLD's provided by a NVLAP certified vendor for the exposure period, will be used to monitor all personnel who could potentially receive 10% or more of the permissible dose limit for external radiation exposure. Personnel working in RCA's, will wear a TLD. Other appropriate radiation exposure monitors will be assigned accordingly (e.g., extremity dosimetry) at the discretion of the RSO or duly authorized representative.

- 8.1.2 TLD's are the permanent record of an individual's occupational radiation exposure. Upon receipt of project dosimetry, TLD's and extremity dosimetry shall be stored in a low background area inside the project main office or in other designated storage locations when not in use. A (TLD) control badge shall be kept where the assigned badges are stored when they are not in use. All CABRERA personnel entering a RCA will be issued, at a minimum, a TLD.
- 8.1.3 The individual's name, social security number, issue date, and date of return will be recorded on form AP-008-03.
- 8.1.4 The TLD, which monitors DDE, SDE, and/or LDE, shall be worn on the front torso in the region of the torso, expected to receive the highest dose. In cases where other areas of the body may receive a higher dose, the HPT shall evaluate and formally require (by specification on the RWP) that the dosimetry be worn at that body location. Multibadging may be utilized in certain situations as deemed appropriate by the RSO/RFS.
- 8.1.5 Extremity monitoring shall be provided when necessary as described by the specific site work plan, or at the discretion of the RSO/RFS.

8.2 Visitors/Group Monitoring

- 8.2.1 A casual visitor is any person touring or visiting the RCA on an infrequent basis, escorted while in the restricted area and not performing or supervising hands on work.
- 8.2.2 Visitors will be issued a TLD on a case by case basis depending on the type and duration of the job. The RFS or RSO shall determine if a TLD is to be issued to a visitor. TLD's will always be issued to contractors expected to exceed 500 mrem. A visitor expected to receive in excess of 25 mrem shall be trained and provided dosimetry.

8.3 Visitor RCA Conditions

- 8.3.1 A visitor may be escorted into a RCA provided that:
 - 8.3.1.1 No entries into a high radiation areas, surface contamination areas, or airborne radioactivity areas shall be allowed,
 - 8.3.1.2 External radiation exposure is limited to 50 mrem per year, or 10 mrem per entry.
 - 8.3.1.3 The visitor is furnished with dosimetry, when appropriate.

- 8.4 Visitor Dosimetry
 - 8.4.1 Visitors within an RCA shall receive, as a minimum, a TLD
 - 8.4.2 Visitor TLD results are recorded on form AP-008-01, which is maintained at the facility. When a visitor is issued a TLD, the individual's, name, social security number, issue date, and date of return will also be recorded on form AP-008-03.
- 8.5 Lost, Damaged or Questionable Dosimetry
 - 8.5.1 In the event of a Lost, Damaged or Questionable TLD, the RFS or RSO shall be notified immediately. A Lost, Damaged or Questionable Dosimetry Report, (AP-008-02) will be completed and filed in the individual's exposure file. The dose estimated from all exposure received while the individual was in an exposure situation must be determined and recorded in the individual's dose record.
 - 8.5.2 In the event of multiple occurrences, the RSO or duly authorized representative shall be notified immediately.

8.5.3

- 8.6 Project Dosimetry Issuance/Control
 - 8.6.1 Prior to project commencement, the RFS and/or the RSO will determine the appropriate radiation monitoring dosimetry required based upon the radionuclides and activity present at the work area. The RFS will contact the RSO to provide the following information:
 - CABRERA Project Name and Account Number
 - Project start date and project duration
 - Suggested dosimetry required for project, including radiation type to monitor for
 - Quantity of dosimeters requested on a quarterly basis including controls
 - Name, address, social security, birth date of project personnel to be monitored.
 - · Address dosimetry is to be shipped to.

- 8.6.2 Personnel assigned to projects will wear the appropriate dosimetry for no more than one quarter or the duration of the project, whichever is shortest.
 - 8.6.2.1 It will be the responsibility of the RFS or RSO to return dosimetry to the vendor for processing at the end of each quarterly monitoring period.
 - 8.6.2.2 If the original projected project duration is extended, the RFS or designee shall inform the RSO so that the proper arrangements can be made to supply additional dosimetry from the vendor.
 - 8.6.2.3 The quarterly issue period may be extended at the discretion of the RSO or duly authorized representative. Extensions shall be "with cause" actions and documented by memo, at a minimum.
 - 8.6.2.4 Dosimetry shall be maintained on site in a low dose rate area with control(s), when not being worn by personnel.
- 8.6.3 Dosimetry Processor (Vendor)
 - 8.6.3.1 The dosimetry vendor must be NVLAP certified in accordance with the project Health and Safety Plan and 10 CFR 20.1501.
 - 8.6.3.2 Upon receiving project dosimetry, the RFS or designee shall verify that the dosimetry received meets the requirements of the project. Any problems should be reported to the CABRERA RSO or duly authorized representative for immediate attention and resolution. All documentation received with dosimetry will be filled out completely. When all required preliminary training documentation has been completed as described in the project Detail Work Procedure, dosimetry will be issued to project personnel.
- 8.7 It is the responsibility of the RFS or designee to ensure that AP-008-03 is completed at the time of dosimetry issuance and a copy is sent to the CABRERA East Hartford Office location.

9.0 QUALITY ASSURANC/RECORDS

9.1 Records

- 9.1.1 Documented information shall be legibly written in ink.
- 9.1.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.1.3 The health physics technician using this procedure shall ensure that it is the most current and approved revision.
- 9.1.4 The health physics technician shall review Forms AP-008-01 through AP-008-04 for accuracy and completeness.
- 9.1.5 Entries on Forms AP-008-01 through AP-008-04 and any other pertinent forms must be dated and initialed by the health physics technician performing the inventory to be valid.
- 9.1.6 The RSO or duly authorized representative shall review completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

| • | AP-008-01 | Site Registration Form |
|---|-----------|--|
| • | AP-008-02 | Lost, Damaged or Questionable Dosimetry Report |
| • | AP-008-03 | Radiation Dosimetry Issue Log |
| • | AP-008-04 | Radiation Exposure Report |
| • | AP-008-05 | Occupational Exposure History Request NRC Form 4 |

AP- 008-01 Site Registration Form

| ADMINISTRATIVE INFORMATION | | | | | |
|---|---|---------------|--------|----|--|
| Name: | Date: | | | | |
| Social Sec. No.: | Date of Birth: | | | | |
| Permanent Address: | | | | | |
| Employer's Name: | | | | | |
| Employer's Address: | | | | | |
| CABRERA Project Name/No.: | | | | | |
| Project Contact: | | · | ······ | | |
| | Date: | | | | |
| Signature: | | | | | |
| DOSIN | TETRY USE ONLY | | | | |
| DRD No.: | DRD Reading: | _mrem | | | |
| TLD Badge No.: | TLD Badge Results | _mrem | | · | |
| RADIATION SAFETY OFFICER APPROVAL | | | | | |
| This person has met the requirements for radiation work | as specified in the CABRERA Radiation Saf | ety Manual: \ | es_ | No | |
| This person meets the requirements for radiation work w | | | Yes | No | |
| Notes: | | | | | |
| | | | | | |
| CABRERA RSO Signature: | | | | | |

AP-008-02 Lost, Damaged or Questionable Dosimetry Report

| ADMINISTRATIVE | | | | | |
|---|----------------------------------|--------------------|------|--|--|
| Report Date/Time: | | | | | |
| Project Name/No.: | | | | | |
| Project Manager/Contact: | | | | | |
| Individual's Name/SSN: | | | | | |
| Badge No.: | | | | | |
| Date/Time of Incident: | | | | | |
| Location if known: | | | | | |
| Applicable RWP No.: | | | | | |
| Date Badge was issued: | | | | | |
| D | OSE CALCULATION | | | | |
| Dose from dosimeter readings | (Total from date issued) thru_ | (Date) = | mrem | | |
| 2. Current dosimeter reading | (If more than one dosimeter, use | highest reading) = | mrem | | |
| 3. If individual was not wearing a dosimeter, or lost the dosimeter, assign highest exposure received by workers in the same area. If none, use dose rate x time in area for the same period. | | | | | |
| Dose Rate | (mrem/hour) x Time | (hours) = | mrem | | |
| Total estimated exposure to be assigned: | | = | mrem | | |
| THE METHOD USED TO ESTIMATE MY EXPOSURE HAS BEEN EXPLAINED TO ME, AND THE ESTIMATE DOSE ASSIGNED TO MY RECORD IS ACCEPTABLE FOR THIS EVENT. | | | | | |
| Individual's Signature: | Date: | | | | |
| DOSE RECORD AUTHORIZATION | | | | | |
| Dose Estimate Calculations By: | | Date: | | | |
| Dose Estimate Reviewed By:(RSO)_ | | Date: | | | |
| Dose Estimate Posted By: | | Date: | | | |

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AP-008

AP-008-03 Radiation Dosimetry Issue Log

| Project/Loc | ation: | Badge Series No.: | | | |
|-------------|--------|-------------------|-----------------|--------------------|-----|
| TLD# | Name | SSN | Form 4 (Y/N) | Dates (From/To) | DOB |
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| Reviewed | l by: | | | Date: | |
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CABRERA SERVICES, INC.

AP-008-04 Radiation Exposure Record

| Name: | | | • | SSN: | • | | | | |
|--|--|--------------------------|----------------------------|-----------------------|------------------------|---|---|----------|--|
| Birth Date: | | | | | | | | | |
| TLD Badge No.: | | | | | | | | | |
| Quarterly Whole Body Dose: 1 st 2 nd 4 th | | | | | | | | | |
| Lifetime Wh | Lifetime Whole Body Dose Equivalent:(Rem) Monitoring Year: | | | | | | | | |
| Monitoring Period | Whole Body (DDE) | Shallow Dose (SDE) | Extremity Dose (SDE) | Lens Dose (LDE) | Organ Dose (CDE) | Internal Effective Dose (CEDE) | Total Effective Dose Equivalent – Rem (DDE+CEDE) TEDE/Cumulative | | |
| January | | | | | | | | | |
| February | | | | | | | · | | |
| March | | | | | | | · | | |
| April | | | | | | | | | |
| Мау | | | | | | | - | | |
| June | | | | | | | | | |
| July | | | | | | | | | |
| August | | | | | | | | | |
| September | | | | | | | | | |
| October | | | | | | | ÷ | | |
| November | | | | | | | | | |
| December | | | | | | | ÷ | | |
| Yearly Totals | | | | | | | | | |
| Notes: N/M = Not Monitored | | | | | | | | | |
| Reviewed: | Reviewed: Date: | | | | | | | | |
| RSO: | RSO: Date: | | | | | | | | |
| AP-008 | | | CABRER | A SERVICI | es, Inc. | | Page | 13 of 14 | |

AP-008-05 OCCUPATIONAL RADIATION EXPOSURE HISTORY

| Name: | SSN: | | |
|--|---|---|----------------------------------|
| Address: | | | |
| | | | |
| | | | |
| Date of Birth: | | | |
| The above individual was monitored by: | TLD: | Direct Reading | Dosimeter: |
| This is a: | Record: | Estimate: | |
| Monitoring Device Number: | | | |
| The monitoring period was: From: | To: | | |
| The Occupational Radiation Exposure was | received during: | | |
| Assignment for: | License No.: | | 1 . |
| Address: | | | : |
| City/State/ZIP: | | | |
| Telephone: | | | , |
| RADIATION EX | (POSURE RESU | JLTS | |
| Deep Dose Equivalent for the period stated | above: | Rem | (DDE) |
| Shallow Dose (skin) for the period stated at | oove: | Rem | (SDE) |
| Extremity Dose for the period stated above: | elevability. | Rem | (SDE) |
| Eye Dose Equivalent for the period stated a | bove: | Rem | (LDE) |
| Committed Effective Dose Equivalent (Inter | nal): | Rem | (CEDE) |
| Total Effective Dose Equivalent (DDE + CE | DE): | Rem | (TEDE) |
| This report is furnished to you under the provision of the control | ons of Nuclear Regu ainst Radiation". Yo | ulatory Commission u should preserve | Regulation 10 this report for |
| Radiation Safety Officer: | | _ Date: | · |
| | | | ; |
| AP-008 CABRERA | SERVICES, INC. | | Page 14 of 14 |

1.0 PURPOSE

This procedure provides the methods for operating beta/gamma survey meters when performing contamination surveys. Adherence to this procedure will provide reasonable assurance that the surveys performed have reproducible results.

2.0 APPLICABILTY

This procedure will be used by Cabrera Services, Inc. (CABRERA) personnel to measure fixed and removable beta-gamma emitting contamination on facility surfaces, equipment, waste packages, personnel, personnel protective clothing, etc.

3.0 PRECAUTIONS, LIMITATIONS, AND REQUIREMENTS

- 3.1 Precautions
 - 3.1.1 Ensure that the thin Mylar or mica window on the probe face is protected from punctures during survey operations.
 - 3.1.2 If any instrument inconsistencies are observed (e.g., unusually high or low background readings, source checks outside the acceptable range, etc.), remove the instrument from use, label it "OUT OF SERVICE" and report the condition to the Radiation Safety Officer (RSO) or duly authorized representative.
- 3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
 - 3.3.2 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.
 - 3.3.3 Survey instrument calibrations shall be performed by an NRC or Agreement State licensed calibration facility.

Revision 0 9/9/200 St. Albans Project 00-062 Operation of Contamination Survey Meters

4.0 REFERENCES

HASP Safety and Health Program (Radiation Safety Program)

OP-001 Radiological Surveys

OP-009 Use and Control of Radioactive Check Sources

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Contamination Survey A survey technique to determine fixed and removable contamination levels.
- 5.3 Acceptance Range A range of values that describe an acceptable daily instrument source check result.

6.0 EQUIPMENT

Applicable alpha, beta/gamma survey instrumentation chosen at the discretion of the RSO/RFS or duly authorized designee.

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating contamination survey meters are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of contamination survey meters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT operating contamination survey meters are responsible for knowing and complying with this procedure.

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Select the contamination survey meter and probe to be used in the survey.
 - 8.1.2 Before each use, perform the following checks:
 - 8.1.2.1 Verify the instrument has a current calibration label.
 - 8.1.2.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.2.3 Position the meter switch to "BAT". Check to see that the needle falls within the "Bat Test" checkband.
 - If the needle falls below the "Bat Test" checkband, install new battery(s).
 - If the needle still falls outside the "Bat Test" checkband after the installation of new battery(s), tag the instrument "Out of Service" and notify the RSO or duly authorized representative.
 - 8.1.3 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.2.1 through 8.1.2.3 and notify the RSO or duly authorized representative.
- NOTE: Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or duly authorized representative be notified.
 - 8.2 Pre-operation of instrument
 - 8.2.1 Position the meter fast/slow ("F/S") switch to "S".
 - 8.2.2 Position the meter switch to the appropriate range scale.
 - 8.2.3 Obtain an OP-020-01 Form.
 - 8.2.4 If a Quality Control (Q.C.) acceptance range has not already been calculated on the OP-020-01 Form, then follow the instructions below, other wise proceed to step 8.2.6.
 - 8.2.5 Enter the QC check source, probe, and meter numbers on Form OP-020-01.

- 8.2.5.1 Ensure the source and detector are in a reproducible geometry, which will be used each time this check is performed.
- 8.2.5.2 Obtain ten separate measurements in a low background area.
- 8.2.5.3 Calculate the average of the ten measurements by adding the measurements and dividing the sum by ten.
- 8.2.5.4 Multiply the average measurement value established in 8.2.5.3 by 0.8 and record on Form OP-020-01 as the lower QC acceptance range.
- 8.2.5.5 Multiply the average measurement value established in 8.2.5.3 by 1.2 and record on Form OP-020-01 as the upper QC acceptance range.
- 8.2.6 Place the QC check source and detector in the proper geometry established for QC check.
- 8.2.7 Allow the instrument reading to stabilize (approximately 30 seconds). Compare the reading to the response check criteria on Form OP-020-01. If the response reading falls outside of the acceptance range, note Fail on Form OP-020-01, tag the instrument "Out of Service" and notify the RSO or duly authorized representative. If the reading falls inside the acceptance range, note Pass on Form OP-020-01; the instrument is ready for performing surveys.
- 8.3 Contamination Survey Techniques
- Caution:

The window area of beta detector windows is 1.7 mg/cm² mica. The window can be easily damaged while surveying areas having protruding fragments. Remove these fragments, if possible, before performing surveys.

Note:

To maintain the calibrated detection efficiency, the detector must be held at the appropriate height, determined during calibration, when surveying. For example, if a beta probe's efficiency was calculated at 1/2 inch from the calibration source, the detector must be held at 1/2 inch from the surface being surveyed to maintain calibrated detection efficiency.

Note:

Avoid contacting the detector probe to the area being surveyed. This potentially could contaminate the probe.

8.3.1 Verify the instrument selector switch is in the X 0.1 position.

- 8.3.2 For a stationary reading, place the detector over the area to be measured and allow meter to stabilize. Record the average meter indication in CPM β /PA on applicable forms.
- 8.3.3 For a scan survey move the detector slowly over the surface (less than one detector width per second). Observe meter indication. If increased readings are observed return to the area and obtain a stationary reading. Record maximum area meter indication in CPM β/PA, on applicable forms.

8.4 Interpretation of Results

The meter reading on the alpha and beta/gamma survey meters must be corrected for detector efficiency and detector surface area before comparing results with the contamination units in Section 3.6 of the Radiation Safety Program. The conversion from CPM α /PA or CPM β /PA to DPM α /100 cm² or β /100 cm² is performed using the following equation.

$$(DPM / 100 cm^2) = \frac{(AxB)}{C}$$

Where:

- A = Alpha or Beta/Gamma survey meter indication in net CPM α /PA or β /PA (i.e. Gross Alpha or Beta Survey Counts minus background counts = Net CPM/PA)
- B = 100 cm² divided by the effective detector surface area in cm². With an effective surface area of 50 cm² for the Ludlum 43-5 alpha detector, the value of B is approximately 2 or for the 15 cm² for the Ludlum 44-9 beta detector, the value of B is approximately 6.7.
- C = Detector efficiency (expressed as decimal).

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The health physics technician performing the survey shall ensure that this procedure is the most current and approved revision.
- 9.2 Records
 - 9.2.1 Documented information shall be legibly written in ink.
 - 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single

Revision 0 9/9/200 St. Albans Project 00-062 Operation of Contamination Survey Meters

- line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The HPT performing the survey shall review Form OP-020-01 and any other applicable forms for accuracy and completeness.
- 9.2.4 Entries on Form OP-020-01 and any other pertinent forms must be dated and initialed by the HPT performing the survey to be valid.
- 9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

OP-020-01 Survey Meter Source Check Form

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OP-020-01 - Survey Meter Source Check Form

| Probe: | | _Serial No.: | | | |
|--------------|----------------------------|-------------------|-----------------|--------------------------|--|
| | | Cal. Du | Cal. Due | | |
| Source: | QC Acceptance Range: Lower | | | Upper | |
| Date | Reading | Pass/ Fail | H.P. Technician | H.P. Tech Initials | |
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| Reviewed By: | | | Date: | | |
| OP-020-01 | Cab | rera Services, Ir | nc. | Page 7 of 7 | |

7

St. Albans Project 00-062

1.0 PURPOSE

This procedure provides instruction on the operation and setup of an alpha/beta sample counter. Adherence to this procedure will provide reasonable assurance that the surveys performed have reproducible results.

2.0 APPLICABILITY

This procedure will be used by Cabrera Services, Inc., (CABRERA) personnel operating an alpha/beta sample counter during surveys. Types of surveys that may use an alpha/beta sample counter are:

- Smear surveys performed to determine the removal of alpha and/or beta contamination on facility surfaces, equipment, waste, and source packages, etc.
- Air sample surveys performed in a workers breathing zone and effluent discharge to determine alpha and/or beta air concentrations.

3.0 PRECAUTIONS, LIMITATIONS, AND REQUIREMENTS

3.1 Precautions

- 3.1.1 If any instrument inconsistencies are observed (e.g., unusually high or low background counts, source checks outside the tolerance range, etc.), remove the instrument from use and report the condition to the RSO or duly authorized representative.
- 3.1.2 Individuals performing work with an alpha/beta counter shall be familiar with the requirements set forth in the current and approved version of this procedure.

3.2 Limitations

3.2.1 This instrument should be set up for use in low background area as determined by the RSO or duly authorized representative.

3.3 Requirements

- 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
- 3.3.2 Survey instrument calibrations shall be performed by an NRC or Agreement State licensed calibration facility.

3.3.3 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.

4.0 REFERENCES

HASP
 OP-001
 OP-002
 NUREG-1556
 Safety and Health Program (Radiation Safety Program)
 Radiological Surveys
 Air Sampling and Analysis
 Consolidated Guidance About Material Licenses (Vol.11)

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Smear sample survey a technique using a two-inch diameter filter papers to determine removable contamination of alpha and/or beta emitting radioactive material.
- 5.3 Air sample survey a technique in which particulates are collected from a known volume of air drawn through a filter paper and concentrations of airborne alpha and beta activity associated with the particulates is determined by sample counting.
- 5.4 Plateau portion of a voltage curve where changes in operating voltage introduce minimum changes in the counting rate.
- 5.5 Chi-square test A statistical test to evaluate the operation of a sample counter by determining how data fit a series of counts to a Poisson distribution.
- 5.6 Daily calibration A determination of alpha and beta sample counting efficiency by counting National Institute of Standard Technologies (NIST) radioactive standards.

6.0 EQUIPMENT

Ludlum model 2929 or equivalent

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating alpha/beta sample counters are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of alpha/beta sample counters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT using alpha/beta sample counters are responsible for knowing and complying with this procedure.

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Before each use, perform the following checks:
 - 8.1.1.1 Verify the instrument has a current calibration label.
 - 8.1.1.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.2 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.1.1 through 8.1.1.2 and notify the RSO or his duly authorized representative.

NOTE:

Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or his duly authorized representative be notified.

- 8.2 Initial Startup.
 - 8.2.1 Turn high voltage potentiometer to its lowest position (fully counterclockwise).
 - 8.2.2 Turn instrument on.

- 8.2.3 The operator can select one of four operational procedures depending on the function to be performed. Before performing any of the following complete steps 8.1.1 to 8.1.2.
 - a) Plateau Curve The Plateau Curve is used to find the proper operating voltage of the instrument and will be performed at the discretion of the RSO or duly authorized representative. This test shall be documented on the attached Form OP-021-01 or equivalent.
 - b) Chi-square Test The Chi-Square Test will be performed at the discretion of the RSO or duly authorized representative in order to test the operational adequacy of the instrument and will be recorded on Form OP-021-02. This test statistically evaluates the sample counter against a poisson distribution.
 - c) Daily Calibration Check This portion of the procedure is performed before samples are counted on any day the instrument is in use.

8.3 Plateau Curve

NOTE: Before beginning, record the previous calibration high voltage values.

- 8.3.1 Set up the instrument in a low background area.
- 8.3.2 Rotate the high voltage potentiometer slowly clockwise until the meter indicates proper voltage. This proper voltage is approximately 500 volts.
- 8.3.3 Set time multiplier switch to "x1."
- 8.3.4 Set the instrument-preset timer to one (1) minute.
- 8.3.5 Insert an alpha calibration standard into the center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a one minute count.
- 8.3.6 Upon completion of the count, record high voltage reading and digital counts appearing in the instrument alpha display in the indicated columns on Form OP-021-01(Plateau Data Sheet)
- 8.3.7 Continue increasing high voltage by 50-volt increments, as described above, obtaining counts and recording data until the end of the plateau is reached. If rapid increase in count rate is observed, proceed to step 8.3.8. If not, notify the RSO or duly authorized representative.

- 8.3.8 Remove the alpha source and replace with a beta source.
- 8.3.9 Reduce high voltage reading to the voltage level chosen during Step 8.3.2 by turning potentiometer counterclockwise.
- 8.3.10 Perform one-minute counts at 50-volt increments and record the data on Form OP-020-01, until the end of the plateau is reached. If a rapid increase in count rate is observed reduce the high voltage.
- 8.3.11 Using linear graph paper or equivalent plotting system, plot alpha and beta counts on the "Y" axis and the voltage for the indicated count on the "X" axis.
- 8.3.12 Select an operating voltage 1/3 the distance beyond the knee of the plateau curve by marking the voltage on the graph and on the plateau data sheet.
- 8.3.13 Sign and date Form OP-021-01 and forward the results along with any graphs produced to the RSO or duly authorized representative for review.

8.4 Chi-Square Test

- 8.4.1 Set up the Instrument in a low background area.
- 8.4.2 Ensure the high voltage potentiometer is positioned according to the posted instrument label. Adjust if necessary.
- 8.4.3 Set the time multiplier switch to "x1".
- 8.4.4 Set the instrument-preset timer to one (1) minute.
- 8.4.5 Insert the alpha calibration standard into center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a one minute count.
- 8.4.6 Upon completion of the count, record digital counts appearing in the alpha display in the "X_i" column on Form OP-021-02 (Chi -Square Data Sheet).
- 8.4.7 Repeat counting sequence without changing settings until a total of 20 counts have been taken and recorded in the "X_i" column on Form OP-021-02.
- 8.4.8 Add the 20 counts recorded in the " X_i " column and record in the "Sum" column. Then divide by 20 to obtain the mean number of counts (X_m) and record on the line " X_m ".

- 8.4.9 Calculate the individual count "X_i" difference from the mean (X_m) value and record in the "(X_i-X_m)" column on Form OP-021-02 for all 20 values.
- 8.4.10 Calculate $(X_i-X_m)^2$, sum the " $(X_i-X_m)^2$ " column, and record on Form OP-020-02.
- 8.4.11 Calculate the value of Chi- Square using the following formula.

$$X^2 = \frac{\sum (X_i - X_m)^2}{X_m}$$

- 8.4.12 The value of Chi-square should be between 8.91 and 32.8 (represents a probability between 0.025 and 0.975). Record this value at "X²". If the Chi-square value falls outside this range, contact the RSO or duly authorized representative for further instructions.
- 8.4.13 Sign and date Form OP-021-02 and forward the results to the RSO or duly authorized representative for review.
- 8.5 Daily Calibration Check
 - 8.5.1 Ensure the high voltage potentiometer is positioned according to the posted instrument label. Adjust, slowly, if necessary.
 - 8.5.2 Set time multiplier switch to "x1".
 - 8.5.3 Set the instrument-preset timer to five (5) minutes.
 - 8.5.4 Record the source type to be used and corresponding serial number on the proper line indicated on Form OP-021-03. Use separate rows of the form for each source efficiency to be calculated.
 - 8.5.5 Insert a blank sample into the center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a five minute background count.
 - 8.5.6 Calculate and record the background total counts and count rate in the columns labeled "Total Counts" and "BKG CPM" respectively, under Background Information on Form OP-021-03. The background count rate in CPM (counts per minute) can be calculated as follows:

$$CPM = \frac{Total Counts}{Total Time}$$

- 8.5.7 Remove the blank sample and insert the alpha or beta calibration standard into the center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a five minute count.
- 8.5.8 Upon completion of the measurement, calculate and record the total counts and count rate in the columns labeled "Total Counts" and "CPM" respectively, under Source Information on Form OP-021-03. The count rate (CPM) can be calculated as listed in Step 8.5.6.
- 8.5.9 Calculate Net Source CPM as below and record on Form OP-021-03 under "Net CPM".

Net Source CPM = CPM - BKG CPM

NOTE: Obtain activity (DPM) value from the source certification paperwork. Decay correct activity, if needed.

8.5.10 Use the source disintegration per minute (DPM) to calculate the efficiency as shown below and record as a decimal on Form OP-021-03.

% Efficiency=
$$\frac{Net Source CPM}{DPM}$$
*100

- 8.5.11 To calculate the efficiency for the next source, remove the current source standard, insert a new source standard and repeat steps 8.5.1 through 8.5.10, as necessary.
- 8.5.12 Remove calibration standards and place in source holders.
- 8.5.13 Generate a control chart tracking the daily efficiencies and notify the RSO or duly authorized representative if any point falls outside of 2σ variance.

NOTE: For the first day on control chart use five data points to begin trend line.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The alpha/beta sample counter will be checked for proper calibration daily with a NIST traceable source when in use.

- 9.1.2 Chi-square and plateau tests are verified and noted as currently valid.
- 9.1.3 The HPT shall ensure that the attachments are of the most current.

9.2 Records

- 9.2.1 Documented information shall be legible written in ink.
- 9.2.2 Data shall not be obliterated by erasing or using white-out. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed and dated.
- 9.2.3 The HPT shall review completed attachment forms for accuracy and completeness.
- 9.2.4 Entries on forms must be dated and initialed by the HPT to be valid.
- 9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

| • | OP-021-01 | Plateau Data Sheet |
|---|-----------|-------------------------|
| • | OP-021-02 | Chi-Square Data Sheet |
| • | OP-021-03 | Daily Calibration Check |

OP-021-01

Plateau Data Sheet

| Date: | | Reco | Recommended Operating Voltage: | | | | | |
|--------------------|-----------------|--------------------|--------------------------------|--------------------|----------------|--------------------|---------------------------------------|--|
| Instrument | <u>.</u> | | | Serial | Number: | | | |
| Alpha Sou | rce Serial N | 0 | | Acti | vity (dpm) | · | | |
| Beta Source | ce Serial No | • | | Acti | vity (dpm) | | | |
| Voltage Setting | Alpha Counts | Voltage Setting | Alpha Counts | Voltage Setting | Beta Counts | Voltage Setting | Beta Counts | |
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| OP-021-01 | | | Cahrera Se | rvices Inc | | D ₂ | age 0 of 11 | |

OP-021-02

Chi-Square Data Sheet

| Date:Instrument: | | Serial Number: | X ² |
|------------------|--------|---|--|
| | | Beta Source No./Activity | <i>f</i> : |
| Count Number | Xi | (X ₁ -X _m) | $(X_l-X_m)^2$ |
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| 2 | | | |
| 3 | | | |
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| Prepared By: | | Da | te: |
| | Print | /Sign | |
| Reviewed By: | Print | Da /Sign | te: |
| OP-021-02 | Cabrer | a Services, Inc. | Page 10 of 11 |

OP-021-03

Daily Calibration Check

| Instrument_ | | | <u></u> - | | Sen | iai No | | | |
|------------------------|---------------|-----------------|------------|---------------|--------------------|-----------|------------|----------|--|
| Alpha Source | e No./A | ctivity | | Beta | Source No. | /Activity | | · | |
| Background Information | | | | | Source Information | | | | |
| Date/Time | Total Time | Total Counts | BKG CPM | Total Time | Total Counts | CPM | Net CPM | % Eff. | |
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| Reviewed B | y: | | Print | /Sign | | Date: _ | <u> </u> | | |
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| OP-021-04 | | | Cabrer | a Service | s. Inc | • | Page | 11 of 11 | |

1.0 PURPOSE

The purpose of this procedure is to provide instruction for the operation of the micro-R meter for gamma radiation surveys. Adherence to this procedure will provide reasonable assurance that the radiological surveys performed have reproducible results.

2.0 APPLICABILITY

This procedure will be used by Cabrera Services, Inc. (CABRERA) personnel operating the micro-R meter during gamma radiation surveys. The micro-R meter is used to determine gamma radiation levels from St. Albans VAECC facility surfaces, equipment, waste and source packages, etc., containing gamma emitting radioactive materials.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

- 3.1.1 Individuals performing work with the micro-R meter shall be familiar with the requirements set forth in the current and approved version of this procedure.
- 3.1.2 If any instrument inconsistencies are observed (e.g., unusually high or low background readings, source checks outside the acceptable range, etc.), remove the instrument from use, label it "OUT OF SERVICE" and report the condition to the Radiation Safety Officer (RSO) or duly authorized representative.

3.2 Limitations

None

3.3 Requirements

- 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
- 3.3.2 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.
- 3.3.3 Survey instrument calibrations shall be performed by an NRC or Agreement State licensed calibration facility.

4.0 REFERENCES

| | HASP | Safety and Health Program (Radiation Safety Program) |
|---|------------|--|
| | OP-001 | Radiological Surveys |
| | OP-009 | Use and Control of Radioactive Check Sources |
| | OP-020 | Operation of Contamination Survey Meters |
| - | NURFG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Gamma Radiation Survey A survey technique to determine gamma radiation levels from radioactive material(s) in facilities, materials, landmasses, etc.
- 5.3 Acceptance Range A range of values that describe an acceptable daily instrument source check result.

6.0 EQUIPMENT

Ludlum Model 19 or equivalent

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating a micro-R meter is familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the operation of a micro-R meter described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT operating the micro-R meter are responsible for knowing and complying with this procedure.

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Before each use, perform the following checks:
 - 8.1.1.1 Verify the instrument has a current calibration label.
 - 8.1.1.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.1.3 Position the meter switch to "BAT". Check to see that the needle falls within the "Bat Test" checkband.
 - If the needle falls below the "Bat Test" checkband, install new battery(s).
 - If the needle still falls outside the "Bat Test" checkband after the installation of new battery(s), tag the instrument "Out of Service" and notify the RSO or duly authorized representative.
 - 8.1.2 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.1.1 through 8.1.1.3 and notify the RSO or duly authorized representative.
- NOTE: Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or duly authorized representative be notified.
 - 8.2 Pre-operation of instrument
 - 8.2.1 Position the meter fast/slow ("F/S") switch to "S".
 - 8.2.2 Position the meter switch to the appropriate range scale.
 - 8.2.3 If a Quality Control (Q.C.) acceptance range has not already been calculated, then follow the instructions below, other wise proceed to step 8.2.5.
 - 8.2.3.1 Ensure the source and detector are in documented reproducible positions, which will be used each time this check is performed. Document this position on appropriate form.
 - 8.2.4 Place the QC check source and detector in the documented position on appropriate form.

- 8.2.5 Allow the instrument reading to stabilize (approximately 30 seconds). Compare the reading to the response check criteria. If the response reading falls outside of the acceptance range, tag the instrument "Out of Service," and notify the RSO or duly authorized representative.
- 8.3 Operation of the instrument
 - 8.3.1 Grid Surveys
 - 8.3.1.1 Turn the audio switch to the "On" position.
 - 8.3.1.2 Verify the instrument selector switch is on the lowest scale (usually the μR position). Turn the instrument selector switch to the next higher scale only if meter indication is off scale.
 - 8.3.1.3 For a stationary grid reading in a facility or land mass, position the instrument one meter above the surface to be surveyed and allow meter to stabilize. With the instrument toggle switch set in the "SLOW" position, the meter reaches 90% of its final reading in 22 seconds. Record the average meter indication in μ R/hr on appropriate form(s).

Note:

Two survey methods (step 8.3.1.4 or 8.3.1.5) can be used to obtain contact readings in the survey grids. The survey method used will be specified in the site specific work plan.

8.3.1.4 For a scan survey, make sure the meter response is set to fast and suspend the instrument from a strap which locates the detector at surface or ground level. Move the instrument slowly over the surface while walking in an "S" pattern unless otherwise instructed by the RSO or duly authorized representative. Areas, which could concentrate radioactive materials such as drainage ditches, floor cracks, and wall/floor joints, should be surveyed. Observe meter indication and listen for increases in audible clicks from the speaker. If elevated readings above background are observed, a stationary survey shall be performed (at one-meter height and at the surface) at the point of elevated activity. Record area meter indications above background in μR/hr on appropriate form.

8.3.1.5 As an alternate to the "S" pattern survey used in step 8.3.1.4, the survey grid can be divided into subgrids and readings taken as directed by the site work plan. Elevated measurements should be performed in the same manner as above (i.e., at one meter and at the surface). The readings from each measurement are recorded on appropriate form.

8.3.2 Waste Container Surveys

- 8.3.2.1 Set the instrument scale to accommodate the highest expected radiation level. If radiation levels may approach 5000 μ R/hr (5 mR/hr) obtain an instrument with appropriate range before performing any radiation surveillance.
- 8.3.2.2 Slowly scan the total surface of the package and record the maximum contact reading obtained on appropriate forms.
- 8.3.2.3 Obtain instrument readings at one meter from all sides of the package and record the maximum reading obtained on appropriate form.

8.3.3 Final Verification

Upon completion of work activities, repeat steps 8.1.1.1 through 8.2.2 and 8.2.4 through 8.2.5, as a final verification that the instrument is working properly

8.3.4 Additional Information

- 8.3.4.1 In a uniform background radiation field (without interfering sources of radiation), methods such as selectively shielding the detector, soil sample analysis, etc., can be used to differentiate between extraneous radioactive sources (e.g., skyshine or radioactive waste shipment containers), naturally occurring radioactive material and/or radioactive contamination.
- 8.3.4.2 Note the location of installed devices, which contain radioactive material and could cause elevated background radiation levels in localized areas.
- 8.3.4.3 Land mass surveys might contain areas with naturally occurring radioactive materials, which will elevate background radiation levels.

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

9.1.1 The health physics technician performing the survey shall ensure that this procedure is current.

9.2 Records

- 9.2.1 Documented information shall be legibly written in ink.
- 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The health physics technician performing the survey shall review appropriate forms and any other applicable forms for accuracy and completeness.
- 9.2.4 Entries must be dated and initialed by the health physics technician performing the survey to be valid.
- 9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

None

1.0 PURPOSE

The purpose of this procedure is to provide instructions for the proper set-up, calibration and data acquisition for the PSR-4 Proportional Probe to be used at the St. Albans Extended Care Facility in the Ejector Pit Room's four-inch diameter underground cast iron pipe.

2.0 APPLICABILITY

This procedure is to be used only in the St. Albans Ejector Pit four-inch diameter underground cast iron pipe. This is because the concept of the probe is to use the eight spring loaded rollers to center the detector within the pipe.

3.0 PRECAUTIONS, LIMITATIONS

- 3.1 Ensure that safety line is attached to the probe before placing it in the pipe.
- 3.2 The only radionuclide monitored at St. Albans is Strontium-90 or daughter products of Strontium-90.
- 3.3 The calibration of this probe will be performed with a Strontium-90 National Institutes of Standards & Technology (NIST) traceable source.
- 3.4 The P-10 gas cylinder should be properly secured to prevent improper movement.
- 3.5 Pressure regulator attachment should fit snug to gas cylinder.
- 3.6 Plastic sheeting should cover cable to prevent contamination.

4.0 REFERENCES

| 4.1 | 10 CFR 20 | Standards for Protection Against Radiation |
|-----|-----------|--|
| 4.2 | AP-012 | Radiation Work Permits |
| 4.3 | OP-001 | Radiological Surveys |
| 4.4 | OP-002 | Air Sampling and Analysis |
| 4.5 | OP-019 | Radiological Posting |
| 4.6 | OP-021 | Alpha-Beta Counting Instrumentation |

St. Albans Field Operations Procedure for the PSR-4 Proportional Probe Rev. 0

5.0 DEFINITIONS

- 5.1 Activity The rate of disintegratation or decay of radioactive material. The units of radioactivity for the purposes of this procedure are disintegrations/minute.
- 5.2 Radiological Controlled Area A work area whose access is restricted to authorized and trained personnel by the use of a Radiation Work Permit due to one or more of the following conditions: radiation area, high radiation area, contaminated area, highly contaminated area or airborne area.
- 5.3 Survey An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal or presence of radioactive material or other sources of radiation.

6.0 EQUIPMENT

- 6.1 PSR-4 Probe with Cable.
- 6.2 P-10 Gas with Pressure/Reducer Regulator.
- 6.3 Safety Cable.
- 6.4 Plastic Tubing.
- 6.5 Ludlum 2221 Scaler Rate Meter.
- 6.6 NIST traceable SR-90 source.

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) is responsible for ensuring that personnel assigned the task of surveying materials are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of contamination survey meters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT is responsible for performing the surveys performed in this procedure.

8.0 INSTRUCTIONS

- 8.1 Connect one end of the gas/HV cable to the PSL-4 probe. Connect the other end to the Ludlum 2221 Scaler/Rate meter. Connect the P-10 gas supply as well.
- 8.2 The calibration of the PSR-4 probe is performed before using it at the St. Albans site. Readings are taken with an Sr-90 NIST traceable 1.25" diameter source. The adjusted net counts are calculated per square centimeter source area and an efficiency (cpm/dpm) is determined.
- 8.3 Background counts must be subtracted from the gross count readings to determine net counts. Background counts can be significantly higher in the Pit Ejector Room due to the presence of natural radon/thoron from the concrete walls and floors. A concerted effort must be made to reduce the background levels by using forced ventilation.
- 8.4 Gas purge should be 15-20 minutes at 100 cc/min.
- 8.5 A safety line should be attached to the probe to pullout should it get stuck. (Note: The P-10 gas/Ludlum 2221 line should not be used as the safety line.)
- 8.6 Place yellow plastic sleeving (two inches wide) around the probe cable to prevent contamination.
- 8.7 When moving/guiding probe into pipe, take a one-minute count every four inches.
- 8.8 Mark gas/HV cable with foot measuring tape to accurately determine depth and positioning in the pipe.
- 8.9 A number of Quality Assurance counts should be performed at pre-determined locations to determine the reproducibility of the data.

Revision 0 10/13/2000 WATER EVAPORATION FROM CONTAINERS WITHIN RADIOLOGIAL CONTROLLED AREAS

St. Albans Project 00-062

1.0 PURPOSE

The purpose of this procedure is to specify process requirements for evaporating water potentially containing radioactive material spilled in a radiological controlled area by enhanced evaporation methods. This procedure sets forth the specific requirements to assure this process does not release radioactive materials from a radiological controlled area.

2.0 APPLICABILITY

2.1 The procedure will be used to ensure that airborne particulates and effluents released to the environment by this process do not exceed criteria applicable to the license conditions at St. Albans VAECC facility or as specified in regulations or guidance provided by applicable regulatory agencies of the federal or state government.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

- 3.1.1 Instruments used to perform airborne surveys shall be operated in accordance with the respective operating procedures.
- 3.1.2 The approved methods for this enhanced evaporation process are heat lamps and/or immersion heaters.
- 3.1.3 The approved rate of evaporation by these processes shall be to a mild boil or mild simmering level.

3.2 Limitations

- 3.2.1 All evaporation shall be performed inside the radiological controlled area. Only water may be evaporated.
- 3.2.2 The evaporation process shall be performed only when Cabrera personnel are physically at the job site.
- 3.2.3 The only radionuclide monitored at St. Albans is Strontium-90 or daughter products of Strontium-90.
- 3.2.4 All vapors, fumes or particulates generated by this process shall be capable of being captured and detected by the air monitoring system in place.

Revision 0 10/13/2000 WATER EVAPORATION FROM CONTAINERS WITHIN RADIOLOCIAL CONTROLLED AREAS

St. Albans Project 00-062

3.2.5 This process shall not be used for water containing tritium or volatile radioactive species such as iodine.

3.3 Requirements

None

4.0 REFERENCES

| • 10 CFR 20 | Standards for Protection Against Radiation |
|--------------------------------|--|
| • AP-012 | Radiation Work Permits |
| • OP-001 | Radiological Surveys |
| OP-002 | Air Sampling and Analysis |
| OP-019 | Radiological Posting |
| OP-021 | Alpha-Beta Counting Instrumentation |
| NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |
| Reg 1.86 | Termination of Operating Licenses for Nuclear Reactors |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Activity The rate of disintegration (transformation) or decay of radioactive material. The units of activity for the purpose of this procedure are Becquerel (Bq) or micro-Curies (μCi).
- 5.2 Air Sample Survey A survey technique which collects particulates from a known volume of air and determines the concentrations of radioactive materials associated with the airborne particulates.
- 5.3 Radiological Controlled Area A work area whose access is restricted to authorized and trained personnel by use of a Radiation Work Permit due to one or more of the following conditions: radiation area, high radiation area, contaminated area, highly contaminated area or airborne area.
- 5.4 Survey is defined as an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.

6.0 EQUIPMENT

6.1 Low-Volume air sample pump with particulate filter paper.

7.0 RESPONSIBILITIES

Revision 0 10/13/2000 WATER EVAPORATION FROM CONTAINERS WITHIN RADIOLOCIAL CONTROLLED AREAS

St. Albans Project 00-062

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of surveying materials are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of contamination survey meters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT are responsible for performing the surveys described in this procedure.

8.0 INSTRUCTIONS

- 8.1 Water containing the potentially contaminated radioactive material to be evaporated is to be placed inside a container within the radiological controlled area.
- 8.2 Follow any specific requirements per the manufacturer regarding the assembly and/or placement of the evaporating enhancement device.
- 8.3 Place low volume air sampling pump with filter assembly within three feet of the top of the container. Start pump at the beginning of the evaporation process.
- 8.4 Perform periodic checks of the evaporation process as well as pump operability.
- 8.5 At the conclusion of the evaporation process for each day, shut off the evaporation device as well as the sample pump.
- 8.6 Count the filter paper with an alpha/beta proportional counter. If pure gamma emitting isotopes are present, the RSO/RFS should consider other appropriate counting equipment.
- 8.7 Monitoring of effluents released to the environment by this process will likely have lower concentration limits. Assume sufficient sampling volume is captured for these monitoring points to meet environmental minimum detectable activities.

Revision 0 10/13/2000 WATER EVAPORATION FROM CONTAINERS WITHIN RADIOLOGIAL CONTROLLED AREAS

St. Albans Project 00-062

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

- 9.1.1 Instrumentation used for surveys will be checked with standards each day prior to use and verified to have current valid calibration.
- 9.1.2 The health physics technician performing the survey shall review Form OP-025-01 for accuracy and completeness.

9.2 Records

- 9.2.1 Documented information shall be legibly written in ink.
- 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The health physics technician performing the survey shall ensure that this procedure is the most current and approved revision.
- 9.2.4 Entries on Form OP-025-01 and any other pertinent forms must be dated and initialed by the health physics technician performing the survey to be valid.
- 9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

1.0 PURPOSE

This procedure provides the methods Cabrera Services, Inc. (CABRERA) use to control recognition of radioactive materials and areas. Adherence to this procedure will provide reasonable assurance that personnel will remain free of contamination, contamination will not spread beyond the designated contamination area, and personnel exposures will be maintained As Low As Reasonably Achievable (ALARA).

2.0 APPLICABILITY

This procedure will be used by CABRERA personnel to control and contain radioactive materials. The following are types of controls methods that will be employed:

- Posting requirements for radioactive materials.
- Establishing and posting radiation areas.
- Establishing and posting contaminated areas.
- Establishing and posting airborne radioactivity areas.

3.0 PRECAUTIONS, LIMITATION, AND REQUIREMENTS

- 3.1 Precautions
 - 3.1.1 If a HPT is unable to perform this procedure due to errors, extenuating circumstances, or for any reason, the HPT shall immediately stop and notify the RSO.
- 3.2 Limitation

None

3.3 Requirements

None

4.0 REFERENCES

| • | 10 CFR 20, Subpart F | Surveys and Monitoring |
|---|----------------------|--|
| • | 10 CFR 20.2103 | Records of Surveys |
| • | HASP | Health and Safety Program |
| • | OP-020 | Operation of Contamination Survey Instrument |
| • | OP-021 | Alpha-Beta Sample Counting Instrument |
| • | OP-022 | Operation of Ionization Chambers |
| | | |

OP-023

Operation of Micro-R Survey Meters

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undo risks from exposure to radiation and radioactive materials.
- 5.2 Contamination Survey A survey technique to determine fixed and removable radioactive contamination on components and facilities.
- 5.3 Radiation Survey is defined as an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.
- 5.4 ALARA (acronym for "as low as is reasonably achievable") An approach to radiation exposure control to maintain personnel radiation exposures as far below the federal limit as technical, economical and practical considerations permit.
- 5.5 Radioactive Materials Materials containing or capable of emitting alpha particles, beta particles, gamma rays, X-rays, neutrons and/or other ionizing radiations.
- 5.6 Airborne Radioactivity Area A room, enclosure or area in which radioactive material is dispersed in the form of dusts, fumes, mists, vapors, or gases and the concentration of the of the dispersed radioactive materials in excess of:
 - 5.6.1 The derived air concentrations (DAC's) specified in Table 1, Column 3 of Appendix B, Title 10 Part 20 of the Code of Federal Regulations.
 - 5.6.2 Concentrations such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours.

6.0 EQUIPMENT

None Required

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of establishing and posting restricted areas are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for monitoring compliance with this procedure and training personnel in establishing and posting restricted areas. The RSO can also assist in the interpretation of the results obtained during surveys.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT establishing and posting restricted areas are responsible for knowing and complying with this procedure.

8.0 INSTRUCTIONS

- 8.1 Posting Requirements for Radioactive Materials
 - 8.1.1 Any area or room in which there is used or stored an amount of licensed material exceeding 10 times of the quantity of such material specified in Appendix C, Title 10 Part 20 of the Code of Federal Regulations shall be posted with a sign or signs "Caution Radioactive Materials Area" or "Danger, Radioactive Materials".
 - 8.1.2 When posting a room as required in step one, a sign should be placed on each entrance door to the room. If the area to be posted is not a room, the area containing the license material shall be bounded by a yellow and magenta/black rope or ribbon securely fastened to stanchions, posts or other durable devices and signs shall be displayed in all accessible directions.
 - 8.1.3 Any container, which contains licensed material in quantities equal to or greater that the quantities listed in Appendix C, Title 10 Part 20 of the Code of Federal Regulation shall be posted with a sign or label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIALS" OR "DANGER, RADIOACTIVE MATERIALS".

- 8.1.4 When posting a container as required by step three, the label should also state the radionuclide present in the container, the activity in the container, the date at which the activity was determined, the radiation levels emanating from the unshielded radioactive source, and the levels from the container holding the radioactive source.
- 8.1.5 Posting of containers is not required if the containers are in transport and packages and labeled in accordance with the regulations of the Department of Transportation. (Title 49 Parts 172 and 173 of the Code of Federal Regulations). Containers, which are awaiting shipment at a facility, are subject to posting requirements as specified in 8.1.1
- 8.2 Establishing and Posting Radiation Areas
 - 8.2.1 Any area accessible to personnel in which there exists ionizing radiation at dose rate levels such that an individual could receive a deep dose equivalent in excess of 5 mrem in 1 hour at 30 cm from the source of from any surface that the radiation penetrates shall be identified and posted with a sign "CAUTION RADIATION AREA".
 - 8.2.2 A Micro-R Meter or other calibrated dose rate meter is used to identify the boundary location of the 5 mrem/hr dose rate.
 - 8.2.3 If an entire room or most of the room is at or above the 5 mrem/hr level, a sign should be placed on each entrance door to the room. If the area to be posted is not a room, the area at or above the 5 mrem/hr level shall be bounded by a yellow and magenta/black rope or ribbon securely fastened to stanchions, posts or other durable device and signs shall be displayed in all accessible directions.
 - 8.2.4 An exemption to this posting requirement is allowed in areas or rooms containing radioactive materials for periods less than 8 hours, if each of the conditions is met:
 - 8.2.4.1 The materials are constantly attended to during these periods by an individual who takes the precautions necessary to prevent the exposure to radiation or radioactive materials in excess of the limits specified in the RSP; and
 - 8.2.4.2 The area or room subject to the licensee's control. For example, the area around the truck loading radioactive waste does not require posting if the above conditions are met.
 - 8.2.5 If the dose rates above 100 mrem/hr are encountered, control access to the area and contact the RSO or duly authorized representative for posting instructions.

8.3 Establishing and Posting Contaminated Areas

- 8.3.1 A restricted area that has fixed and removable radioactive materials in the form of dusts, particulates or sorbed contaminants which are above the limits specified in the RSP shall be identified and posted with a "CONTAMINATED AREA" sign.
- 8.3.2 Contamination levels are determined using procedure OP-001 (Radiological Surveys) and the results of the survey measurements compared to the contamination limits specified in the RSP.
- 8.3.3 If an entire room or most of the room is above the contamination criteria, a sign should be placed on the entrance door to the room. If the area to be posted is not a room, the above area contamination criteria shall be bounded by a yellow and magenta/black rope or ribbon securely fastened to stanchions, posts or other durable device and signs displayed in all accessible directions.
 - 8.3.3.1 A single entry point shall be established to access the contaminated area. A step-off pad is placed at the entry point, which provides a defined boundary between contaminated and restricted areas.
 - 8.3.3.2 Receptacles for protective clothing and waste materials shall be placed just inside the entry point to collect protective clothing from personnel exiting the area.
 - 8.3.3.3 If work activities in the work areas are likely to generate significant dusts containing radioactive materials, the area should be enclosed within a containment to prevent the spread of contamination beyond the identified contaminated area.
- 8.4 Establishing and Posting Airborne Radioactivity Areas
 - 8.4.1 CABRERA's policy is to minimize (and protect, if practical) the amount of radioactive materials taken into a workers body. In order to accomplish this, Airborne Radioactivity Areas are posted at 10% DAC, as specified in Table 1, Column 3 of Appendix B of 10 CFR 20. Maintaining the airborne activity below these limits will eliminate any posting requirements.

- 8.4.2 To verify that these limits are not exceeded, an air sample is taken during each work activity, which could create an airborne radioactivity hazard. The results of these samples are compared with the above limits to verify the limits are not exceeded. If these limits are exceeded, immediately contact the RSO or duly authorized representative.
- 8.4.3 A room, enclosure or area shall be posted with a "CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVITY AREA" if radioactive material is dispersed in the form of fumes, dusts, mists, vapors, or gases and the contamination of the dispersed radioactive materials is in excess of:
 - 8.4.3.1 The derived air concentration (DAC) specified n Table 1, Column 3 of Appendix B, Title 10 Part 20 of the Code of Federal Regulations.
 - 8.4.3.2 Concentration such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours.
- 8.4.4 If sampling results identify a room, enclosure, or area that requires posting as specified in 8.4.3, immediately stop work activities and contact the RSO or duly authorized representative for instructions.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 Instrumentation used in the surveys will be checked with standards daily and verified to have current valid calibration.

9.2 Records

- 9.2.1 Record any radioactive materials posting made in the project logbook. Include the date, location, and all information posted.
- 9.2.2 Record the date and the location of any radiation areas established in the project logbook. Include a sketch of the area and radiation area boundary on survey forms.
- 9.2.3 Record the date and location of any contaminated areas established in the project logbook. Include a sketch of the area and contaminated area boundary on survey forms.

- 9.2.4 Record the date and location of any airborne radioactivity areas established in the project logbook. Include a sketch of the area on survey forms. Indicate time and date of any notifications required by this procedure.
- 9.2.5 Document and record radiological survey records, routine survey schedules, and tracking forms that are generated during the performance of this procedure.
- 9.2.6 Documented information shall be legibly written in ink.
- 9.2.7 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.8 The HPT performing the posting shall ensure that this procedure is the most current and approved revision.
- 9.2.9 The HPT performing the posting shall review Forms and any other applicable forms for accuracy and completeness.
- 9.2.10 Entries on Forms and any other pertinent forms must be dated and initialed by the HPT performing the posting to be valid.
- 9.2.11 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

None

1.0 PURPOSE

The purpose of this procedure is to establish the framework and to define the requirements for Cabrera Services, Inc., (CABRERA) personnel performing radiological surveys. Adherence to this procedure will provide reasonable assurance that the radiological surveys performed maintain reproducible results. In addition, adherence to this procedure will provide adequate control of radiation exposures As Low As Reasonably Achievable (ALARA).

2.0 APPLICABILITY

This procedure provides the requirements for identifying, scheduling, and performing routine, clean area, radiation, contamination, and airborne surveys by radiation safety personnel. All remediation and facility areas that are radiologically controlled as well as non-radiologically controlled areas containing fixed contamination and areas adjacent to contaminated areas are within consideration for routine survey performance. This procedure does not include survey requirements for radiation generating devices and survey requirements specified in radiation work permits (RWP's).

This procedure will be used by CABRERA personnel to perform radiation and contamination surveys at St. Albans VAECC facilities. The following types of surveys may be performed using this procedure.

- · Surveys performed for shipping radioactive materials.
- Surveys performed to characterize facilities, sites, and items contaminated with radioactive materials.
- Surveys performed to provide radiological support for decontamination and decommissioning facilities and sites.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

- 3.1.1 Instruments used to perform routine surveys shall be operated in accordance with the respective operating procedure.
- 3.1.2 Large area smears may be used to augment (but not replace) the 100 cm² smear survey. Large area wipes may be counted with the Ludlum Model-3 or equivalent. Large area smears are used to obtain immediate information concerning loose contamination for the purpose of radiological protection and to minimize time spent performing disc smears on an item easily identified as contaminated.

- 3.1.3 Personnel performing routine surveys shall be logged in on a Radiation Work Permit in accordance with AP-012 (if applicable).
- 3.1.4 Audible response instruments should be used during direct scan surveys.
- 3.1.5 The instruments used for routine or special surveys shall be within current calibration and shall have had a performance test check performed daily or before use in accordance with the instrument's operating procedure.

3.2 Limitations

- 3.2.1 The maximum probe speed during direct scan surveys of surfaces shall be 3 cm/sec.
- 3.2.2 The probe face shall be held within ¼ inch of the surface being surveyed for alpha radiation, and within ½ inch of the surface being surveyed for beta-gamma radiation.
- 3.2.3 If an instrument used to perform routine surveys fails any operational check, it shall be removed from service. All data collected during the period of instrument failure must be evaluated by the RSO or duly authorized representative.
- 3.2.4 Posting of radiological control areas shall be performed in accordance with OP-019.

3.3 Requirements

- 3.3.1 Obtain and review any previous surveys performed in the area to determine radiation conditions which will be encountered.
- 3.3.2 Before performing any survey using this procedure, the HPT shall be trained. The training shall allow the HPT to perform surveys independently.
- 3.3.3 To ensure achieving the required sensitivity of measurements, survey samples will be analyzed in a low-background area.
- 3.3.4 Dose rate surveys, at a minimum, should be performed in locations where workers are exposed to radiation levels that might result in radiation doses in excess of 10% of the occupational dose limits or where an individual is working in a dose rate area of 2.5 mrem/hr or more.

3.3.5 If contamination is found in unrestricted areas, prevent access to the area and immediately notify the RSO or duly authorized representative.

4.0 REFERENCES

| 10 CFR 20, Subpart F | Surveys and Monitoring |
|--|--|
| • 10 CFR 20.2103 | Records of Surveys |
| HASP | Safety and Health Program (RSP) |
| AP-012 | Radiation Work Permits |
| • OP-018 | Decontamination of Equipment and Tools |
| • OP-19 . | Radiological Posting |
| • OP-020 | Operation of Contamination Survey Meters |
| • OP-021 | Alpha-Beta Counting Instrumentation |
| • OP-022 | Operation of Micro-R Meters |
| • OP-023 | Operation of Ionization Chambers |
| • NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Contamination Survey A survey technique to determine fixed and removable radioactive contamination on components and facilities.
- 5.3 Radiation Survey is defined as an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.
- 5.4 ALARA (acronym for "as low as is reasonably achievable") An approach to radiation exposure control to maintain personnel exposures as far below the federal limits as technical, economical and practical considerations permit.

6.0 EQUIPMENT

All instruments used to perform routine surveys shall be used in accordance with the applicable CABRERA administrative and operational procedures. Authorized suppliers of properly calibrated and maintained equipment will supply all instruments.

Radiation and Contamination survey meters will be selected based on job specific requirements and will be identified in the Site Specific Work Plan.

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of performing routine surveys are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for monitoring compliance with this procedure and training personnel in performing radiation and contamination surveys. The RSO can also assist in the interpretation of the results obtained during surveys.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT performing radiation and contamination surveys are responsible for knowing and complying with this procedure.

8.0 INSTRUCTIONS

8.1 Safety Considerations

The safety requirements specified in the job specific HASP and Work Plans, along with the Radiation Safety Program, and other safety documentation must be adhered to when performing surveys.

8.2 Initial Preparations

Obtain and review any previous surveys performed in the area to determine radiation conditions, which will be encountered.

- 8.2.1 Obtain appropriate survey instruments and prepare the instruments for use.
- 8.2.2 Obtain necessary forms, smears, and protective clothing, which will be used during the survey.
- 8.2.3 Plan the strategy for performing the survey before entering the area to reduce exposure time within the area.
- 8.2.4 If smearable contamination is expected to be above allowable limits, set up an anticipate entry into the area which will prevent the spread of contamination in the area.

8.3 Radiation Surveys

- 8.3.1 If radiation levels are unknown or previous surveys remain in question, first measure general area radiation levels using a Micro-R Meter or equivalent dose rate meter to determine if elevated radiation levels exist in the survey area.
- 8.3.2 Small Areas/Items/Waste Containers This survey technique is used to establish exposure rates from small areas, items, or containers, which contain radioactive materials.
 - 8.3.2.1 Scan the entire surface area of the area, item, or container with a Micro-R or equivalent meter and record locations and readings on OP-001-02 or equivalent form.
 - 8.3.2.2 Measure the exposure rate at 30 centimeters from all surfaces or sides of the area, item, or container and record the location and readings on OP-001-02 or equivalent form.
- 8.3.3 Facility Surveys This survey technique is used to release facilities (buildings etc.) to "unrestricted" status or determine status of facilities requiring decontamination and decommissioning. Final release of a facility will be established using MARSSIM guidance.
 - 8.3.3.1 Establish a 1 meter by 1 meter grid system of the facility surfaces using a marking system that assigns a unique number/letter system to the center of each grid. Graphically illustrate the location of the grid system on OP-001-02 or equivalent form.
 - 8.3.3.2 Using a Micro-R Meter, obtain radiation levels at 1 meter from the grid center point and at contact with the grid center point. Record reading on OP-001-02 or equivalent Form. If elevated readings are noted, scan the surface of the grid and note location of any elevated readings with a marker and on OP-001-02 or equivalent Form.
 - 8.3.3.3 Obtain 4 Micro-R readings from locations surrounding the facility or within the facility, which do not contain activity. This establishes a background level for comparison to the reading taken in step 8.2.3.2 above.
- 8.3.4 Area Surveys This survey technique is used to release land masses to "unrestricted" status or determine status of areas requiring decontamination before release. Final release of a site area will be established using MARSSIM guidance

- 8.3.4.1 Establish a 10 meter by 10 meter grid system of the area to be surveyed using surveyor stakes or equivalent, which are numbered with a unique number/letter system to identify the center of each grid. List the locations of the "gridded" system on OP-001-02 or equivalent form.
- 8.3.4.2 Using a Micro-R meter, obtain radiation levels at 1 meter from the grid corner point and at contact with the surface of the ground. Record all readings on OP-001-02 or equivalent Form.
- 8.3.4.3 Survey the remainder of the grid at the surface using an "S" walking pattern. If elevated readings are noted above or below the grid center point reading, subdivide the grid into 9 subgrids (3 subgrids X 3 subgrids) and obtain readings at 1 meter above the ground surface, and obtain contact readings in the center of the each subgrid. Record all readings on OP-001-02 or equivalent.

8.4 Contamination Surveys

- 8.4.1 If removable contamination is suspected or previous surveys are in question, first scan likely contaminated area with an α and/or β probe to determine if elevated areas of contamination exists. Obtain smear samples from any elevated areas and count smears in sample counter. If smearable contamination is found, use appropriate protective clothing and entry control techniques to prevent the spread of contamination.
- 8.4.2 Small Areas/Items/Waste Containers This survey technique is used to establish contamination levels on small areas, items, or containers, which contain radioactive materials.
 - 8.4.2.1 If the area, item, or waste container contains alpha activity, scan the area with an alpha probe at ¼ inch above the surface. Note readings on OP-001-02 or equivalent Form.
 - 8.4.2.2 If the area, item, or waste container contains beta activity, scan the area with a beta probe at approximately ½ inch above the surface to be surveyed and obtain reading following meter stabilization. Record meter reading on OP-001-02 or equivalent form. The surface of the waste container can be surveyed for beta activity only if the radiation level from the container does not elevate the beta probe background. If the background level is below 200

- CPM, scan the surface of the container and note readings on appropriate survey form.
- 8.4.2.3 To determine the removable surface contamination on area or items, first take a large area smear (LAS) using a paper hand towel or Maslin cloth and count the smear in a low background area using the alpha and beta probes. If no contamination is found on the LAS, take 100 cm² smear for every 2 square foot of surface area and count smears for alpha and beta activity. Record results on OP-001-02 or equivalent form.
- 8.4.2.4 For waste containers, a LAS should be taken from the bottom, top, and sides of the container. If no contamination is found on the LAS, take 300 cm² smears for every 2 square foot of surface area and count smears for alpha and beta in a sample counter. Take one smear each from the container sealing area, lid, and container contact points with ground or floor. Record all results of smear activity on OP-001-02 or equivalent Form. If contamination levels are above limits, decontaminate the surface of the container and repeat survey.
- 8.4.2.5 Facility Surveys This survey technique is used to aid in the release of facilities (buildings etc.) to "unrestricted" status or determine status of facilities requiring decontamination and decommissioning.
- 8.4.2.6 The grid system established in section 8.3.3.1 will also be utilized for contamination surveys.
- 8.4.2.7 Hold the beta probe at approximately ½ inch above the grid center point and obtain reading following meter stabilization. Record the meter reading on OP-001-02 or equivalent form.
- 8.4.2.8 If the readings are at background levels, randomly scan the remainder of the grid, concentrating on cracks, floor/wall joints, top of horizontal surfaces, ventilation ducts and grills, and other areas that might collect radioactive materials.

 Mark any locations above the release criteria on OP-001-02 or equivalent form.
- 8.4.2.9 If readings are at or near the release levels, scan grid surface and identify portion of the grid that is above the release criteria. Note these areas on the survey form and

mark the area of the grid with spray marker (or equivalent) on OP-001-02 or equivalent form.

- 8.4.2.10 Repeat steps 8.4.2.7 through 8.4.2.9 with an alpha probe at ¼ inch above the grid center point. If sufficient documentation of previous history is known about the facility, the alpha survey may not be required if:
 - The alpha contamination is known not to be present, or
 - The alpha measurements can be randomly taken of every 10th grid.
- 8.4.2.11 One smear sample from a 100cm² area will be taken in each grid. If the above survey found no elevated readings in the grid, the smear sample will be taken in the center of the grid. If elevated levels readings are identified the smear sample will be taken from the area where the highest reading was obtained.
- 8.4.2.12 Each smear sample will be labeled with the grid location and counted for alpha and beta activity in the sample counter. The smear sample results will be recorded on OP-001-02 or equivalent Form.
- 8.4.3 Area Surveys This survey technique is used to aid release of land masses to "unrestricted" status or determine status of area requiring decontamination before release.
 - 8.4.3.1 The grid system established in section 8.2.4, step 8.2.4.1 will also be utilized for contamination surveys.
 - 8.4.3.2 Hold the beta probe at ½ inch above the grid center point and obtain reading following meter stabilization. Record the meter reading on OP-001-02 or equivalent form.
 - 8.4.3.3 If readings are at background levels, randomly scan the remainder of the grid. Mark any locations above release criteria on OP-001-02 or equivalent form.
 - 8.4.3.4 If readings are at or near the release levels scan the grid surface and identify portion of the grid that is above release criteria. Note these areas on OP-001-02 or equivalent form.
 - 8.4.3.5 Areas contaminated with radioactive materials may require soil sample analysis to determine the activity concentration.

The quantity and location of samples will be determined on a case-by-case basis.

8.5 Frequency and Requirements for Routine Surveys

Appropriate routine radiological surveys shall be performed at the following frequencies as a minimum:

8.5.1 Radiation Surveys

- Upon initial entry after extended periods of closure
- Daily, at contamination control points, where the potential exists for personnel to be exposed to radioactive contamination
- Daily, during continuous operation, and when levels are expected to change in High Radiation Areas
- Weekly, in routinely occupied areas adjacent to radiological control areas
- Weekly for operating HEPA-filtered ventilation units
- Weekly, for any temporary Radiation Area boundaries to ensure that the Radiation Areas do not extend beyond posted boundaries
- Monthly, or upon entry if entries are less than monthly, for Radioactive Material Storage Areas
- Monthly, for potentially contaminated ducts, piping, and hoses in use outside the radiological facilities

8.5.2 Contamination Surveys

- Daily, at contamination control points, personnel protective equipment change out areas, or step-off pads, when in use or once per shift in high use situations
- Daily, in office spaces located in the radiological control areas
- Daily, in lunchrooms or eating areas adjacent to radiological control areas
- Weekly, for all designated lunchrooms supporting the project
- Weekly, in routinely occupied locker rooms or the shower areas

adjacent to radiological control areas

- Weekly, or upon entries, if entries are less frequent, in radiological control areas
- Weekly, or upon entries, if entries are less frequent, in the areas where radioactive materials are handled or stored
- Weekly for all project offices on site
- Monthly, in areas with fixed contamination
- 8.5.3 Airborne Surveys:

Airborne survey frequency, locations, and methods are determined by the radiation work permits (RWP's) and by the RSO.

- 8.6 Identifying and Scheduling Routine Radiological Surveys
 - 8.6.1 The RSO or duly authorized representative shall identify and schedule routine surveys as required by the radiological conditions and work activities.
 - 8.6.2 Routine Survey Schedules shall be developed using a standard system for designating surveys as follows:

Frequency of Survey

| • | Daily | D |
|---|---------------|---|
| • | Weekly | W |
| • | Monthly | M |
| • | Quarterly | Q |
| • | Semi-Annually | S |
| • | Annually | Α |
| • | Upon Entry | U |
| | | |

Type of Survey

| • | Radiation | R |
|---|---------------|---|
| • | Contamination | С |
| • | Area TLD | Т |
| _ | Air Sample | Α |

Example: Where:

DRC-1

D: is the survey frequency (Daily in this example)

R: is the type of survey (Radiation in this example)

- C: is a type of survey (Contamination)
- 1 corresponds to the numerical sequence of the survey
- 8.6.3 Routine survey schedules shall be submitted to and approved by the RSO or duly authorized representative.
- 8.6.4 Prepare routine survey tracking forms using the approved routine survey schedules.
- 8.6.5 Changes to any routine survey schedule shall be submitted to and approved by the RSO or duly authorized representative.
- 8.6.6 Routine Survey Schedules should be indicated on form OP-001-01or equivalent form. Task Leaders may elect alternate forms of containing, as a minimum, the information included on the OP-001-01 form.
- 8.7 Using As Low As is Reasonably Achievable (ALARA) Principles for Scheduling and Performing Surveys
 - 8.7.1 Routine surveys should not be performed in High Radiation Areas unless other work necessitates entry. Boundary verification surveys would be appropriate if an entry is not required.
 - 8.7.2 Routine surveys should be performed in conjunction with other work surveys as much as practicable.
- 8.8 Performance of Routine Surveys
 - 8.8.1 HPT's shall perform routine surveys in accordance with the applicable operational procedure.
 - 8.8.2 Upon completion of a routine survey, the HPT shall initial the appropriate Routine Survey Tracking Form.
- 8.9 Periodic Evaluation of Routine Surveys
 - 8.9.1 Routine survey schedules shall be reviewed and updated periodically to ensure that all areas within the project boundaries are receiving the appropriate routine survey coverage.
 - 8.9.2 Changes of conditions within the project area will be reported to the RSO or duly authorized representative and may require a modification of the routine radiological survey schedule.
- 8.10 Management Notification

8.10.1 The RSO shall be notified, in writing by the project manager, of any failure to complete a routine survey as scheduled. The missed survey will be completed within 24 hours of discovering the inconsistency.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 Instruments used to perform routine radiological surveys will be inspected for serviceability each day and checked against check sources to verify they are in proper working condition per the applicable Operational Procedure.
 - 9.1.2 Radiation and Contamination surveys will be reviewed by the RSO or duly authorized representative for accuracy and completeness.

9.2 Records

- 9.2.1 At a minimum, each survey record should include the following:
 - A diagram of the area surveyed, if applicable.
 - A list of items and equipment surveyed.
 - Specific locations on the survey diagram where wipe test were taken.
 - Ambient radiation levels with appropriate units.
 - Contamination levels with appropriate units.
 - Make and model number of instruments used.
 - Background levels, if applicable.
 - Name of the person making the evaluation and recording the results and date.
- 9.2.2 Radiological Survey Records, routine survey schedules, and tracking forms are generated during the performance of this procedure.
- 9.2.3 Documented information shall be legibly written in ink.
- 9.2.4 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single

- line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.5 The health physics technician performing the survey shall ensure that this procedure is the most current and approved revision.
- 9.2.6 The health physics technician performing the survey shall review Forms and any other applicable forms for accuracy and completeness.
- 9.2.7 Entries on Forms and any other pertinent forms must be dated and initialed by the health physics technician performing the survey to be valid.
- 9.2.8 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

• OP-001-01

Routine Survey Schedule

• OP-001-02

Survey Form

OP-001-01 ROUTINE SURVEY SCHEDULE

| Survey Designation | Location of Surv | ey |
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| Prepared By: | | Date: |
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| OP-001 | CABRERA SERVICES, INC. | Page 14 of 19 |

OP-001-02 Radiological Survey Sheet

| Location: | | | IRI | NP# | | | Survey | # | · | | Survey Ty | me. | | · · · · · · · · · · · · · · · · · · · | | | |
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1.0 PURPOSE

This procedure describes methods for control of instrument check sources and the methods used to evaluate sources for the potential of leaking radioactive material. These sources are used to ensure proper radiation detection instrument operation. Adherence to this procedure will provide reasonable assurance that personnel exposures will be below specified limits, sources will not be lost or misplaced, personnel will remain free of contamination, and contamination will not be spread beyond any designated contaminated areas. In addition, adherence to this procedure will provide reasonable assurance that leak testing of radioactive sources meet the requirements of 10 CFR 20 and NRC license.

2.0 APPLICABILITY

This procedure will be used by Cabrera Services, Inc. (CABRERA) personnel for use and control of radioactive check sources used for portable radiation detectors. This procedure will also be used for leak testing of radioactive sources and also applies to licensed and exempt sources.

3.0 PRECAUTIONS, LIMITATIONS, AND REQUIREMENTS

3.1 Precautions

- 3.1.1 When performing a leak test on non-exempt quantity sources, use specific license procedures.
- 3.1.2 If non-exempt quantity sources are used, the RSO or duly authorized representative will determine any additional precautions (i.e., finger rings, etc.).
- 3.1.3 If licensed quantity sources are leak tested, the RSO or duly authorized representative will determine any additional precautions (i.e., finger rings, etc.).
- 3.1.4 The window area of a particle detector is covered with a thin window and may be easily punctured. Avoid surveying areas which have protruding fragments that may puncture the detector face. Remove the protruding fragments, if possible, before surveying. Upon removal of the leak test sample, monitor the sample away from the source. If the sample yields a high-count rate compared to background, assume the source to be leaking and estimate the activity based upon the reading of the portable instrument.

3.2 Limitations

- 3.2.1 Storage location(s) of instrument check sources will be approved by the RSO or duly authorized representative for protection against loss, leakage, or dispersion by the effect of fire or water.
- 3.2.2 A Radiation Work Permit must be generated for leak testing of non-exempt sources.

3.3 Requirements

- 3.3.1 Individual source quantities shall not exceed exempt quantity limits without permission of the RSO or duly authorized representative.
- 3.3.2 The methods specified in this procedure will be audited annually to ensure compliance with the requirements to control radioactive sources.
- 3.3.3 The results of leak test samples shall be stated as less than 0.005 microcuries of removable activity if applicable in order to comply with NRC requirements.
- 3.3.4 Ensure accountability and direct control of the source at all times when it is unlocked. Minimize the number of people in the area of the source during the leak test to reduce exposure and maintain work areas as low as is reasonably achievable (ALARA). If high radiation area controls are necessary, the source must either be locked or guarded.
- 3.3.5 Only qualified Health Physics personnel may use or have possession of CABRERA radioactive check sources.

4.0 REFERENCES

| • | OP-001 | Radiological Surveys |
|---|------------|--|
| ٠ | OP-020 | Operation of Contamination Survey Meters |
| | OP-021 | Alpha-Beta Sample Counting Instrumentation |
| • | OP-022 | Operation of Ionization Chambers |
| | OP-023 | Operation of Micro-R Survey Meters |
| | NUDEG-1556 | Consolidated Guidance About Material Licenses (Vol 11) |

5.0 DEFINITIONS AND ABBREVIATIONS

5.1 Restricted Area – An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

5.2 Leak Test – A survey technique used to determine the presence of removable activity from the surface of a sealed source.

6.0 EQUIPMENT

- Ludlum 2929 or equivalent
- Smears
- · Portable radiation detection equipment
- Calibration sources

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) The PM is responsible for ensuring that all personnel assigned the tasks of control and leak testing of sealed sources of radioactive material, are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained with radioactive sources as described in this procedure. The RSO ensures the Health Physics Technicians are qualified by training and experience to perform the requirements of this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT are responsible for control and use of radioactive check sources. The HPT conducting leak tests of sealed sources are responsible to comply with the provisions of this procedure.

8.0 INSTRUCTIONS

- 8.1 Action Levels
 - Inventory

The RSO or duly authorized representative shall be notified immediately if it has been determined that a source is missing and an immediate search shall be conducted.

Leakage

If a source is suspected to have lost integrity, the RSO or duly authorized representative shall be notified immediately and a leak test shall be performed.

Radiation Levels

Radiation levels shall be maintained at less than 2 millirem per hour on any accessible surface where the radioactive check sources are stored. Notify the RSO or duly authorized representative if radiation levels exceed 2 millirem per hour.

8.2 Inventory

A physical inventory of all instrument check sources will be conducted by the RSO or duly authorized representative at least once each quarter and whenever a new check source is received or an old check source is disposed. The results shall be recorded on Form OP-009-01 and shall be retained in the source file for a period of not less than three years.

8.3 Initial Preparations

- 8.3.1 Select a work area to conduct the leak test that is free of radioactive contamination.
- 8.3.2 Select instruments that are capable of detecting at least 0.005 microcuries of the radionuclide of concern.
- 8.3.3 Inform the RSO or duly authorized representative of the source to be leak tested. The RSO or duly authorized representative will evaluate the test and provide precautionary measures to ensure protection of people and equipment in the work area.
- 8.3.4 Smear the outside surface of the source using cloth or paper. This smear will be the leak test sample that is analyzed for activity associated with a potentially leaking source.
- 8.3.5 Be cautious when handling leak test samples to prevent the spread of contamination, should the sample have loose radioactivity on it from a leaking source.
- 8.3.6 If the source emits particle radiation, a very thin window will typically cover the radioactive material. Take special precautions to prevent damage to the window during leak testing.
- 8.3.7 Be sure to wear rubber or latex gloves when handling the leak test samples or equipment associated with the test.

8.4 Analysis

The leak test sample shall be analyzed by a method, which will ensure detection of at least 0.005 microcuries of the radionuclide of interest. Existing Cabrera procedures shall be used as practical to ensure appropriate analysis and documentation of results.

Note:

If the activity estimation determines the leak test sample to be in excess of the leak test limit of 0.005 microcuries, then label the source as unusable to prevent further spread of activity. Conduct a detailed survey of the leak test work area to ensure that activity from the source has not spread beyond the capsule of the source.

8.5 Performing a Leak Test

- 8.5.1 Although leak tests are not required for exempt quantity sealed sources, in the event a source is suspected of having a loss of encapsulation or other possible leakage, the following procedure shall be followed, under the direction of the RSO or duly authorized representative:
 - 8.5.1.1 A visual inspection of the source shall be made for physical damage. If an area of the source is noticeably damaged, perform the leak test in that area, otherwise proceed to step 8.3.1.2.
 - 8.5.1.2 Determine the extent of source leakage by one of the following methods:
 - 8.5.1.3 Dry Wipe Test This test will be performed on encapsulated sources or adjacent surfaces of plated or foil sources. The sources shall be wiped with a dry disc smear applying moderate pressure. Removal of any radioactive materials from the source or adjacent surfaces (i.e., source leakage) will be determined by counting the filter paper with appropriate instrumentation.
 - 8.5.1.4 Wet Wipe Test This test will be performed on encapsulated sources only. The entire surface of the source shall be wiped with a disc smear moistened with water, applying moderate pressure. Removal of any radioactive material from the source will be determined by counting the filter paper with appropriate instrumentation after the filter paper has dried out.
- 8.5.2 When any contamination or leak test reveals the presence of 0.005 μ Ci or greater of removable contamination, or activity removed is above the critical level of the detecting instrument, the source shall be retested. The source will be either repaired, if possible, or

disposed of as radioactive waste if the second test is unsatisfactory. The results of leak tests for the sources are recorded on Form OP-009-02 and shall be retained for a minimum of three years.

8.6 Survey

The on-contact radiation level exterior to where the sources are stored shall be maintained at less than 2 millirem per hour on any accessible surface. A radiation survey of the storage location shall be performed at least quarterly and after the receipt of any additional check sources.

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

9.1.1 The quality of leak test analyses is dependent upon the quality of the wipe, and the quality of analysis. Periodic evaluation of the process and analysis methods shall be conducted to ensure appropriate methods are used and this procedure is followed.

9.2 Records

- 9.2.1 The RSO or duly authorized representative prepares and maintains a source file which shall, at a minimum, consist of the following:
 - Procurement history of each source, including copies of seller certification;
 - Status change damage, sale or transfer, disposal, or recalibration;
 - Completed "Sealed Source Inventory and Leak Test" Form; and,
 - Any other correspondence related to the sources.
- 9.2.2 Documented information shall be legibly written in ink.
- 9.2.3 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.4 The health physics technician using this procedure shall ensure that it is the most current and approved revision.
- 9.2.5 The health physics technician performing inventory shall review Forms OP-009-01 and OP-009-02 for accuracy and completeness.
- 9.2.6 Entries on Forms OP-009-01 and OP-009-02 and any other pertinent forms must be dated and initialed by the health physics technician performing the inventory to be valid.

9.2.7 The RSO or duly authorized representative shall review completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

OP-009-01 Sealed Source Inventory and Leak Test

OP-009-02 Sealed Source Leak Test Data Sheet

OP-009-01 SEALED SOURCE INVENTORY AND LEAK TEST

| Inventory Period: | First Quart | er 🗌 Secon | d Quarter 🔲 | Third Quarter | Fourth Quar | ter 🗌 | |
|-------------------|-----------------------|---------------|-------------|---------------------------------------|-----------------------|------------------------|-----------|
| Isotope | Source (Type/Form) | Serial Number | Location | Initial Activity | Corrected Activity | Leak Test uCi/smear | |
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| OP-009-01 | | | Cabrera Ser | vices. Inc. | | | Page 8 of |

OP-009-02 Sealed Source Leak Test Data Sheet

| Source Information | Source ID Number | |
|--|------------------------------|---|
| Source Manufacturer: | Date of Assay: | records and the second |
| Source Model Number: | Source Serial # | |
| Activity of Source at Assay Date: | Ci Source Today: | Ci |
| Radionuclide name: | Half-life of radionucli | de |
| Leak Test Sample Information | | |
| Location of Leak Test Work Area | | |
| Describe the method of leak testing: | | |
| | | |
| Sample Geometry: | Detector: | |
| Detection Efficiency: | c/d Background count time | e: min. |
| Background count rate: | pm MDA: | microcuries |
| Sample net count rate: | cpm Sample count time | : min. |
| Leak test sample activity: | microcuries | |
| Leak Test Result - Check all boxes that | apply | |
| □ The leak test sample is in excess of t | he 0.005 microcurie limit | |
| The leak test sample is below the 0.0 | 005 microcurie limit | |
| □ The source has been controlled to pr | event the spread of activity | from the shield. |
| Source Leak Test Performed by: | | Date: |
| Leak Test Analysis Conducted by: | | _ Date: |
| Radiation Safety Officer: | | Date: |

1.0 PURPOSE

The purpose of this procedure is to specify requirements for releasing material from controlled areas and to minimize the potential for unintentionally releasing contaminated items to uncontrolled areas in accordance with the provisions stated in Section 4.0, References. This procedure sets forth the specific requirements for release of materials from controlled areas applicable to Cabrera Services, Inc. (CABRERA) field projects.

2.0 APPLICABILITY

- 2.1 This procedure provides instructions for CABRERA personnel while performing release surveys of items controlled as contaminated or potentially contaminated with radioactive materials.
- 2.2 The procedure will be used to ensure by survey that materials released from contaminated or potentially contaminated areas will meet the release criteria applicable to the license conditions, St. Albans VAECC facility requirements, or as specified in regulations or guidance provided by applicable regulatory agencies of the federal or state government.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

- 3.1.1 Instruments used to perform release surveys shall be operated in accordance with the respective operating procedure.
- 3.1.2 Large area smears may be used to augment (but not replace) the 100 cm² smear survey. Large area wipes may be counted with the Ludlum Model-3 or equivalent. Large area smears are used to obtain immediate information concerning loose contamination for the purpose of radiological protection and to minimize time spent performing disc smears on an item easily identified as contaminated.
- 3.1.3 A release document package, at a minimum, shall include the following forms:
 - 3.1.3.1 The Health Physics daily log.
 - 3.1.3.2 Material Release Log.
 - 3.1.3.3 Radiation and Contamination Survey or an Unconditional Release of Equipment or Items Survey and/or Sample Calculation Worksheet.

- 3.1.3.4 Daily Instrument Calibration Log.
- 3.1.4 The release document shall include the following information:
 - 3.1.4.1 The date of the release survey.
 - 3.1.4.2 The number of the release survey.
 - 3.1.4.3 A description or identification of the item.
 - 3.1.4.4 The identity of the Health Physics Technician performing the release survey.
 - 3.1.4.5 The evaluator of the material for release.
 - 3.1.4.6 The release approval of the RSO or duly authorized representative.
- 3.1.5 Surveys performed for the release of material shall be documented on a Radiation and Contamination Survey and/or on an Unconditional Release of Equipment or Items Survey.
- 3.1.6 Radiation/contamination surveys shall be performed in accordance with OP-001.
- 3.1.7 Items identified as radioactive during the release survey shall be controlled in accordance with OP-019.
- 3.1.8 Personnel performing release surveys shall be logged in on a Radiation Work Permit in accordance with AP-012 (if applicable).
- 3.1.9 Audible response instruments must be used during direct scan surveys.
- 3.1.10 The instruments used for release surveys shall be within current calibration and shall have had a response check performed daily or before use in accordance with the instrument's operating procedure.
- 3.1.11 Items presented for release shall be direct scanned in an area of low background.

3.2 Limitations

3.2.1 The maximum probe speed during direct scan surveys of surfaces shall be 3 cm/sec.

- 3.2.2 A response check shall be performed at the completion of the workday for instruments used for direct scan surveys in accordance with the instruments operating procedure.
- 3.2.3 The probe face shall be held within ¼ inch of the surface being surveyed for alpha radiation, and within ½ inch of the surface being surveyed for beta-gamma radiation.
- 3.2.4 If an instrument used to perform release surveys fails any operational check, it shall be removed from service. All data collected during the period of instrument failure must be evaluated by the RSO or duly authorized representative.
- 3.2.5 Posting and access control of controlled areas shall be performed in accordance with OP-019.

3.3 Requirements

None

4.0 REFERENCES

| 10 CFR 20 | Standards for Protection Against Radiation |
|--------------------------------|--|
| AP-012 | Radiation Work Permits |
| OP-001 | Radiological Surveys |
| OP-009 | Use and Control of Radioactive Check Sources |
| OP-019 | Radiological Posting |
| • OP-020 | Operation of Contamination Survey Meters |
| OP-021 | Alpha-Beta Counting Instrumentation |
| OP-023 | Operation of Micro-R Survey Meters |
| NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |
| Reg 1.86 | Termination of Operating Licenses for Nuclear Reactors |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Activity The rate of disintegration (transformation) or decay of radioactive material. The units of activity for the purpose of this procedure are Becquerel (Bq) or micro-Curies (μCi).
- 5.2 Contamination Deposition of radioactive material in any place where it is not desired. Contamination may be due to the presence of alpha particle, beta particle or gamma ray emitting radionuclides.
- 5.3 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.

- 5.4 Fixed Contamination Radioactive contamination that is not readily removed from a surface by applying light to moderate pressure when wiping with a paper or cloth disk smear, or masslinn.
- 5.5 Minimum Detectable Activity (MDA) For purposes of this procedure, MDA for removable radioactive contamination is defined as the smallest amount of sample activity that will yield a net count with a 95% confidence level based upon the background count rate of the counting instrument used.
- 5.6 Release for Unconditional Use A level of radioactive material below which it is acceptable for use without restrictions. Under normal circumstances, authorized limits for residual radioactive material are set equal to, or below, the values specified in Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors.
- 5.7 Survey is defined as an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.
- 5.8 Survey Exempt Materials The contents of sealed containers which remain unopened while in a controlled area are exempt, the outside surfaces are not exempt.

6.0 EQUIPMENT

None

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of surveying materials are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of contamination survey meters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT are responsible for performing the surveys described in this procedure.

8.0 INSTRUCTIONS

8.1 Release Limits for Gross Activity (Unknown Isotopes)

| EMISSION | REMOVABLE | TOTAL (Fixed and Removable |
|------------|-------------------------|----------------------------|
| | dpm/100 cm ² | dpm/100 cm ² |
| Beta-Gamma | 200 | 1000 |

NOTE:

If <u>all</u> of the constituents of the contamination are known <u>and</u> documented on the release documents, the release limits of Table 1 of Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors applies.

- 8.2 Inaccessible Surfaces
 - 8.2.1 Items with inaccessible surfaces should be disassembled as completely as possible to facilitate release surveys. Items with inaccessible surfaces will not be unconditionally released unless evaluated by a designated evaluator who authorizes and documents the release.
 - 8.2.2 The following guidance will be used when performing evaluations:
 - 8.2.2.1 A history of the item should be reviewed.
 - 8.2.2.2 The actual release survey shall be reviewed.
 - 8.2.2.3 Determination of the radiological conditions in the area the item has been used or stored shall be reviewed.
- 8.3 Materials considered dangerous, fragile, or not readily smearable due to their physical or chemical nature shall not be unconditionally released unless evaluated on a case by case basis for release in a manner consistent with Section 8.2.2. Evaluation for release shall be performed by a designated evaluator only.
- 8.4 Survey Exempt Materials
 - 8.4.1 Items such as briefcases, pens, papers, personal clothing, etc., are exempt from the Health Physics release survey requirements of this procedure, unless deemed appropriate by the HPT.
 - 8.4.2 Individuals shall survey the exempt items in the same manner as a whole body frisk when leaving a controlled area or have a Health Physics Technician perform the survey.
- 8.5 Survey Procedure

- 8.5.1 Upon receipt of an item presented for release, attempt to determine the history:
 - 8.5.1.1 Purpose of item.
 - 8.5.1.2 The current and past use of the item.
 - 8.5.1.3 The location(s) in which the item was used or stored.
 - 8.5.1.4 If the item was ever used for work with radioactive material or used in an area where radioactive material was used or stored.

NOTE:

This knowledge of the item history should provide the surveyor with information helpful in performing the release survey.

- 8.5.2 Using protective clothing such as gloves, perform large area smears of 100% of the accessible surfaces of the item using large area wipes (e.g. masslinn).
 - 8.5.2.1 Determine if transferable (loose) radioactive material is present by measuring the amount of activity on the surface of the cloth.
 - 8.5.2.2 If the presence of radioactive material is indicated by a count rate above background, the item shall be treated as contaminated until the results of the disc smear survey are obtained and determination is made concerning the actual 100 cm² loose contamination levels. The material shall be controlled in accordance with OP-019.
- 8.5.3 Perform a direct scan of 100% of all accessible areas of the item, in accordance with the instrument's operating procedure, and OP-001.

NOTE:

Items presented for release shall be direct scanned in an area of low background. Preferably \leq 100 CPM. The Health Physics Technician performing the release survey shall determine if the background is acceptable for direct scan of the item.

- 8.5.4 If the scan indicates radioactive material on the surface of the item is less than the limits of release for total activity, proceed to 8.5.10.
- 8.5.5 If the scan indicates radioactive material on the surface is greater than regulatory limits for total activity, the item cannot be released.
- 8.5.6 During the direct scan of the accessible surfaces of the item, a static measurement shall be taken:
 - 8.5.6.1 If an increase in the audible count rate is detected.

- St. Albans Project 00-062
 - 8.5.6.2 After each minute of scanning.
 - 8.5.6.3 When the Health Physics Technician determines that an indication of fixed activity in an area less than ten square centimeters may be present.
 - 8.5.6.4 During the static measurement, the meter probe shall be held at the proper distance from the surface being surveyed for the proper response period to allow the meter reading to stabilize, in accordance with the instrument's operating procedure.
 - 8.5.7 Perform disc smears which are representative of 100% of the effective surface area.
 - 8.5.7.1 100% of the effective accessible surface means performing a 100 cm² disc smear on all accessible areas of the item suspected of being contaminated.
 - 8.5.8 Count the smears in accordance with reference OP-001 and/or OP-021 as appropriate.
 - 8.5.8.1 Record smear data on the Radiation and Contamination Survey.
 - 8.5.8.2 If the smear results indicate transferable activity below the release limits, proceed to Step 8.5.10
 - 8.5.8.3 If the smear results indicated transferable activity above the release limits, the item cannot be released
 - 8.5.9 If item has internal or inaccessible surfaces, CABRERA personnel will disassemble the item and repeat Steps 8.5.2 through 8.5.5 or have the item evaluated for release by a designated evaluator.
 - 8.5.10 If the item meets the release limits or is evaluated as meeting the unconditional release criteria complete form OP-004-01. The RSO or duly authorized representative must review the release documents and approve the release before allowing the item to leave the controlled area.
 - 8.5.11 If items are identified as radioactive during the release survey, contact the RSO or duly authorized representative.
 - 8.6 Action level

- 8.6.1 If direct frisk beta-gamma instrument readings exceed 100 cpm above background (with background less than 200 cpm) those areas shall be surveyed as follows:
 - 8.6.1.1 Perform a smearable contamination survey using 100 cm² of affected areas, and count the smears for beta-gamma contamination to determine if contamination is "fixed" or "removable."
- 8.6.2 Dose rate surveys, which exceed 0.2 mR/hr, shall be brought to the attention of the RSO or duly authorized representative for release or acceptance approval.
- 8.7 The results of the survey shall be documented on Radiation and Contamination surveys.

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

- 9.1.1 Instrumentation used for surveys will be checked with standards each day prior to use and verified to have current valid calibration.
- 9.1.2 When releasing a large volume of materials, a program may be established under the discretion of the RSO or duly authorized representative to ensure by second check that no radioactive material has been released to the public or the environment.
- 9.1.3 The health physics technician performing the survey shall review Form OP-004-01 and any other applicable forms for accuracy and completeness.

9.2 Records

- 9.2.1 Documented information shall be legibly written in ink.
- 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The health physics technician performing the survey shall ensure that this procedure is the most current and approved revision.
- 9.2.4 Entries on Form OP-004-01 and any other pertinent forms must be dated and initialed by the health physics technician performing the survey to be valid.

9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

OP-004-01

Unconditional Release of Equipment or Items Report

Revision 0 9/9/2000 Unconditional Release of Material from Radiological Control Areas

St. Albans Project 00-062

OP-004-01 UNCONDITIONAL RELEASE OF EQUIPMENT AND ITEMS LOG

Project Number

| Item/ | Comments | Survey# | Date |
|--------------------|------------------------|---------|--------------|
| Equipment Released | Comments | Sur roy | |
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| P-004 | CABRERA SERVICES, INC. | | Page 1 |

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1.0 PURPOSE

This procedure instructs Cabrera Services Inc. (CABRERA) field personnel in the proper use of step-off pads.

This procedure provides the method Cabrera Services, Inc. (Cabrera) uses to ensure step off pads are used in accordance with procedure requirements. Adherence to this procedure will provide reasonable assurance that step-off pads are being used to prevent the spread of contamination. Adherence to this procedure also provides adequate control of contamination levels which meets CABRERA's goal of maintaining radiation exposures As Low As is Reasonably Achievable (ALARA).

2.0 APPLICABILITY

This procedure applies to all CABRERA radiological remediation projects or operations that use step-off pads for radiological contamination control.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

Step-Off pads should always be placed in the Radiological Buffer Area just outside the contamination area as a control to prevent the spread of contamination.

3.2 Limitations and Requirements

Not Applicable

4.0 REFERENCES

HASP

 OP-001
 OP-004

 Health and Safety Plan (Radiation Safety Program)

 Radiological Surveys
 Unconditional Release of Material from Radiological Control Areas

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Contamination Survey A survey technique to determine fixed and removable radioactive contamination on components and facilities.

- 5.3 Radiation Survey is defined as an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.
- 5.4 ALARA (acronym for "as low as is reasonably achievable") An approach to radiation exposure control to maintain personnel radiation exposures as far below the federal limit as technical, economical and practical considerations permit.

6.0 EQUIPMENT

Step-Off Pads

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) The PM is responsible for ensuring that all personnel assigned the task of utilizing step-off pads are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation Safety Officer (RSO) The Radiation Safety Officer is responsible for monitoring compliance with this procedure and training personnel in the use of step-off pads.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT performing radiological surveys in accordance with this procedure are responsible for knowing and complying with this procedure.

8.0 INSTRUCTION

- 8.1 Location of Step-Off Pads
 - 8.1.1 Radiation safety personnel will specify the placement of step-off pads based on the requirements listed below:
 - A single step-off pad should be installed at exit points from areas where loose surface contamination levels exceed 200 dpm/100 cm² for β , γ .
 - Two step-off pads, separated by a covered area where possible, should be installed at exit points from areas where contamination

levels exceed one hundred times the limits for a single step-off pad.

- 8.1.2 Considerations must be given to other radiological conditions and general safety precautions when installing step-off pads:
 - Step-off pads should be positioned at personnel control points in such a manner that they do not cause individuals to remain in significant radiation fields while removing protective clothing. In these cases, the step-off pad should be separated from the actual point of exit, by a covered area.
 - Step-off pads should be placed in such a manner that they do not constitute a safety hazard. For example, step-off pads should not be placed on steep ground, slippery surfaces, etc.
 - Step-off pads should not be placed at Emergency Exits or at an Equipment Exit or Entrance.
- 8.2 Use of Step-Off Pads
 - 8.2.1 Step off pads shall be considered uncontaminated surfaces in the case of a single step-off pad; or as surfaces of lower contamination than the contaminated area, in the case of first two step-off pads (when exiting the posted area). The step-off pad needs to be surveyed periodically in accordance OP-001.
 - 8.2.2 Before stepping out of the Contaminated Area or Airborne Radioactivity Area to the step-off pad, the worker should:
 - Remove exposed tape.
 - Remove rubber overshoes.
 - · Remove outer pair of gloves.
 - Remove hood from the rear.
 - Remove respiratory protection as applicable.
 - Remove coveralls, inside out, touching the insides only.
 - Take down barrier closure, as applicable.
 - Remove tape or fastener from inner shoe cover.
 - Remove each shoe cover, place the shoe cover into the

container for contaminated shoes, and step onto clean step-off pad.

- Remove cloth glove liners.
- Replace barrier closure, as applicable.
- Commence whole body frisking.
- Frisk badge and dosimeter.
- 8.2.3 The sequence for the removal of primary and supplemental dosimetry is dependent upon where the dosimetry was worn and the potential for contamination.
- 8.2.4 Use of Multiple Step-Off Pads
 - Multiple step-off pads should be used to control exit from high surface contamination areas. These pads define interim control measures within the posted area to limit the spread of contamination. The following controls apply:
 - The inner step-off should be located immediately outside of the highly contaminated work area, but still within the posted area.
 - The worker should remove highly contaminated outer clothing prior to stepping on the inner step-off pad.
 - Additional secondary step-off pads, still within the posted area, may be used as necessary to restrict the spread of contamination out of the immediate area.
 - The final or outer step-off pad should be located immediately outside the contamination area.

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

None

9.2 Records

- 9.2.1 All records generated by this procedure are used in the Radiation Protection Program to document contamination levels of work areas and materials onsite.
- 9.2.2 Radiological survey records, routine survey schedules, and tracking forms are generated during the performance of this procedure.
- 9.2.3 Documented information shall be legibly written in ink.
- 9.2.4 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.5 The health physics technician performing the survey shall ensure that this procedure is the most current and approved revision.
- 9.2.6 The health physics technician performing the survey shall review any applicable forms for accuracy and completeness.
- 9.2.7 Entries on forms and any other pertinent documents must be dated and initialed by the health physics technician performing the survey to be valid.
- 9.2.8 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

None

1.0 PURPOSE

- 1.1 This procedure establishes the Cabrera Services Inc., (CABRERA) Training Program that, upon satisfactory completion, will allow individuals to enter and perform work with US NRC licensed radioactive material.
- 1.2 Adherence to this procedure along with site specific guidance will provide reasonable assurance that personnel will be aware of their surroundings, the hazards associated with the type of material in the work area, and the type of work conducted.

2.0 APPLICABILITY

2.1 This procedure will be used for all CABRERA project work involving licensed radioactive materials.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

3.1.1 No individual shall be allowed to work with licensed radioactive materials without training qualification and documentation under this program.

3.2 Limitations

3.2.1 Any person successfully completing this program shall be qualified for a period of one year. Annual refresher training is required to maintain training qualifications.

3.3 Requirements

3.3.1 Records of training shall be maintained. Documentation of previous training for which credit is being given shall include: individual's name, date of training, topics covered, and name of the certifying individual.

- 3.3.2 The training program for employees and contractors, requiring access to licensed radioactive material shall ensure, at a minimum, that the following regulatory requirements are met:
 - 3.3.2.1 10 CFR Part 19.12 States the training requirements for workers who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem (1 mSv):

At a minimum, 4 hours of Radiation Safety Training will be required for subcontracted personnel and any worker meeting the condition stated in CFR 19.12(a). This 4 hour training shall cover the topics required in CFR 19.12 (a)(1) through (a)(6), as well as any pertinent information in 10 CFR parts 19 and 20 and the Site's NRC license and standard operating procedures. It is mandatory that any females participating in this program receive specific training on prenatal radiation exposure (Reference 4.). An annual refresher course in Radiation Safety will also be required, and as be such provided and documented.

3.3.2.2 29 CFR 1910.120 - Contains the minimum training requirements for hazardous waste operations and emergency response personnel, supervisors, and management:

All workers shall be required to possess, and provide documentation of, a current 40-hour EPA Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Certificate. In addition, site specific HAZWOPER training shall be performed to complete the requirements of 29 CFR 1910.120. The site specific HAZWOPER training shall also cover the content of the Emergency Plan, and provide detailed instruction on response to site emergency events.

- 3.3.3 Individuals performing a specific limited task, or requiring access for observation or similar purposes, shall be exempt from the requirements in Section 3.3.2, and may be allowed on-site if the following requirements are met:
 - 3.3.3.1 Prior to entry, the individual shall have, or be given, the appropriate radiation, hazardous operations, right to know, and other site specific information necessary for the radiological and other hazardous conditions expected to be encountered.
 - 3.3.3.2 The individual shall have approval of the RSO or duly authorized representative to enter the site. The RSO or duly authorized representative shall document this approval by co-signing the individuals entry in the site access log.
 - 3.3.3.3 Such persons shall also have a continuous escort by, or be within continuous view of, a fully trained site representative (e.g. RSO, RFS, HPT).

4.0 REFERENCES

| • | NRC Regulatory Guide 8.29 | "Instruction Concerning Risks From Occupational Radiation Exposure" |
|---|--------------------------------|--|
| • | Draft Regulatory Guide DG-8012 | "Instruction Concerning Risks From Occupational Radiation Exposure" 12/94 |
| • | NRC Regulatory Guide 8.13 | "Instruction Concerning Prenatal Radiation Exposure" |
| • | INPO 93-009 | Guidelines for General Employee Training |
| • | RSP | Radiation Safety Program |
| • | RSTM | Radiation Safety Training Manual |
| • | 10 CFR Part 19 | Code of Federal Regulations |
| • | 10 CFR Part 20 | Code of Federal Regulations |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Procedure A logical, concise document describing the general requirements and methods to be used regarding a specific topic.
- 5.2 Training The transfer of information by instruction to ensure knowledgeable personnel.

6.0 EQUIPMENT

None Required

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) The PM is responsible for ensuring that personnel assigned the task of training are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in implementing actions described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. The RFS is responsible for identifying training needs. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) Health Physics Technicians are responsible for radiation and general safety protection and counseling workers in the proper way to protect themselves. The HPT performing requirements of this procedure is responsible for knowing and complying with this procedure.
- 7.5 All Other Personnel All CABRERA personnel are responsible to ensure their training needs are met to ensure safe and efficient completion of projects.

8.0 INSTRUCTIONS

8.1 This program is designed to include approximately 4 hours of classroom instruction, practical training as necessary, and three hours to complete a 50 question multiple choice exam (see Attachment B). Each individual will be required to achieve, at a minimum, a passing score of 80%. Any individual that scores below 80% but greater than 65% will be allowed to take the test over after completing the 4 hour course. Additional site-specific HAZWOPER training will also be required as necessary. The course instructor should use training aids, which include, but not be limited to slides, handouts, instruments, etc. to increase trainee understanding of the material being presented.

Note:

It is mandatory that any females that are participating in this program and/or allowed access to a licensed site receive specific training on prenatal radiation exposure (see Section 4.0).

- 8.2 Four Hour Radiation Worker Training
 - 8.2.1 Attachment 1 is an outline of topics to be covered in the 4 hour radiation worker training. This outline shall serve as a general curriculum for instructors.
- 8.3 HAZWOPER Site Specific Training
 - 8.3.1 The required 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training shall be supplemented with any site specific information which is required by 29 CFR 1910.120, and is pertinent to worker safety at the licensed site. At a minimum, the following information shall be covered:
 - Names of personnel and alternates responsible for site safety and health;
 - Safety, health and other hazards present on site;
 - Site Emergency Response Plan;
 - Use of site-specific personal protective equipment;
 - Work practices by which the employee can minimize risks from hazards;
 - Safe use of engineering controls and equipment on-site

- Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards;
- Site decontamination procedures; and
- Confined space entry procedures.
- 8.4 Procedures for operation of instruments, methods of job completion, information important to emergency response, and methods of personnel protection will be discussed with all personnel prior to their job assignments which involve these activities.
- 8.5 An individual training record shall be maintained for each individual assigned to work at CABRERA work sites.
- 8.6 A course attendance record shall be prepared by the instructor for each class given.
- 8.7 A review of personnel qualifications shall be completed by the individual and reviewed by the project manager for each individual hired to perform a specific job function at the project site.
- 8.8 On-The-Job training is as important as other types of training and should be documented when it occurs. An instructor shall validate on-the-job training as it occurs. The project manager may provide this validation in the absence of an instructor.

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

9.1.1 Each individual will be required to achieve at a minimum a passing score of 80%. Any individual that scores below 80% but greater than 65% will be allowed to take the test over after completing the 4 hour course. Additional site-specific HAZWOPER training will also be required as necessary. The course instructor should use training aids, which include, but not be limited to slides, handouts, instruments, etc. to increase trainee understanding of the material being presented.

9.2 Records

- 9.2.1 Documented information shall be legibly written in ink.
- 9.2.2 Data shall not be obliterated by erasing or using white-out. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.

- 9.2.3 The RSO or duly authorized representative shall ensure that the Training procedure is the most current revision number.
- 9.2.4 The RSO or duly authorized representative shall review the Training examination for accuracy and completeness.
- 9.2.5 Student taking the exam must date and sign the exam for it to be valid.
- 9.2.6 The exam shall be kept in the students file folder by the RSO at the site office. The RSO's file cabinet shall be kept locked when unattended.

10.0 ATTACHMENTS

Attachment 1

Radiation Worker Training Instructor Outline

Attachment 2

Guideline for Examination

Attachment 1

Radiation Worker Training Instructor Outline

INSTRUCTORS OUTLINE

A. INTRODUCTION

1. Goal

Upon successful completion of this program, the individual shall have sufficient understanding of licensed Site procedures and basic principles of radiation protection.

2. Health Physics

- a. State the purpose of Health Physics "To protect people and their environment from the harmful effects of ionizing radiation"
- b. Present a description of the Health Physics Department including the basic responsibilities of:
 - i. Radiation Safety Officer (RSO)
 - ii. Radiological Field Supervisor (RFS)
 - iii. Health Physics Technicians

3. Site history

- a. Give a brief description of the history of the Site including:
 - i. chronological history
 - ii known hazardous materials
 - iii. locations of buried materials
- 4. Scope of current activities and licensed operations
 - a. Give a brief presentation of current activities and licensed activities

involving radioactive material on the site. Present general information on the current status of accessible (above ground if any) site contamination. Describe any other hazards that workers may encounter during present and upcoming activities.

B. RADIATION PROTECTION

- 1. Atomic Structure
 - a. Atom; Describe the basic structure of the atom
 - i. Proton Relative size 1 AMU Positive (+) electrical charge # of protons determines element
 - ii. Neutron Relative size 1 AMU, No electrical chargeProtons & Neutrons reside in the Nucleus
 - iii. Electron Relative size 1/2000 AMU Negative (-) electrical charge Orbits Nucleus
 - b. A standard atom has equal number of protons and electrons for neutral electrical charge

c. Proton to Neutron ratio equal to 1 in lighter atoms. As atoms get heavier additional neutrons > 1/1 ratio are required for the nucleus to maintain internal balance (stable).

Example:

| Hydrogen | 1 Proton | 0 Neutrons |
|-----------|------------|--------------|
| Oxygen | 8 Protons | 8 Neutrons |
| Potassium | 19 Protons | 20 Neutrons |
| Iron | 26 Protons | 30 Neutrons |
| Lead | 82 Protons | 126 Neutrons |
| Thorium | 90 Protons | 142 Neutrons |

d. Isotope; Family of atoms within an element where the nuclei have the same number of protons but differing number of neutrons.

Example:

Element: Thorium, Isotopes: Th-230, Th-232

Th-230: 90 Protons 140 Neutrons

Th-232: 90 Protons 142 Neutrons

- e. Imbalance in neutron / proton ratio causes atom to be unstable i.e. RADIOACTIVE.
- f. Nature strives to be in balance, to stabilize an unbalanced atom emits radiation.

2. Radioactive Material

An unstable atom or group of atoms who in an effort to become stable emit ionizing radiation.

- a. Radioactive Contamination:
 - i. Radioactive atoms on the surface of non-radioactive material (loose or fixed)
 - ii. Radioactive material where we don't want it.
- b Nuclear Activation:
 - i. Material not originally radioactive, but activated by exposure to a Nuclear Reactor Core, neutron source, etc.

Example:

Co⁶⁰

- c. Naturally occurring:
 - i. Radioactive atoms occurring in nature.
- 3. Radiation

In an effort to balance N/P ratio radioactive isotopes emit ionizing radiation.

Ionization - The removal of an orbiting electron from its parent atom.

There are 4 types of ionizing radiation emitted from unstable atoms. This lecture will deal only with only the 3 natural types of ionizing radiation.

a. Alpha Particles

- i. 2 protons (++) 2 neutrons, no electrons (Helium nucleus).
- ii. Emitted from nucleus of heavy isotopes.
- iii lonizes by electrical attraction of electrons (-) by protons (++) in the Alpha particle.
- iv. Moves at 1/20 the speed of light (slow by nuclear standards).
- v. lonizes very readily due to slow speed and high electrical (++) charge stopped by sheet of paper.
- vi. Hazard to body only if taken internally. Dead layer of skin protects from external sources.
- vii. Alpha radiation is greatest internal hazard of the radiation's emitted by isotopes of thorium.

b. Beta Particle

- i. Particle emitted from the nucleus of unstable isotope.
- ii Generally (-) electrical charge.
- iii Generated in the nucleus by transformation of a neutron into (+) proton and (-) Beta.
- iv. Ionizes by electrical repulsion (-) beta repels electrons.
- v. Moves 1/10 the speed of light.
- vi. Due to the smaller electrical charge than Alpha, Beta penetrates deeper into materials.

- vii. Shielded by 1/4 to 1/2 inch of most solid materials.
- viii. External hazard to skin and eyes.
- ix. Internal hazard

c. Gamma Ray

- i. Packet of energy, no mass (other examples light, radiant heat, radio).
- ii. No electrical charge, moves at the speed of light.
- iii Emitted in conjunction with beta radiation's.
- iv. Ionizes by other indirect methods based on energy (offer to discuss after class).
- v. Very high penetrating power due to no electrical interaction.
- vi. Major external radiation hazard with some internal hazard also.

Note: Ensure students understand difference between radiation and radioactive material.

4. Units

- rem The unit of measurement for reporting biological damage to humans from radiation energy absorbed in human tissue.
 - i. Generally reported in fractions of a rem or millirem.1000 millirem = 1 rem.
 - ii. Used to report total dose

iii. Used to report dose rate (2 rem/hour = 2000 mrem/hr)

Note: Ensure students have firm understanding of dose and dose rate concepts.

- b. DPM Disintegration Per Minute (Unit of activity)
 - A disintegration is the spontaneous emission of particles
 (and associated gamma rays) from an unstable nuclei.
 - ii. DPM Disintegration Per Minute
- 5. Measurement
 - a. TLD
- i. Used to measure total external dose (Deep, Skin, Eye)
- ii. Demonstrate how worn (Whole Body, Wrist, Finger Rings)
- iii. What to do when lost or damaged.
- iv. What to do when not in use (storage).
- v. Used to determine legal external dose
- vi Used to comply with 10 CFR 19 and 20
- b. Personnel Friskers
 - i. Used to measure contamination.
 - ii. Demonstrate instrument and show proper frisking techniques.
 - iii. Show how to determine background and readings greater than background

c. Radiation Survey Meter

- i. Demonstrate general use of dose rate survey meter.
- ii. Compare dose rate reading with total dose reading from TLD.

d. Breathing Zone Air Sampler

- i. Demonstrate proper use of BZ.
- ii. Discuss basic principles of airborne monitoring (DAC) hours.

e. Whole Body Counter / Bioassay

- i. Explain basic principles of whole body counting (Analysis
 of gamma rays emitted by RAM in the body).
- ii. Discuss Allowable Limit of Intake (ALI-maximum allowable amount of RAM taken inside the body in one year).
- iii. Mention other types of BIOASSAY (urine, fecal analysis).

f. Smear Survey

- Used for determining levels of loose surface contamination.
- ii. Explain units DPM/100 cm².
- iii. Demonstrate smear technique.
- iv. Loose surface contamination limits (clean):

≤20 DPM/100 cm² Alpha

≤1000 DPM/100 cm² Beta/Gamma

- g. Fixed Contamination Survey
 - i. Demonstrate fixed contamination survey.
 - ii. Limit for fixed surface:

100 DPM/100 cm² Alpha

5000 DPM/100 cm² Beta/Gamma

Note:

Ensure that all students know that only radiation protection staff may perform radiation and contamination surveys (only exception personnel frisking of body and clothes).

- 6. Background Radiation
 - a. Natural sources
 - i. Radon approximately 200 mrem/year (Rn²²⁰ from Th²³², Rn²²² from U²³⁸). Top 12" in 1 mile² average in USA 2000 lbs U, 6000 lbs Th
 - ii. Other than Radon approximately 100 mrem/year(Cosmic, K⁴⁰)
 - b. Man made
 - Medical, approximately 53 mrem/yr (39mrem diagnostic xrays, 14mrem nuclear medicine)
 - ii. Fallout < 4.0 mrem/yr (historical bomb testing)
 - iii. Nuclear fuel cycle <0.1 mrem/yr (U mining, transportation, Nuc. plants, waste disposal).

Note:

Maximum allowable public exposure from licensed operations is 100 mrem/yr.

 iv. Consumer Products <10.0 mrem/yr (tobacco products, building materials, smoke detectors, drinking water, natural gas)

The average person by age 50 will have a total dose of 18 rem (18000 mrem) from all sources

The total average dose for all people is 360 mrem/year. This total is based on the total exposure for all Americans divided by population. An individuals dose is dependent on factors such as geographic location and medical history.

7. Occupational Dose

1992: 250,000 Individuals monitored for occupational exposure

125,000 no measurable exposure

125,000 average exposure of 300 mrem

8. Biological Effects

- a. Radiation effects on cells of the body.
 - i. Cell will die.
 - ii. Cell will repair it self.
 - iii. No damage.
 - iv. Cell is damaged, survives, cannot reproduce.
 - v. Cell genetic material is damaged, damage is passed on to next generation (mutation).

- b. Acute vs Chronic Exposure
 - i Acute Exposure High dose in short period.
 - ii Acute effects
 - <25 rem no readily detectable effects
 - >25 rem exposure slight changes in blood (MD)
 - >100 rem vomiting, diarrhea, loss of hair
 - 450 rem LD-50 with no medical intervention
 - 600 rem LD-100 with no medical intervention
- c. Chronic exposure Low dose over long period of time.Chronic exposure is the basis for our Radiation Program.
- d. Stochastic Damage (Cancer)
 - A particular cells level of cancer risk is dependent on how fast the cells reproduce themselves. "Radiosensitivity"
 - ii. Cancer Statistics, 20% of all adults will develop a fatal cancer from all possible causes.

In a group of 10,000 workers, 2000 will die from cancer. Expose this same group to 1 rem of ionizing radiation (DDE) statistically 4 additional cancers will result (2000 - 2004). For 100 rem 400 additional cancers.

iii. Relative Risk Table:

Hazard

Est. of days lost

Pack of Cigarettes/day

2370 days

20% overweight

985 days

Home accidents

95 days

1 rem lifetime exposure

1 day

Note: Other statistics are available in reg guide 8.29

- iv. Somatic Effects Effects that appear in the exposed individual
- v. Genetic Effects Effects that appear in the exposed individuals offspring

Note: There is no statistical evidence of genetic effects appearing in humans. Genetic effects have been observed in laboratory animals at very high doses.

- 9. Exposure Limits
 - a. External Dose Limits
 - i. Skin SDE 50 rem/Yr.
 - ii Max. Extremity 50 rem/Yr.
 - iii. Eyes LDE 15 rem/Yr (Cataracts).

b. Total Effective Dose Equivalent TEDE

Limit based on total dose to the body from external sources (Deep Dose [gamma] Equivalent) and doses to the body from internal sources.

TEDE = DDE + CEDE

CEDE = %ALI, 1 ALI = 5 rem CEDE

2000 DAC hours = 1 ALI

TEDE Limit - 5 rem/Yr. NRC

c. Declared Pregnant Woman (Dose to Embryo/Fetus)

500 mrem TEDE for duration of pregnancy.

Low limit due to high radiosensitivity of all developing cells..

- 10 Exposure Control
 - a. Basic concepts for reducing exposure.
 - i. Time
 - ii. Distance
 - iii Shielding
 - iv. Source Reduction
 - b. Radiation Work Permit (RWP)
 - i. Required for all work with RAM.
 - ii Must be modified if work scope changes.

- iii Must be authorized to work under RWP, authorized personnel must be trained.
- iv. Contact Radiation Protection to initiate or to add names to an existing RWP.
- c. ALARA As Low As is Reasonably Achievable
 - i. Discuss concept of ALARA principle.
 - ii. Management's responsibility to provide adequate work facilities and provide training.
 - iii. Health Physics responsibilities:
 - Awareness of jobs in progress
 - Perform proper surveys
 - Surveillance of work areas
 - iv. Workers responsibilities:
 - Proper knowledge of job requirements
 - Inform HP of work scope and changes
 - Follow all rules & procedures
 - Note: Important to stress to all radiation workers that nobody has better control over your actions than yourself. every rad worker has final responsibility for ensuring a safe working environment.

11. Posting

Discuss standard posting procedures, include Tri-foil symbol, standard yellow & magenta colors, Rad rope and step off pads.

a. Radioactive Material

i. RAM posting indicates the presence of Radioactive
 Material within the posted area.

b. Radiation Area

i. Indicates that within the posted area radiation dose rates are greater than or equal to 5.0 mrem/hr at 30 centimeters from the radiation source or any surface that the radiation penetrates.

c. Contaminated Area.

- i. Indicates that within the posted area loose surface contamination may exist with levels in excess of 20 DPM/100 cm² α or 200 DPM/100 cm² β , γ .
- ii. Requirements for entry into a contaminated area are:
 - 1) Protective Clothing
 - 2) RWP [or HP permission].

12. MISC. Practical Information

a. RAD Waste.

The cost of waste storage for potential disposal is very high every effort shall be made to limit the generation waste.

- b. Airborne Contamination.
 - i. One potential for unnecessary radiation exposure working at a radiologically contaminated site comes from breathing contaminated air.
 - ii. Sources of airborne contamination:
 - Equipment dissemble & repair
 - Decontamination operations
 - Filing & Grinding
 - Mechanical Shock
 - Routine equipment operations
 - iii. It is very important that HP be notified anytime unplanned operations are taking place that could create an airborne situation.
- c. Pathways for internal contamination
 - i. Inhalation
 - ii. Oral ingestion
 - iii. Cuts or other skin openings

d. Protective Clothing

- Display and discuss standard protective clothing, to include:
 - Coveralls
 - Lab Coat
 - Hood
 - Shoe Covers
 - Gloves (plastic, latex, cloth)
 - Safety Glasses
- ii. Using a working copy of an RWP select one student to demonstrate proper dressing.
- iii. Review other types of protective clothing such as plastic (tyvek) suites, and face shield.

e. Emergencies

- i. For medical emergencies:
 - For minor illness leave the area & report to the HSA.
 - If minor cuts occur, contact HP prior to reporting to medical.

Note: All cuts, scratches, or other skin openings must be checked by HP prior to entry into any contaminated area, or working with radioactive materials.

Note:

If major illness or injury occurs DO NOT remove the individual, if qualified perform first aid, if not get help.

The time utilized in removing an individual from a radiological control area during a medical emergency will have a much greater effect on that persons health than any negative effects of treating the individual within the radiological controlled area.

13. Workers Rights & Responsibilities

a. NRC Form 3

i. Show copy of Form 3, discuss. Give the locations found.

How to report potential violations to the NRC. Rights to obtaining exposure history. Protection from discrimination.

b. Workers responsibilities

- i. Stress to all students that they have the greatest
 responsibility in ensuring a safe working environment.
- ii. All persons working with RAM have a legal responsibility to comply with all RWPs, procedures, license requirements and NRC regulations.

Note: Individuals willfully violating safety requirements can be held criminally liable.

c. House Keeping

 All persons working inside any HP restricted area is responsible for general cleanliness in addition to radiological responsibilities.

14. Facilities Tour & Practical Training

- a. All persons unfamiliar with the Site shall have a tour of the work areas and a review of the following.
 - i. Entry and exit requirements including Personnel frisking.
 - Discussion of contaminated areas including:Step Off Pads Posting Waste Containers
 - iii. Protective Clothing & Dress out area
 - iv. Health Physics Office
 - v. Right to Know Information Center

ATTACHMENT 2 EXAMINATION

| _ | | | | | _ |
|---|----|----|----|---|---|
| R | ev | ic | in | n | n |
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Training

RADIATION WORKER QUALIFICATION EXAM

| NAME | | SS# | |
|--|--------------------------------------|--------------|----------------|
| GRADE: | GRADED BY | | RETRAIN DATE |
| I HAVE REVIEWED THIS I INCORRECTLY HAVE BEI GIVEN THE OPPORTUNIT OTHER MATERIAL PRESI | EN REVIEWED BY T Y TO ASK QUESTIC | HE INSTRUCTO | R. I HAVE BEEN |
| SIGNATURE | DATE | | |

This exam contains 50 multiple choice questions, there is only one correct answer for each question. Circle the answer you think is correct. If you decide to change an answer put a line through and initial the answer you are changing and circle your new choice. There is a three hour time limit for this exam. GOOD LUCK.

- 1. A radiation worker who has satisfactorily completed this course in radiation protection will be able to_____.
 - a. Approve Radiation Work Permits
 - b. Protect themselves from Radiation hazards they may encounter
 - c. Enter all posted areas without HP approval
 - d. All of the above
- 2. You have the primary responsibility for radiation protection.
 - a. All the time
 - b. Only when HP is not in the work area
 - c. When your supervisor puts you in charge
 - d. Never (Management responsibility)
- 3. What three primary components make up an atom?
 - a. Alpha, Beta & Gamma
 - b. Electron, Neutron & Proton
 - c. Radiation, Contamination & lonization
 - d. Nucleus, X-Ray & Cosmic

4. An example of Radioactive Material is .

- a. A wrench with fixed contamination
- b. A frisker check source
- c. A smear reading 20,000 DPM/100 cm^2
- d. All of the above

5. An example of a type of radiation is _____.

- a. Gamma ray
- b. Isotope Thorium-232
- c. Nucleus
- d. A wrench with fixed contamination

6. Safety Glasses protect your eyes from _____.

- a. Gamma radiation
- b. Radioactive Waste
- c. Beta Radiation
- d. Radon Gas

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| 7. | rem is the unit used to measure | |
| | a. Loose surface contamination | |
| | b. Radiation dose to human tissue | |
| | c. The number of unstable atoms in one gram of soil | |
| | d. Levels of airborne contamination | |
| 8. | How many millirem (mrem) equals one rem? | |
| | a. 10 | |
| | b. 100 | |
| | c. 1000 | |
| | d. 100,000 | |
| 9. | Your legal whole body dose (TEDE) is measured by | |
| | a. TLDs, Bioassay, & B-Z Air Sampler | |
| | b. Frisking | |
| | c. Health Physics survey | |
| | d. RWP | |

10. The two types of Radiation of primary concern emitted by thorium isotopes are:

- a. Alpha & Beta
- b. Beta & Gamma
- c. Alpha & Gamma
- d. Alpha & X-Rays

11. The type of Radiation that will not penetrate a persons dead layer of skin is?

- a. Alpha
- b. Beta
- c. Gamma
- d. X-ray

12. A Breathing Zone air sampler (BZ) is used to measure____

- a. Gamma radiation dose to the whole body
- b. Surface contamination in work areas
- c. Airborne contamination in work area
- d. All of the above

- 13. What instrument is used to measure radioactive material inside the body?
 - a. Hand held frisker
 - b. TLD
 - c. Whole body counter
 - d. Pocket dosimeter
- 14. A Smear survey is used to determine _____
 - a. Fixed surface contamination
 - b. Loose surface contamination
 - c. General area dose rates
 - d. Skin contamination on personnel
- 15. Who is allowed to perform smear surveys?
 - a. Only trained radiation workers
 - b. Outage services personnel
 - c. Health Physics staff
 - d. Only personnel listed on the NRC license

16. The average dose received by people in the United States from natural and man-made sources is

- a. 1-5 mr/year
- b. 10-50 mr/year
- c. 100-500 mr/year
- d. 1000-5000 mr/year

17. The highest dose from man-made sources to the general public comes from

- a. Medical industry
- b. Nuclear Power
- c. Television Sets
- d. Microwave ovens

18. Will human body cells repair themselves after radiation exposure typically received by radiation workers?

- a. Never
- b. Usually
- c. Always
- d. Unknown

c. Overweight by 20%

- 22. Which of the following exposures has the greatest potential to effect your health?
 - a. 10 rem exposure to the whole body
 - b. 10 rem exposure to the skin of the body
 - c. 10 rem exposure to your hands & forearms
 - d. All of the above are equal risk
- 23. The NRC occupational limit for TEDE (Total Effective Dose Equivalent)?
 - a. 1.0 rem / Year
 - b. 2.5 rem / Quarter
 - c. 5.0 rem / Year
 - d. 50 rem / Year
- 24. The NRC Whole Body dose limit (TEDE) for declared pregnant females is?
 - a. 4.5 rem / Quarter
 - b. 2.5 rem during pregnancy
 - c. 500 mrem during pregnancy
 - d. Not allowed to receive exposure

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- 25. The concept of ALARA is to _____
 - a. Keep accurate records on personnel exposure
 - b. Spread exposure among all radiation workers
 - c. Develop methods to reduce overall exposure
 - d. Limit work with Radioactive Material to 40 hrs/week
- 26. Who has the greatest responsibility for maintaining a successful ALARA program?
 - a. Health Physics
 - b. Management
 - c. Radiation Workers
 - d. All of the above
- 27. What are the standard radiation warning colors?
 - a. Yellow & Magenta
 - b. Black & White
 - c. Red & White
 - d. Black & Magenta

- 28. Body Cells that reproduce the most rapidly tend to be...
 - a. The least sensitive to Radiation.
 - b. The most sensitive to Radiation.
 - c. Sensitivity is unrelated to reproduction rate.
 - d. None of the above.
- 29. Before entering an area posted "CONTAMINATED AREA" you must:
 - a. Obtain an RWP
 - b. Put on Lab Coat & Gloves
 - c. Notify your supervisor
 - d. No requirements for contaminated areas
- 30. On a radiologically contaminated site, a significant potential for radiation exposure comes from?
 - a. Breathing Radioactive Material
 - b. Wearing contaminated protective clothing
 - c. Instrument check sources
 - d. TV monitors

- 31. A standard method of reducing your potential exposure to radiation is?
 - a. Covering the site with plastic sheeting
 - b. Using protective clothing for all jobs
 - c. Building shielding around all sources
 - d. Time, distance, and shielding
- 32. Step off pads are considered to be ...
 - a. Activated
 - b. Clean
 - c. Contaminated
 - d. Useless
- 33. The TEDE (Total Effective Dose Equivalent) is the sum of.
 - a. Deep Dose + Skin Dose
 - b. Deep Dose + Internal Dose
 - c. Deep Dose + Eye Dose
 - d. Skin Dose + Internal Dose

- 34. The unit that applies to surface contamination is..
 - a. rem
 - b. mR/hr
 - c. DPM/100 cm²
 - d. DAC hour
- 35. The <u>unit</u> that applies to airborne exposure is..
 - a. rem
 - b. mR/hr
 - c. DPM/100 cm²
 - d. DAC hour
- 36. If your supervisor tells you to add your name to an RWP and help complete a job for a co-worker, you should ______.
 - a. Add your name and follow all instructions on the RWP
 - b. Sign into the work area using your co-workers name
 - c. Tell your supervisor he must add your name to the RWP
 - d. Contact Health Physics to add your name

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| 37. While working inside a contaminate your coveralls you should | ed area you get a small tear in the sleeve of |
| a. Put tape over the tear and | d continue working |
| b. Leave the area and perfo | rm a whole body frisk |
| c. Continue working and fris | k when job is completed |
| d. Leave the area and notify | Health Physics |
| 38. While working inside a controlled a small cut on your hand you should | rea you puncture your glove and receive a |
| a. Replace the glove and co | ntinue working |
| b. Leave the area and frisk y | your hand, if clean |
| return to work | |
| c. Leave the area and conta | ct Health Physics |
| d. Leave the area, frisk and | report to the RFS. |
| 39. While performing a whole body fris | k, when should you notify |
| Health Physics of possible contam | ination ? |
| a. Any sustained frisker rea | ding above background |
| b. Any sustained reading of | 100 cpm above background |
| c. When the frisker alarm so | ounds |
| d. If the contamination cann | ot be easily removed |

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- 40. The legal requirements for radiation protection are established by
 - a. Nuclear Regulatory Commission (NRC)
 - b. International Atomic Energy Agency (IAEA)
 - c. Environmental Protection Agency (EPA)
 - d. Occupational Safety & Health Agency (OSHA)
- 41. Ensuring that workers receive adequate training in radiation protection is the responsibility of ______.
 - a. Each worker
 - b. The license holder
 - c. Department supervisors
 - d. OSHA
- 42. Where is the NRC Notice to employees (NRC form-3) listing your rights as radiation workers available?
 - a. Nailed to a tree on the south end of the site
 - b. Posted inside each Contaminated Area
 - c. In the Emergency Operations Program
 - d. Clearly posted in all buildings on site

43. While working in a highly contaminated area your co-worker receives a severe cut on the arm. what should you do first?

- a. Move the individual to a non-contaminated area.
- b. Call for help and try to stop the bleeding (If qualified)
- c. Help him walk to the first aid station.
- d. Contact Health Physics

44. At your supervisors direction you dump a drum of potentially contaminated trash into the dumpster. The result of this action can be ______.

- a. The company is fined by the NRC
- b. You can be fired
- c. You can be held criminally liable
- d. All of the above

45. After completing a job inside a contaminated area you need to bring your tools outside the contaminated area, you should _____.

- a. Wipe down the tools and contact Health Physics
- b. Wipe down the tools and frisk them when you leave
- c. Leave the tools in the area and obtain a new set
- d. Smear the tools and check the smear with a frisker

46. You find a container marked Radioactive Material inside the office spaces you should.

- a. Move the container into a Contaminated Area
- b. Quickly move the container outside
- c. Warn people in the area and contact the NRC
- d. Warn people in the area and contact Health Physics

47. When can you enter a contaminated area without personal protective equipment?

- a. When a health physics representative approves
- b. When told to by your supervisor
- c. Never
- d. When no one is looking

48. Why should liquids never be put into a Rad Waste bag?

- a. Liquids add excessive weight to the waste container
- b. Liquids can leak out and spread contamination
- c. Liquids can cause the waste to rot
- d. Liquids can evaporate and cause airborne contamination

- 49. Which of the following would be an effective way to reduce radioactive waste?
 - a. Do not take packing material into a contaminated area
 - b. Plan jobs to prevent unnecessary trips into the area
 - c. Whenever possible use tools and equipment already in the area
 - d. All of the above
- 50. When may a worker with a cut, scratch, or sore be allowed to enter a Health Physics Contaminated area?
 - a. After a proper bandage is applied
 - b. Only with site medical approval
 - c. No cuts scratches or sores allowed in restricted areas
 - d. After Health Physics has checked the injury and given specific approval.

1.0 PURPOSE

This procedure provides instructions for monitoring personnel for exposure to radiation in the workplace. Adherence to this procedure will provide reasonable assurance that exposures to radiation will be properly monitored enabling exposure to be controlled to As Low As Reasonably Achievable (ALARA).

2.0 APPLICABILITY

External radiation monitoring shall be conducted when it is likely that an adult will exceed 10% of the annual limits listed in 10 CFR 1201(a) or at a more conservative limit chosen by the RSO or duly authorized representative.

This procedure will be used for monitoring of all personnel for exposure to radiation. Monitoring will be provided as described in the site specific work plan for the job to be accomplished.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

Not Applicable

3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 Site Registration Form
 - 3.3.1.1 All new personnel and visitors required to enter a RCA must complete a Site Registration Form (AP-008-01) prior to starting work at a facility.
 - 3.3.1.2 Complete Site Registration Form will be retained with the individual personnel exposure file. Site Registration Forms for CABRERA personnel will be updated annually or earlier if existing information is known to be incorrect.
 - 3.3.2 Occupational Radiation Exposure History
 - 3.3.2.1 An NRC Form 4 or equivalent must be completed by each individual and reviewed by the RSO or cluly authorized representative prior to the individual being permitted to work

in a radiological controlled area (RCA) where a dose of more than 25 mrem could be received.

- 3.3.3 Dosimetry Assignment
 - 3.3.3.1 The Thermoluminescent Dosimeter (TLD) badge number, name, social security number, whether or not a worker has a completed NRC Form 4 or equivalent, the monitoring period (date from...to) and the individuals date of birth shall be recorded on OP-008-01, for each individual monitored on a project. The original form will be maintained as a permanent record of the project monitoring. A copy will be maintained in the CABRERA, East Hartford office.
- 3.3.4 Occupational Exposure Limits & Administrative Control Levels.
 - 3.3.4.1 Nuclear Regulatory Commission limits per calendar year:

| 0 | Whole Body (TEDE) | 5 Rem |
|---|--|----------|
| 0 | Lens Dose Equivalent (LDE) | 15 Rem |
| 0 | Shallow Dose Equivalent (SDE) (Skin or Extremity) | 50 Rem |
| 9 | Organ Dose (CDE) | 50 Rem |
| A | dministrative Control Levels (per quarter) | |
| • | Whole Body (TEDE) | 1.25 Rem |
| • | Lens Dose Equivalent (LDE) | 3.75 Rem |
| • | Shallow Dose Equivalent (SDE) (Skin or Extremity) | 12.5 Rem |
| | | |

3.3.4.3 The CABRERA RSO or duly authorized representative shall authorize exposure above the Quarterly Administrative Control Levels.

3.3.5 Radiological Control Areas

3.3.4.2

3.3.5.1 An RCA is considered to be any portion of a facility, plant, vehicle or project for which restrictions apply for purposes of occupational radiation exposure control. Radiation

Organ Dose (CDE)

12.5 Rem

- exposures received within the boundary of a restricted area are occupational exposures. As described in the applicable Project Detail Work Procedure, RCAs will be established to provide the specific radiological controls necessary for the completion of the work scope and the protection of all project personnel. The following guidelines apply:
- 3.3.5.2 An RCA is always located within a restricted area as defined by 10 CFR 20. Each radiation area, high radiation area, airborne radioactivity area and contaminated area shall be contained within an RCA.
- 3.3.5.3 Personnel and casual visitors within an RCA will be provided with appropriate dosimetry and monitored for radiation exposure when appropriate.

3.3.6 Radiation Work Permits

- 3.3.6.1 Personnel working in an RCA must be assigned to a specific RWP applicable to the job being performed.
- 3.3.6.2 Personnel performing work requiring a DRD shall sign in on Form AP-008-06, DRD Dose Tracking Log, prior to the start of work indicating the time of entry, starting DRD dose, and DRD serial number. Upon completion of the work or at the end of shift, personnel shall sign out on the DRD Dose Tracking Log, indicating the time out and the current DRD dose.
- 3.3.6.3 A weekly accumulated estimated exposure report, based upon Direct Reading Dosimeter (DRD) results, will be maintained and posted for employee review at the start of each workweek. This report will reflect a running total of exposure available for the current calendar quarter. The beginning quarterly available exposure will be 1250 mrem for the individuals with a completed and signed Occupational Exposure History Form.

3.3.7 Occupational Radiation Exposure History Request

3.3.7.1 An Occupational Radiation Exposure Request, AP-008-05 will be completed for all personnel for whom permanent exposure results have been obtained. Copies of this letter will be sent to the individual, and maintained in the individual's personnel exposure file by the CABRERA Radiation Safety Office, East Hartford.

3.3.7.2 Any time CABRERA is required to report an individual's exposure to the Nuclear Regulatory Commission or other regulatory agency, a copy of the report will be sent to the individual.

3.3.8 Project Records / Documentation

3.3.8.1 Upon completion of the project, it will be the responsibility of the RFS or designee to forward all project records, logs, and communications regarding personnel exposure, exposure records, dosimetry records, and all other pertinent information about personnel dosimetry and individual radiation protection for RSO or duly authorized representative review, and filing in anticipation of NRC review.

4.0 REFERENCES

| • | RSP | Radiation Safety Program |
|---|-----|--------------------------|
| | | |

- AP-001 Record Retention
- AP-012 Radiation Work Permits
- OP-001 Radiation and Contamination Surveys
- AP-009 Training Program

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Monitoring Measurement of radiation exposure to evaluate potential dose equivalent to the individual.
- 5.2 Dosimetry Devices worn on the body (TLD or DRD) to measure the radiation dose received by the exposed individual.
- 5.3 Dose The deposition of energy in matter. Equivalent to the radiation dose times the quality factor for the type of radiation.
- 5.4 Quality Factor The factor, which is radiation dependent and identifies the relative biological effectiveness of a radiation type and energy. The quality factor is multiplied times the Dose to yield the Dose Equivalent.
- 5.5 TEDE The Total Effective Dose Equivalent The sum of the Deep Dose Equivalent (external dose) and the Committed Effective Dose Equivalent (internal dose).

- 5.6 CDE Committed Dose Equivalent The dose equivalent to organs or tissues that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.
- 5.7 CEDE Committed Effective Dose Equivalent The sum of the products of all organs or tissues with CDE and their respective weighting factors.
- 5.8 SDE Shallow Dose Equivalent Applies to the skin and to any extremity, it is used for external radiation which cause primary energy deposition in the first 0.007 cm of tissue averaged over one square centimeter.
- 5.9 LDE- Eye Dose Equivalent The dose delivered to the lens of the eye at a tissue depth of 0.3 centimeters.
- 5.10 DDE Deep Dose Equivalent The dose equivalent delivered by external radiation to tissue at a depth of 1 centimeter.
- 5.11 TLD Thermoluminescent Dosimeter A device which provides passive measurement of DDE, SDE, and/or LDE.
- 5.12 DRD Direct Reading Dosimeter A self indicating, integrating radiation exposure measuring device, (e.g. pocket ion chamber).

6.0 EQUIPMENT

None

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) The PM is responsible for ensuring that personnel assigned the tasks using radioactive or hazardous materials are properly trained in their use and the necessity that they be monitored for exposure to radiations and hazardous materials as described in the site specific work plan.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of personal monitoring devices for radiation and hazardous materials.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.

- 7.4 Health Physics Technicians (HPT) The HPT are responsible for performing the surveys described in the site specific work plan and ensuring the proper use of monitoring devices by workers.
- 7.5 Workers All personnel are required to wear their dosimerty as required by the RWP and to maintain their exposure to radiation ALARA.

8.0 INSTRUCTIONS

- 8.1 Radiation Dosimetry TLD
 - 8.1.1 At a minimum, TLD's provided by a NVLAP certified vendor for the exposure period, will be used to monitor all personnel who could potentially receive 10% or more of the permissible dose limit for external radiation exposure. Personnel working in areas with dose rates above 5 mrem/hour, will wear a TLD and a low range Direct Reading Dosimetry (DRD). Other appropriate radiation exposure monitors will be assigned accordingly (e.g., extremity dosimetry) at the discretion of the RSO or duly authorized representative.
 - 8.1.2 TLD's are the permanent record of an individual's occupational radiation exposure. Upon receipt of project dosimetry, TLD's and extremity dosimetry shall be stored in a low background area inside the project main office or in other designated storage locations when not in use. A (TLD) control badge shall be kept where the assigned badges are stored when they are not in use. All CABRERA personnel entering a RCA where 25 mrem could be received will be issued, at a minimum, a TLD.
 - 8.1.3 The individual's name, social security number, issue date, and date of return will be recorded on form AP-008-03.
 - 8.1.4 The TLD, which monitors DDE, SDE, and/or LDE, shall be worn on the front torso in the region of the torso, expected to receive the highest dose. In cases where other areas of the body may receive a higher dose, the HPT shall evaluate and formally require (by specification on the RWP) that the dosimetry be worn at that body location. Multibadging may be utilized in certain situations as deemed appropriate by the RSO/RFS.
 - 8.1.5 Extremity monitoring shall be provided when necessary as described by the specific site work plan, or at the discretion of the RSO/RFS.
- 8.2 Direct Reading Dosimeters

8.2.1 Personnel working in a RCA may be issued/monitored by a DRD. DRD's may either be issued for an individual or group depending on the type and duration of work to be performed. The RFS or RSO will determine if it will be necessary to issue individual or group DRD's. The DRD's used for general radiation work will have a range of 0 to 200 millirem. DRD's will be reset to zero (0) at the start of each work shift

8.3 Visitors/Group Monitoring

- 8.3.1 A casual visitor is any person touring or visiting the RCA on an infrequent basis, escorted while in the restricted area and not performing or supervising hands on work.
- 8.3.2 Visitors will be issued a TLD on a case by case basis depending on the type and duration of the job. The RFS or RSO shall determine if a TLD is to be issued to a visitor. TLD's will always be issued to contractors expected to exceed 500 mrem. A visitor expected to receive in excess of 25 mrem shall be trained and provided dosimetry.

8.4 Visitor RCA Conditions

- 8.4.1 A visitor may be escorted into a RCA provided that:
 - 8.4.1.1 No entries into a high radiation areas, surface contamination areas, or airborne radioactivity areas shall be allowed,
 - 8.4.1.2 External radiation exposure is limited to 50 mrem per year, or 10 mrem per entry.
 - 8.4.1.3 The visitor is furnished with dosimetry, when appropriate.

8.5 Visitor Dosimetry

- 8.5.1 Visitors within an RCA shall receive, as a minimum, a low range 0-200 mR Direct Reading Dosimeter (DRD)
- 8.5.2 Visitor TLD results are recorded on form AP-008-01, which is maintained at the facility. When a visitor is issued a TLD, the individual's, name, social security number, issue date, and date of return will also be recorded on form AP-008-03.
- 8.6 Lost, Damaged or Questionable Dosimetry
 - 8.6.1 In the event of a Lost, Damaged or Questionable TLD or DRD, the RFS or RSO shall be notified immediately. A Lost, Damaged or

Questionable Dosimetry Report, (AP-008-02) will be completed and filed in the individual's exposure file. The dose estimated from all exposure received while the individual was in an exposure situation must be determined and recorded in the individual's dose record.

- 8.6.2 In the event of multiple occurrences, the RSO or duly authorized representative shall be notified immediately.
- 8.7 Dropped or Off-Scale Personal Ion Chambers
 - 8.7.1 If a DRD is dropped or if it's hairline is no longer visible (off-scale), the response of this device may no longer be valid and an estimate of the dose received by an individual must be made based on; dose rates and time in the work area, typical dose received on that type of job, or the dose received by another person doing the same type of work in the same area. Form AP-008-02 shall be used to document this type of situation. The dose determined shall be added to the dose record at the discretion of the RSO. The RSO or duly authorized representative shall review, approve, and maintain all completed dose estimates.
- 8.8 Project Dosimetry Issuance/Control
 - 8.8.1 Prior to project commencement, the RFS and/or the RSO will determine the appropriate radiation monitoring dosimetry required based upon the radionuclides and activity present at the work area. The RFS will contact the RSO to provide the following information:
 - CABRERA Project Name and Account Number
 - Project start date and project duration
 - Suggested dosimetry required for project, including radiation type to monitor for
 - Quantity of dosimeters requested on a quarterly basis including controls
 - Name, address, social security, birth date of project personnel to be monitored.
 - Address dosimetry is to be shipped to.

- 8.8.2 Personnel assigned to projects will wear the appropriate dosimetry for no more than one quarter or the duration of the project, whichever is shortest.
 - 8.8.2.1 It will be the responsibility of the RFS or RSO to return dosimetry to the vendor for processing at the end of each quarterly monitoring period.
 - 8.8.2.2 If the original projected project duration is extended, the RFS or designee shall inform the RSO so that the proper arrangements can be made to supply additional dosimetry from the vendor.
 - 8.8.2.3 The quarterly issue period may be extended at the discretion of the RSO or duly authorized representative. Extensions shall be "with cause" actions and documented by memo, at a minimum.
 - 8.8.2.4 Dosimetry shall be maintained on site in a low dose rate area with control(s), when not being worn by personnel.
- 8.8.3 Dosimetry Processor (Vendor)
 - 8.8.3.1 The dosimetry vendor must be NVLAP certified in accordance with the project Health and Safety Plan and 10 CFR 20.1501.
 - 8.8.3.2 Upon receiving project dosimetry, the RFS or designee shall verify that the dosimetry received meets the requirements of the project. Any problems should be reported to the CABRERA RSO or duly authorized representative for immediate attention and resolution. All documentation received with dosimetry will be filled out completely. When all required preliminary training documentation has been completed as described in the project Detail Work Procedure, dosimetry will be issued to project personnel.
- 8.9 It is the responsibility of the RFS or designee to ensure that AP-008-03 is completed at the time of dosimetry issuance and a copy is sent to the CABRERA East Hartford Office location.

9.0 QUALITY ASSURANC/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 DRD's shall be calibrated by a certified laboratory or validated procedure every six months when in use.

9.2 Records

- 9.2.1 Documented information shall be legibly written in ink.
- 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The health physics technician using this procedure shall ensure that it is the most current and approved revision.
- 9.2.4 The health physics technician shall review Forms AP-008-01 through AP-008-04 for accuracy and completeness.
- 9.2.5 Entries on Forms AP-008-01 through AP-008-04 and any other pertinent forms must be dated and initialed by the health physics technician performing the inventory to be valid.
- 9.2.6 The RSO or duly authorized representative shall review completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

| • AP-008-01 | Site Registration Form |
|-------------|--|
| • AP-008-02 | Lost, Damaged or Questionable Dosimetry Report |
| • AP-008-03 | Radiation Dosimetry Issue Log |
| • AP-008-04 | Radiation Exposure Report |
| • AP-008-05 | Occupational Exposure History Request NRC Form 4 |
| • AP-008-06 | DRD Dose Tracking Log |

AP- 008-01 Site Registration Form

| ΑΑ | ADMINISTRATIVE INFORMATION | | | |
|---|---|----------------|-----|----|
| Name: | Date: | | | |
| Social Sec. No.: | Date of Birth: | | • | |
| Permanent Address: | | | | |
| Employer's Name: | | | | |
| Employer's Address: | | | | |
| CABRERA Project Name/No.: | | | | |
| Project Contact: | | | | |
| | | | | |
| Signature: | Date: | | | |
| | DOSIMETRY USE ONLY | | | |
| DRD No.: | DRD Reading: | mrem | | |
| TLD Badge No.: | TLD Badge Results | mrem | | |
| RADIA | ATION SAFETY OFFICER APPROVAL | | | |
| This person has met the requirements for ra | adiation work as specified in the CABRERA Radiation | Safety Manual: | Yes | No |
| This person meets the requirements for radi | iation work with consideration of the notes below: | | Yes | No |
| Notes: | | | | |
| | | | | |
| CABRERA RSO Signature: | | | | |

AP-008-02 Lost, Damaged or Questionable Dosimetry Report

| ADMINISTRATIVE | | | | | | |
|---|--------------------------------------|----------------------|--|--|--|--|
| Report Date/Time: | | | | | | |
| Project Name/No.: | | | | | | |
| Project Manager/Contact: | | | | | | |
| Individual's Name/SSN: | | | | | | |
| Badge No.: | | | | | | |
| Date/Time of Incident: | | | | | | |
| Location if known: | | | | | | |
| Applicable RWP No.: | | | | | | |
| Date Badge was Issued: | | | ************************************** | | | |
| DO | OSE CALCULATION | | | | | |
| 1. Dose from dosimeter readings | (Total from date issued) thru | (Date) = | mrem | | | |
| 2. Current dosimeter reading | (If more than one dosimeter, use hig | hest reading) = | mrem | | | |
| 3. If individual was not wearing a dosimeter, in the same area . If none, use dose rate x times | | exposure received by | workers | | | |
| Dose Rate | (mrem/hour) x Time | (hours) = | mrem | | | |
| Total estimated exposure to be assigned: | | = | mrem | | | |
| THE METHOD USED TO ESTIMATE AND THE ESTIMATE DOSE ASSIGN EVENT. | | | | | | |
| Individual's Signature: | Date: | | | | | |
| DOSER | ECORD AUTHORIZATION | | | | | |
| Dose Estimate Calculations By: | | Date: | | | | |
| Dose Estimate Reviewed By:(RSO)_ | | Date: | | | | |
| Dose Estimate Posted By: | | Date: | | | | |

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AP-008-03 Radiation Dosimetry Issue Log

| Project/Loc | Project/Location: | | | Badge Series No.: | | |
|--------------|---|---|--|-------------------|-----|--|
| TLD# | Name SSN Form 4 Dates Dates (Y/N) (From/To) | | | | DOB | |
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| Reviewed | hv: | | | Date: | | |
| 1 CO FICTION | ъу: | *************************************** | | Date | | |

CABRERA SERVICES, INC.

AP-008-04 Radiation Exposure Record

| Name: | | | | SSN: | | | | |
|----------------------|--|--------------------------|--|-----------------|-----------------|---|---------------|--|
| Birth Date: | | | | | | | | |
| TLD Badge I | No.: | | | | | | | |
| Quarterly Wi | nole Bod | y Dose: 1 | st | 2 nd | 3 rd | 4 ^{sh} | | |
| Lifetime Who | Lifetime Whole Body Dose Equivalent:(Rem) Monitoring Year: | | | | | | | |
| Monitoring Period | Whole Body (DDE) | Shallow Dose (SDE) | Dose Dose Dose Effective Equivalent - (SDE) (LDE) (CDE) Dose (DDE+CEDI | | | Total Effective Dose Equivalent – Rem (DDE+CEDE) TEDE/Cumulative | | |
| January | | | | | | | | |
| February | | | | | | | | |
| March | | | | | | | | |
| April | | | | | | | | |
| May | | | | | | | | |
| June | | | : | | | | | |
| July | | • | | | | | | |
| August | | | | | | | | |
| September | | | | | | | | |
| October | | | | | | | | |
| November | | | | , | | | | |
| December | | | | | | | | |
| Yearly Totals | | | | | | | | |
| Notes: | | | | . — | | - | | |
| N/M = Not Mo | nitored | | | | | | | |
| Reviewed | | | | | | Date: | | |
| RSO: | | | | | | Date: | | |
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AP-008-05 OCCUPATIONAL RADIATION EXPOSURE HISTORY

| Name: | SSN: |
|---|---|
| Address: | |
| | |
| | |
| Date of Birth: | |
| The above individual was monitored by: | TLD: Direct Reading Dosimeter: |
| This is a: | Record: Estimate: |
| Monitoring Device Number: | _ |
| The monitoring period was: From: | To: |
| The Occupational Radiation Exposure was | received during: |
| Assignment for: | License No.: |
| Address: | |
| City/State/ZIP: | |
| Telephone: | |
| RADIATION EX | POSURE RESULTS |
| Deep Dose Equivalent for the period stated | above:Rem (DDE) |
| Shallow Dose (skin) for the period stated ab | ove:Rem (SDE) |
| Extremity Dose for the period stated above: | Rem (SDE) |
| Eye Dose Equivalent for the period stated at | oove:Rem (LDE) |
| Committed Effective Dose Equivalent (Intern | al):Rem (CEDE) |
| Total Effective Dose Equivalent (DDE + CEI | DE): Rem (TEDE) |
| This report is furnished to you under the provision CFR Part 20 titled "Standards for Protection Aga further reference. | ns of Nuclear Regulatory Commission Regulation 10 inst Radiation". You should preserve this report for |
| Radiation Safety Officer: | Date: |
| AP-008 CABRERA | SERVICES, INC. Page 15 of 16 |

AP-008-06 DRD Dose Tracking Log

| Name | Date | DRD Serial No. | Time In | Dose in | Time Out | Dose Out | Net Dose |
|------|------|-------------------|------------|------------|-------------|-------------|-------------|
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| Reviewed: | | Date: |
|-----------|------------------------|---------------|
| RSO: | | Date: |
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1.0 PURPOSE

This procedure provides the methods for operating alpha/beta survey meters when performing contamination surveys. Adherence to this procedure will provide reasonable assurance that the surveys performed have reproducible results.

2.0 APPLICABILTY

This procedure will be used by Cabrera Services, Inc. (CABRERA) personnel to measure fixed and removable alpha and/or beta emitting radioactive material on facility surfaces, equipment, waste packages, personnel, personnel protective clothing, etc.

3.0 PRECAUTIONS, LIMITATIONS, AND REQUIREMENTS

- 3.1 Precautions
 - 3.1.1 Ensure that the thin Mylar or mica window on the probe face is protected from punctures during survey operations.
 - 3.1.2 If any instrument inconsistencies are observed (e.g., unusually high or low background readings, source checks outside the acceptable range, etc.), remove the instrument from use, label it "OUT OF SERVICE" and report the condition to the Radiation Safety Officer (RSO) or duly authorized representative.
- 3.2 Limitations

None

- 3.3 Requirements
 - 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
 - 3.3.2 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.
 - 3.3.3 Survey instrument calibrations shall be performed by an NRC or Agreement State licensed calibration facility.

4.0 REFERENCES

RSP Radiation Safety Program
AP-001 Record Retention
OP-001 Radiological Surveys
OP-009 Use and Control of Radioactive Check Sources

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area containing radioactive material(s) to which access is controlled to protect individuals from exposure to ionizing radiation.
- 5.2 Alpha/Beta Contamination Survey A survey technique to determine fixed and removable alpha/beta contamination.
- 5.3 Acceptance Range A range of values that describe an acceptable daily instrument source check result.

6.0 EQUIPMENT

- 6.1 For Alpha Surveys Ludlum Model 43-5 probe and Ludlum Model 3 survey meter or equivalent meter/probe combination.
- 6.2 For Beta Surveys Ludlum Model 44-9 probe and Ludlum Model 3 survey meter or equivalent meter/probe combination.

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating contamination survey meters are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of contamination survey meters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT operating contamination survey meters are responsible for knowing and complying with this procedure.

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Select the contamination survey meter and probe to be used in the survey.
 - 8.1.2 Before each use, perform the following checks:
 - 8.1.2.1 Verify the instrument has a current calibration label.
 - 8.1.2.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.2.3 Position the meter switch to "BAT". Check to see that the needle falls within the "Bat Test" checkband.
 - If the needle falls below the "Bat Test" checkband, install new battery(s).
 - If the needle still falls outside the "Bat Test" checkband after the installation of new battery(s), tag the instrument "Out of Service" and notify the RSO or duly authorized representative.
 - 8.1.2.4 Check alpha detectors for light leaks by pointing the mylar window of the detector toward a light source and observing no change in the meter indication.
 - 8.1.3 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.2.1 through 8.1.2.44 and notify the RSO or duly authorized representative.

NOTE:

Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or duly authorized representative be notified.

- 8.2 Pre-operation of instrument
 - 8.2.1 Position the meter fast/slow ("F/S") switch to "S".
 - 8.2.2 Position the meter switch to the appropriate range scale.
 - 8.2.3 Obtain an OP-020-01 Form.
 - 8.2.4 If a Quality Control (Q.C.) acceptance range has not already been calculated on the OP-020-01 Form, then follow the instructions below, other wise proceed to step 8.2.5.

- 8.2.4.1 Ensure the source and detector are in documented reproducible positions, which will be used each time this check is performed. Document this position on Form OP-020-01.
- 8.2.5 Place the QC check source and detector in the documented position on Form OP-020-01.
- 8.2.6 Allow the instrument reading to stabilize (approximately 30 seconds). Compare the reading to the response check criteria on Form OP-020-01. If the response reading falls outside of the acceptance range, tag the instrument "Out of Service" and notify the RSO or duly authorized representative.
- 8.3 Contamination Survey Techniques

Caution:

The window area of alpha detectors are covered with a very thin (1 mg/cm²) aluminized Mylar window and beta detector windows are 1.7 mg/cm² mica. Either window can be easily when surveying areas, which have protruding fragments that might puncture the detector face. Remove these fragments before performing surveys.

Note:

To maintain the calibrated detection efficiency, the detector must be held at the appropriate height, determined during calibration, when surveying. For example, if a beta probe's efficiency was calculated at 1/2 inch from the calibration source, the detector must be held at 1/2 inch from the surface being surveyed to maintain calibrated detection efficiency.

Note:

Avoid contacting the detector probe to the area being surveyed. This potentially could contaminate the probe.

- 8.3.1 Verify the instrument selector switch is in the X 0.1 position.
- 8.3.2 For a stationary reading, place the detector over the area to be measured and allow meter to stabilize. Record the average meter indication in either CPM α/PA (probe area) or CPM β/PA on applicable forms.
- 8.3.3 For a scan survey move the detector slowly over the surface (less than one detector width per second). Observe meter indication. If increased readings are observed return to the area and obtain a stationary reading. Record maximum area meter indication in either CPM α/PA or CPM β/PA, on applicable forms.

8.4 Final Verification

Upon completion of work activities, repeat steps 8.1.2.1 through 8.2.2.4 and

8.2.5 through 8.2.6, as a final verification that the instrument is working properly

8.5 Interpretation of Results

The meter reading on the alpha and beta survey meters must be corrected for detector efficiency and detector surface area before comparing results with the contamination units in Section 3.6 of the Radiation Safety Program. The conversion from CPM α /PA or CPM β /PA to DPM α /100 cm² or β /100 cm² is performed using the following equation.

$$(DPM /100 cm^2) = \frac{(AxB)}{C}$$

Where:

- A = Alpha or Beta survey meter indication in net CPM α /PA or β /PA (i.e. Gross Alpha or Beta Survey Counts minus background counts = Net CPM/PA)
- B = 100 cm² divided by the effective detector surface area in cm². With an effective surface area of 50 cm² for the Ludlum 43-5 alpha detector, the value of B is approximately 2 or for the 15 cm² for the Ludlum 44-9 beta detector, the value of B is approximately 6.7.
- C = Detector efficiency (expressed as decimal).

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The health physics technician performing the survey shall ensure that this procedure is the most current and approved revision.
- 9.2 Records
 - 9.2.1 Documented information shall be legibly written in ink.
 - 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
 - 9.2.3 The HPT performing the survey shall review Form OP-020-01 and any other applicable forms for accuracy and completeness.
 - 9.2.4 Entries on Form OP-020-01 and any other pertinent forms must be dated and initialed by the HPT performing the survey to be valid.

9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

OP-020-01 Survey Meter Source Check

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Operation of Contamination Survey Meters

Survey Meter Source Check Form

| Instrument: | | | | Serial | No.: |
|-------------|-------------|---------|--------------|--------------------|-------------------------------|
| Source: | | | Acceptable R | lange: | _ to |
| | Date | Cal Due | Reading | H.P. Technician | H.P. Technician Initial |
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OP-020-01

Cabrera Services, Inc.

Page 7 of 7

1.0 PURPOSE

This procedure provides instruction on the operation and setup of an alpha/beta sample counter. Adherence to this procedure will provide reasonable assurance that the surveys performed have reproducible results.

2.0 APPLICABILITY

This procedure will be used by Cabrera Services, Inc., (CABRERA) personnel operating an alpha/beta sample counter during surveys. Types of surveys that may use an alpha/beta sample counter are:

- Smear surveys performed to determine the removal of alpha and beta contamination on facility surfaces, equipment, waste, and source packages, etc.
- Air sample surveys performed in a workers breathing zone to determine alpha and beta air concentrations.

3.0 PRECAUTIONS, LIMITATIONS, AND REQUIREMENTS

3.1 Precautions

- 3.1.1 If any instrument inconsistencies are observed (e.g., unusually high or low background counts, source checks outside the tolerance range, etc.), remove the instrument from use and report the condition to the RSO or duly authorized representative.
- 3.1.2 Individuals performing work with an alpha/beta counter shall be familiar with the requirements set forth in the current and approved version of this procedure.

3.2 Limitations

3.2.1 This instrument should be set up for use in low background area as determined by the RSO or duly authorized representative.

3.3 Requirements

- 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
- 3.3.2 Survey instrument calibrations shall be performed by an NRC or Agreement State licensed calibration facility.

3.3.3 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.

4.0 REFERENCES

| RSP | Radiation Safety Program |
|--------------------------------|--|
| AP-005 | ALARA Program |
| AP-001 | Record Retention |
| AP-013 | Packaging Radioactive Material |
| • OP-001 | Radiological Surveys |
| NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Smear sample survey a technique using a two-inch diameter filter papers to determine removable contamination of alpha and/or beta emitting radioactive material.
- 5.3 Air sample survey a technique in which particulates are collected from a known volume of air drawn through a filter paper and concentrations of airborne alpha and beta activity associated with the particulates is determined by sample counting.
- 5.4 Plateau portion of a voltage curve where changes in operating voltage introduce minimum changes in the counting rate.
- 5.5 Chi-square test A statistical test to evaluate the operation of a sample counter by determining how data fit a series of counts to a Poisson distribution.
- 5.6 Daily calibration A determination of alpha and beta sample counting efficiency by counting National Institute of Standard Technologies (NIST) radioactive standards.

6.0 EQUIPMENT

Ludlum model 2929 or equivalent

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating alpha/beta sample counters are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of alpha/beta sample counters described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT using alpha/beta sample counters are responsible for knowing and complying with this procedure.

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Before each use, perform the following checks:
 - 8.1.1.1 Verify the instrument has a current calibration label.
 - 8.1.1.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.2 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.1.1 through 8.1.1.2 and notify the RSO or his duly authorized representative.

NOTE:

Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or his duly authorized representative be notified.

- 8.2 Initial Startup.
 - 8.2.1 Turn high voltage potentiometer to its lowest position (fully counterclockwise).
 - 8.2.2 Turn instrument on.

- 8.2.3 The operator can select one of four operational procedures depending on the function to be performed. Before performing any of the following complete steps 8.1.1 to 8.1.2.
 - a) Plateau Curve The Plateau Curve is used to find the proper operating voltage of the instrument and will be performed at the discretion of the RSO or duly authorized representative. This test shall be documented on the attached Form CP-021-01 or equivalent.
 - b) Chi-square Test The Chi-Square Test will be performed at the discretion of the RSO or duly authorized representative in order to test the operational adequacy of the instrument and will be recorded on Form OP-021-02. This test statistically evaluates the sample counter against a poisson distribution.
 - c) Daily Calibration Check This portion of the procedure is performed before samples are counted on any day the instrument is in use.

8.3 Plateau Curve

NOTE: Before

Before beginning, record the previous calibration high voltage values.

- 8.3.1 Set up the instrument in a low background area.
- 8.3.2 Rotate the high voltage potentiometer slowly clockwise until the meter indicates proper voltage. This proper voltage is approximately 500 volts.
- 8.3.3 Set time multiplier switch to "x1."
- 8.3.4 Set the instrument-preset timer to one (1) minute.
- 8.3.5 Insert an alpha calibration standard into the center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a one minute count.
- 8.3.6 Upon completion of the count, record high voltage reading and digital counts appearing in the instrument alpha display in the indicated columns on Form OP-021-01(Plateau Data Sheet)
- 8.3.7 Continue increasing high voltage by 50-volt increments, as described above, obtaining counts and recording data until the end of the plateau is reached. If rapid increase in count rate is observed, proceed to step 8.3.8. If not, notify the RSO or duly authorized representative.

- 8.3.8 Remove the alpha source and replace with a beta source.
- 8.3.9 Reduce high voltage reading to the voltage level chosen during Step 8.3.2 by turning potentiometer counterclockwise.
- 8.3.10 Perform one-minute counts at 50-volt increments and record the data on Form OP-020-01, until the end of the plateau is reached. If a rapid increase in count rate is observed reduce the high voltage.
- 8.3.11 Using linear graph paper or equivalent plotting system, plot alpha and beta counts on the "Y" axis and the voltage for the indicated count on the "X" axis.
- 8.3.12 Select an operating voltage 1/3 the distance beyond the knee of the plateau curve by marking the voltage on the graph and on the plateau data sheet.
- 8.3.13 Sign and date Form OP-021-01 and forward the results along with any graphs produced to the RSO or duly authorized representative for review.

8.4 Chi-Square Test

- 8.4.1 Set up the Instrument in a low background area.
- 8.4.2 Ensure the high voltage potentiometer is positioned according to the posted instrument label. Adjust if necessary.
- 8.4.3 Set the time multiplier switch to "x1".
- 8.4.4 Set the instrument-preset timer to one (1) minute.
- 8.4.5 Insert the alpha calibration standard into center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a one minute count.
- 8.4.6 Upon completion of the count, record digital counts appearing in the alpha display in the "X_i" column on Form OP-021-02 (Chi -Square Data Sheet).
- 8.4.7 Repeat counting sequence without changing settings until a total of 20 counts have been taken and recorded in the "X_i" column on Form OP-021-02.
- 8.4.8 Add the 20 counts recorded in the " X_i " column and record in the "Sum" column. Then divide by 20 to obtain the mean number of counts (X_m) and record on the line " X_m ".

- 8.4.9 Calculate the individual count "X_i" difference from the mean (X_m) value and record in the "(X_i-X_m)" column on Form OP-021-02 for all 20 values.
- 8.4.10 Calculate $(X_i-X_m)^2$, sum the " $(X_i-X_m)^2$ " column, and record on Form OP-020-02.
- 8.4.11 Calculate the value of Chi- Square using the following formula.

$$X^2 = \frac{\sum (X_i - X_m)^2}{X_m}$$

- 8.4.12 The value of Chi-square should be between 8.91 and 32.8 (represents a probability between 0.025 and 0.975). Record this value at "X2". If the Chi-square value falls outside this range, contact the RSO or duly authorized representative for further instructions.
- 8.4.13 Sign and date Form OP-021-02 and forward the results to the RSO or duly authorized representative for review.
- 8.5 Daily Calibration Check
 - 8.5.1 Ensure the high voltage potentiometer is positioned according to the posted instrument label. Adjust, slowly, if necessary.
 - 8.5.2 Set time multiplier switch to "x1".
 - 8.5.3 Set the instrument-preset timer to five (5) minutes.
 - 8.5.4 Record the source type to be used and corresponding serial number on the proper line indicated on Form OP-021-03. Use separate rows of the form for each source efficiency to be calculated.
 - 8.5.5 Insert a blank sample into the center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a five minute background count.
 - 8.5.6 Calculate and record the background total counts and count rate in the columns labeled "Total Counts" and "BKG CPM" respectively, under Background Information on Form OP-021-03. The background count rate in CPM (counts per minute) can be calculated as follows:

$$CPM = \frac{Total Counts}{Total Time}$$

- 8.5.7 Remove the blank sample and insert the alpha or beta calibration standard into the center of the sample tray, slide the sample tray under the detector and depress the "COUNT" button to obtain a five minute count.
- 8.5.8 Upon completion of the measurement, calculate and record the total counts and count rate in the columns labeled "Total Counts" and "CPM" respectively, under Source Information on Form OP-021-03. The count rate (CPM) can be calculated as listed in Step 8.5.6.
- 8.5.9 Calculate Net Source CPM as below and record on Form OP-021-03 under "Net CPM".

Net Source CPM = CPM - BKG CPM

NOTE:

Obtain activity (DPM) value from the source certification paperwork. Decay correct activity, if needed.

8.5.10 Use the source disintegration per minute (DPM) to calculate the efficiency as shown below and record as a decirnal on Form OP-021-03.

% Efficiency=
$$\frac{Net Source CPM}{DPM}$$
*100

- 8.5.11 To calculate the efficiency for the next source, remove the current source standard, insert a new source standard and repeat steps 8.5.1 through 8.5.10, as necessary.
- 8.5.12 Remove calibration standards and place in source holders.
- 8.5.13 Generate a control chart tracking the daily efficiencies and notify the RSO or duly authorized representative if any point falls outside of 2σ variance.
- NOTE: For the first day on control chart use five data points to begin trend line.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The alpha/beta sample counter will be checked for proper calibration daily with a NIST traceable source when in use.
 - 9.1.2 Chi-square and plateau tests are verified and noted as currently valid.

9.1.3 The HPT shall ensure that the attachments are of the most current.

9.2 Records

- 9.2.1 Documented information shall be legible written in ink.
- 9.2.2 Data shall not be obliterated by erasing or using white-out. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed and dated.
- 9.2.3 The HPT shall review completed attachment forms for accuracy and completeness.
- 9.2.4 Entries on forms must be dated and initialed by the HPT to be valid.
- 9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

| • | OP-021-01 | Plateau Data Sheet |
|---|-----------|-------------------------|
| • | OP-021-02 | Chi-Square Data Sheet |
| • | OP-021-03 | Daily Calibration Check |

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OP-021-01

Plateau Data Sheet

| Date: | | _ Reco | Recommended Operating Voltage: | | | | | | | | |
|--------------------|--|--------------------|--------------------------------|--------------------|----------------|--------------------|----------------|--|--|--|--|
| Instrument | : <u> </u> | | Serial Number: | | | | | | | | |
| | | | | Acti | vity (dpm) | | | | | | |
| Beta Sourc | e Serial No | • | | Acti | vity (dpm) | · | | | | | |
| Voltage Setting | Alpha Counts | Voltage Setting | Alpha Counts | Voltage Setting | Beta Counts | Voltage Setting | Beta Counts | | | | |
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| Prepared E | ly: | | Print/Sign | | | Date: | | | | | |
| Reviewed I | Print/Sign Reviewed By: Date: Print/Sign | | | | | | | | | | |
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| OP-021-01 | | (| Cabre ra S ei | vices, Inc. | | Pε | ige 9 of 11 | | | | |

OP-021-02

Chi-Square Data Sheet

| Date:In | strument: | | Serial Number: | X ² | | |
|----------------|-----------|---------------------------|-----------------------------------|----------------|--|--|
| | | Beta Source No./Activity: | | | | |
| Count Numbe | er | Xi | (X ₁ -X _m) | $(X_i-X_m)^2$ | | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
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| Sum | | | <i></i> | | | |
| X _m | | | | | | |
| Prepared By: | | | Dat | te: | | |
| | | Print/Sig | n | | | |
| Reviewed By: | | Print/Sig | int/Sign | | | |
| OP-021-02 | | | ervices, Inc. | Page10 of 11 | | |

OP-021-03

Daily Calibration Check

| mandment_ | | | instrumentSerial No | | | | | | | |
|---------------------------------------|--|---|---------------------|---------------|-----------------|-------------|------------|---|--|--|
| Alpha Source | Alpha Source No./Activity Beta Source No./Activity | | | | | | | | | |
| Background Information | | | Source Information | | | | | | | |
| Date/Time | Total Time | Total Counts | BKG CPM | Total Time | Total Counts | CPM | Net CPM | % Eff. | | |
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| OP-021-04 | | | Cahrer | a Sarvica | s. Inc. | | Poss | 11 06 11 | | |

1.0 PURPOSE

This procedure provides the methods for operating ion chamber instruments for dose rate surveys. Adherence to this procedure will provide reasonable assurance that the radiological surveys performed have reproducible results.

2.0 APPLICABILITY

This procedure will be used by Cabrera Services, Inc. (CABRERA) CABRERA personnel to operate Ionization chambers during dose rate surveys.

3.0 PRECAUTIONS, LIMITATIONS, AND REQUIREMENTS

- 3.1 Precautions
 - 3.1.1 During surveys, exercise care not to puncture the thin Mylar window.
 - 3.1.2 If any instrument inconsistencies are observed (e.g., unusually high or low background readings, source checks outside the acceptable range, etc.), remove the instrument from use, label it "OUT OF SERVICE" and report the condition to the RSO.
- 3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
 - 3.3.2 Survey instrument calibrations shall be performed by a NRC or Agreement State recognized and licensed calibration facility.
 - 3.3.3 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.

4.0 REFERENCES

| • | RSP | Radiation Safety Program |
|---|------------|--|
| • | ALARA | ALARA Program |
| • | AP-001 | Record Retention |
| • | OP-001 | Radiological Surveys |
| • | OP-009 | Use and Control of Radioactive Check Sources |
| ٠ | NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Radiation Area Any area accessible to personnel where dose rate levels from ionizing radiation are such that an individual could receive a deep dose equivalent in excess of 5 mrem in one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.
- 5.3 Dose The deposition of energy in matter. Equivalent to the radiation dose times the quality factor for the type of radiation.
- 5.4 Quality Factor The factor, which is radiation dependent and identifies the relative biological effectiveness of a radiation type and energy. The quality factor is multiplied times the Dose to yield the Dose Equivalent.
- 5.5 TEDE The Total Effective Dose Equivalent The sum of the Deep Dose Equivalent (external dose) and the Committed Effective Dose Equivalent (internal dose).
- 5.6 CDE Committed Dose Equivalent The dose equivalent to organs or tissues that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.
- 5.7 CEDE Committed Effective Dose Equivalent The sum of the products of all organs or tissues with CDE and their respective weighting factors.
- 5.8 SDE Shallow Dose Equivalent Applies to the skin and to any extremity, it is used for external radiation which cause primary energy deposition in the first 0.007 cm of tissue averaged over one square centimeter.
- 5.9 EDE- Eye Dose Equivalent The dose delivered to a thickness of tissue 300 mg/cm² by external radiation.
- 5.10 DDE Deep Dose Equivalent The dose equivalent delivered by external radiation to tissues deeper than 1 centimeter.
- 5.11 Daily calibration A determination of alpha and beta sample counting efficiency by counting National Institute of Standard Technologies (NIST) radioactive standards.

6.0 EQUIPMENT

Ludlum model 9 Ionization Chamber or equivalent

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating ionization chambers are familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the use of ionization chambers described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT using ionization chamber survey meters are responsible for knowing and complying with this procedure.

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Select the ion chamber to be used in the survey.
 - 8.1.2 Before each use, perform the following checks:
 - 8.1.2.1 Verify the instrument has a current calibration label.
 - 8.1.2.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.2.3 Position the meter switch to "BAT". Check to see that the needle falls within the "Bat Test" check-band.
 - If the needle falls below the "Bat Test" check-band, install new battery(s).
 - If the needle still falls outside the "Bat Test" check-band after the installation of new battery(s), tag the instrument "Out of Service" and notify the RSO or duly authorized representative.
 - 8.1.3 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.2.1 through 8.1.2.3 and notify the RSO or duly authorized representative.

NOTE:

Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or duly authorized representative be notified.

- 8.2 Pre-operation of instrument
 - 8.2.1 Position the meter fast/slow ("F/S") switch to "S".
 - 8.2.2 Position the meter switch to the appropriate range scale.
 - 8.2.3 Obtain an OP-020-01 Form.
 - 8.2.4 If a Quality Control (Q.C.) acceptance range has not already been calculated on the OP-020-01 Form, then follow the instructions below, other wise proceed to step 8.2.6.
 - 8.2.5 Enter the QC check source, probe, and meter numbers on Form OP-020-01.
 - 8.2.5.1 Ensure the source and detector are in a reproducible geometry, which will be used each time this check is performed.
 - 8.2.5.2 Obtain ten separate measurements in a low background area.
 - 8.2.5.3 Calculate the average of the ten measurements by adding the measurements and dividing the sum by ten.
 - 8.2.5.4 Multiply the average measurement value established in 8.2.5.3 by 0.8 and record on Form OP-020-01 as the lower QC acceptance range.
 - 8.2.5.5 Multiply the average measurement value established in 8.2.5.3 by 1.2 and record on Form OP-020-01 as the upper QC acceptance range.
 - 8.2.6 Place the QC check source and detector in the proper geometry established for QC check.
 - 8.2.7 Allow the instrument reading to stabilize (approximately 30 seconds). Compare the reading to the response check criteria on Form OP-020-01. If the response reading falls outside of the acceptance range, note Fail on Form OP-020-01, tag the instrument "Out of Service" and notify the RSO or duly authorized representative. If the reading falls inside the acceptance range, note Pass on Form OP-020-01; the instrument is ready for performing surveys.

8.3 Operation of Instrument

- 8.3.1 Gamma Survey Techniques
 - 8.3.1.1 Switch the audio toggle switch to the "ON" position.
 - 8.3.1.2 Ensure the beta shield is covering the Mylar window.
 - 8.3.1.3 When entering a radiation area of unknown radiation levels turn the range selector switch to the highest scale or the highest scale for the dose rate expected. Rotate the range selector switch downscale until an upscale meter needle deflection is observed.
 - 8.3.1.4 When obtaining a gamma exposure rate place the entire detector volume in and perpendicular to the radiation field.
 - 8.3.1.5 Gamma exposure rates are obtained in the area where a worker will be located during work activities. If only a position of the workers body will be exposed to the field, the highest exposure rate will be used to determine working time.
 - 8.3.1.6 Gamma exposure rates on waste packages are obtained by placing the centerline of the detector at the indicated distance from the package and perpendicular to the radiation field.
 - 8.3.1.7 Record the highest meter indication in mR/hr and its location on the forms provided in procedure OP-001.
- 8.3.2 Survey techniques for Lens of Eye Dose

For lens of eye equivalent doses, record the dose for the beta shield in the closed configuration if the shield is 300 mg/cm² thick or less. If the beta shield is greater than 300 mg/cm², then conservatively use the beta shield in the open configuration to record equivalent dose for the lens of the eye.

8.3.3 Beta Survey Technique

Caution:

The window area of the detector is covered with a 7 mg/cm² aluminized Mylar covering and can be easily punctured. Avoid protruding fragments that might puncture the detector face.

8.3.3.1 When a higher reading is obtained with the beta shield open compared with the beta shield closed, this indicates the presence of beta radiation.

- 8.3.3.2 To obtain the beta dose first obtain a reading with the beta shield closed (CW) as described in Section 8.3.1. Next, obtain a reading with the beta shield open (OW) at the same location holding the meter in the same configuration.
- 8.3.3.3 Determine the beta dose using the following formula:

True β Dose = (OW – CW) x BCF

Where:

OW = Open Window reading (beta shield open)

CW = Closed Window reading (beta shield closed)

BCF = Beta Correction Factor (5 for reading taken at 4 centimeters - use with caution this is isotope dependent)

- 8.3.3.4 Beta dose rates to the skin or lens of the eye are obtained in the area where workers will be located during work activities. If only a portion of the workers body will be exposed to the field, the highest exposure rate will be used to determine working time.
- 8.3.3.5 Beta dose rates to the skin are obtained by obtaining measurement at 4 centimeters from the surface contacted by the worker.
- 8.3.3.6 Record the beta dose rates in mrad/hr (β) and location on the forms provided in procedure OP-001.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The health physics technician performing the survey shall ensure that this procedure is current.
- 9.2 Records
 - 9.2.1 Documented information shall be legibly written in ink.
 - 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
 - 9.2.3 The HPT shall ensure that the attachments are of the most current.

- 9.2.4 The HPT shall review completed attachment forms for accuracy and completeness.
- 9.2.5 Entries on forms must be dated and initialed by the HPT to be valid.
- 9.2.6 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

None

1.0 PURPOSE

The purpose of this procedure is to provide instruction for the operation of the micro-R meter for gamma radiation surveys. Adherence to this procedure will provide reasonable assurance that the radiological surveys performed have reproducible results.

2.0 APPLICABILITY

This procedure will be used by Cabrera Services, Inc. (CABRERA) personnel operating the micro-R meter during gamma radiation surveys. The micro-R meter is used to determine gamma radiation levels from facility surfaces, equipment, waste and source packages, etc., containing gamma emitting radioactive materials.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

- 3.1.1 Individuals performing work with the micro-R meter shall be familiar with the requirements set forth in the current and approved version of this procedure.
- 3.1.2 If any instrument inconsistencies are observed (e.g., unusually high or low background readings, source checks outside the acceptable range, etc.), remove the instrument from use, label it "OUT OF SERVICE" and report the condition to the Radiation Safety Officer (RSO) or duly authorized representative.

3.2 Limitations

None

3.3 Requirements

- 3.3.1 Calibration sources shall be traceable to the National Institutes of Science and Technology (NIST).
- 3.3.2 A battery check, general observation of instrument condition and source check shall be performed each day before instrument use and daily following work activities as a final verification.
- 3.3.3 Survey instrument calibrations shall be performed by an NRC or Agreement State licensed calibration facility.

4.0 REFERENCES

| • | RSP | Radiation Safety Program |
|---|------------|--|
| • | ALARA | ALARA Program |
| • | AP-001 | Record Retention |
| • | OP-001 | Radiological Surveys |
| • | OP-009 | Use and Control of Radioactive Check Sources |
| • | OP-020 | Operation of Contamination Survey Meters |
| • | NUREG-1556 | Consolidated Guidance About Material Licenses (Vol.11) |

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area to which access is controlled to protect individuals against undue risks from exposure to radiation and radioactive materials.
- 5.2 Gamma Radiation Survey A survey technique to determine gamma radiation levels from radioactive material(s) in facilities, materials, landmasses, etc.
- 5.3 Acceptance Range A range of values that describe an acceptable daily instrument source check result.

6.0 EQUIPMENT

Ludlum Model 19 or equivalent

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of operating a micro-R meter is familiar with this procedure, adequately trained in the use of this procedure, and have access to a copy of this procedure.
- 7.2 Radiation safety Officer (RSO) The RSO is responsible for verifying that personnel comply with this procedure and are trained in the operation of a micro-R meter described in this procedure.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT operating the micro-R meter are responsible for knowing and complying with this procedure.

7

8.0 OPERATION

- 8.1 Instrument Inspection
 - 8.1.1 Before each use, perform the following checks:
 - 8.1.1.1 Verify the instrument has a current calibration label.
 - 8.1.1.2 Visually inspect the instrument for physical damage or defects.
 - 8.1.1.3 Position the meter switch to "BAT". Check to see that the needle falls within the "Bat Test" checkband.
 - If the needle falls below the "Bat Test" checkband, install new battery(s).
 - If the needle still falls outside the "Bat Test" checkband after the installation of new battery(s), tag the instrument "Out of Service" and notify the RSO or duly authorized representative.
 - 8.1.2 Remove and tag the instrument "Out of Service" if it fails any of the criteria in Step 8.1.1.1 through 8.1.1.3 and notify the RSO or duly authorized representative.
- NOTE:

Any defects, damages or other physical abnormalities require that the instrument be removed from service and the RSO or duly authorized representative be notified.

- 8.2 Pre-operation of instrument
 - 8:2.1 Position the meter fast/slow ("F/S") switch to "S".
 - 8.2.2 Position the meter switch to the appropriate range scale.
 - 8.2.3 If a Quality Control (Q.C.) acceptance range has not already been calculated, then follow the instructions below, other wise proceed to step 8.2.5.
 - 8.2.3.1 Ensure the source and detector are in documented reproducible positions, which will be used each time this check is performed. Document this position on appropriate form.
 - 8.2.4 Place the QC check source and detector in the documented position on appropriate form.

- 8.2.5 Allow the instrument reading to stabilize (approximately 30 seconds). Compare the reading to the response check criteria. If the response reading falls outside of the acceptance range, tag the instrument "Out of Service," and notify the RSO or duly authorized representative.
- 8.3 Operation of the instrument
 - 8.3.1 Grid Surveys
 - 8.3.1.1 Turn the audio switch to the "On" position.
 - 8.3.1.2 Verify the instrument selector switch is on the lowest scale (usually the μR position). Turn the instrument selector switch to the next higher scale only if meter indication is off scale.
 - 8.3.1.3 For a stationary grid reading in a facility or land mass, position the instrument one meter above the surface to be surveyed and allow meter to stabilize. With the instrument toggle switch set in the "SLOW" position, the meter reaches 90% of its final reading in 22 seconds. Record the average meter indication in μR/hr on appropriate form(s).

Note:

Two survey methods (step 8.3.1.4 or 8.3.1.5) can be used to obtain contact readings in the survey grids. The survey method used will be specified in the site specific work plan.

8.3.1.4 For a scan survey, make sure the meter response is set to fast and suspend the instrument from a strap which locates the detector at surface or ground level. Move the instrument slowly over the surface while walking in an "S" pattern unless otherwise instructed by the RSO or duly authorized representative. Areas, which could concentrate radioactive materials such as drainage ditches, floor cracks, and wall/floor joints, should be surveyed. Observe meter indication and listen for increases in audible clicks from the speaker. If elevated readings above background are observed, a stationary survey shall be performed (at onemeter height and at the surface) at the point of elevated activity. Record area meter indications above background in μR/hr on appropriate form.

8.3.1.5 As an alternate to the "S" pattern survey used in step 8.3.1.4, the survey grid can be divided into subgrids and readings taken as directed by the site work plan. Elevated measurements should be performed in the same manner as above (i.e., at one meter and at the surface). The readings from each measurement are recorded on appropriate form.

8.3.2 Waste Container Surveys

- 8.3.2.1 Set the instrument scale to accommodate the highest expected radiation level. If radiation levels may approach 5000 μR/hr (5 mR/hr) obtain an instrument with appropriate range before performing any radiation surveillance.
- 8.3.2.2 Slowly scan the total surface of the package and record the maximum contact reading obtained on appropriate forms.
- 8.3.2.3 Obtain instrument readings at one meter from all sides of the package and record the maximum reading obtained on appropriate form.

8.3.3 Final Verification

Upon completion of work activities, repeat steps 8.1.1.1 through 8.2.2 and 8.2.4 through 8.2.5, as a final verification that the instrument is working properly

8.3.4 Additional Information

- 8.3.4.1 In a uniform background radiation field (without interfering sources of radiation), methods such as selectively shielding the detector, soil sample analysis, etc., can be used to differentiate between extraneous radioactive sources (e.g., skyshine or radioactive waste shipment containers), naturally occurring radioactive material and/or radioactive contamination.
- 8.3.4.2 Note the location of installed devices, which contain radioactive material and could cause elevated background radiation levels in localized areas.
- 8.3.4.3 Land mass surveys might contain areas with naturally occurring radioactive materials, which will elevate background radiation levels.

9.0 QUALITY ASSURANCE/RECORDS

9.1 Quality Assurance

9.1.1 The health physics technician performing the survey shall ensure that this procedure is current.

9.2 Records

- 9.2.1 Documented information shall be legibly written in ink.
- 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
- 9.2.3 The health physics technician performing the survey shall review appropriate forms and any other applicable forms for accuracy and completeness.
- 9.2.4 Entries must be dated and initialed by the health physics technician performing the survey to be valid.
- 9.2.5 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

None

1.0 PURPOSE

This procedure provides the methods Cabrera Services, Inc. (CABRERA) uses in operation of air samplers and calculation of radioactive particulate activity in air sample. This procedure describes the methods used to calculate Derived Air Concentration (DAC) DAC-hour exposures to workers. Adherence to this procedure will provide reasonable assurance that the surveys performed have accurate and reproducible results.

2.0 APPLICABILITY

This procedure will be used by CABRERA personnel to operate air samplers during surveys and work activities at customer facilities, calculate, and record DAC-Hour exposures to workers. Air samples are performed when the average alpha and beta contamination on facility surfaces, equipment and waste packages exceed the contamination limits specified in Table 1 of the Radiation Protection Manual (RPM) and included as Attachment OP-002-03 of this procedure. Air monitoring shall be performed in areas where there exists potential to exceed 10 percent of any DAC.

3.0 PRECAUTIONS, LIMITATIONS AND REQUIREMENTS

3.1 Precautions

Not Applicable

3.2 Limitations

Not Applicable

- 3.3 Requirements
 - 3.3.1 Air samplers should only be operated in temperatures between –4° F to 122° F.
 - 3.3.2 Air sampler inspections shall be performed by qualified Health Physics personnel.

4.0 REFERENCES

RSP

Radiation Safety Program

AP-001

Record Retention

OP-021

Alpha-Beta Sample Counting Instrumentation

Reg Guide 8.25

Air sampling in the Workplace

NUREG-1556

Consolidated Guidance About Material Licenses (Vol.11)

5.0 DEFINITIONS AND ABBREVIATIONS

- 5.1 Restricted Area An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.
- 5.2 Smear Sample Survey A survey technique using filter paper smears to determine quantities of alpha and beta emitting radioactive material which can be removed from facility surfaces and waste packages.
- 5.3 Air Sample Survey A survey technique which collects particulates from a known volume of air and determines the concentrations of radioactive materials associated with the airborne particulates.
- 5.4 Annual Limit on Intake (ALI) The annual limit on intake (ALI) of radioactive materials is the smaller amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year (40 hours per week for 50 weeks) that would result in a committed effective dose equivalent (CEDE) of 5 rem or a committed dose equivalent (CDE) of 50 rems to any individual organ or tissue.
- 5.5 Derived Air Concentration (DAC) Derived air concentration is the concentration of a given radionuclide in air which, if breathed by "reference man" for a working year (40 hours per week for 50 weeks) under the conditions of light work (inhalation rate of 1.2 cubic meters of air per hour), results in an air intake of one ALI.
- 5.6 DAC-Hour The product of the concentration of radioactive material in air (expressed as a multiple of the derived air concentration for each nuclide) and the time of exposure to that nuclide, in hours, 2000 DAC-Hours represents one ALI.
- 5.7 Airborne Radioactivity Area A room, enclosure or area in which the radioactive material is dispersed in the form of dusts, fumes, mists, particulates, vapors and the concentration of the dispersed radioactive materials in excess of:
 - 5.7.1 The derived air concentrations (DAC's) specified in Table 1, column 3 of Appendix B, Title 10 Part 20 of the Code of Federal Regulations, or
 - 5.7.2 Concentrations such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week, an intake of 0.6 percent on the annual limit on intake (ALI) or 12 DAC-hrs.

6.0 EQUIPMENT

6.1 None

7.0 RESPONSIBILITIES

- 7.1 Project Manager (PM) the PM is responsible for ensuring that personnel assigned the task of air sampling and air sampling analysis are familiar with this procedure, adequately trained with the specific instrument being used to perform surveys.
- 7.2 Radiation Safety Officer (RSO) The RSO is responsible for monitoring compliance with this procedure and training personnel in the use of the air sampling and air sampling analysis. The RSO can also assist in the interpretation of the results obtained during surveys.
- 7.3 Radiological Field Supervisor (RFS) During field assignments, the RFS is responsible for ensuring that this procedure is implemented. When the RSO is not on site, the RFS will act as the RSO's duly authorized representative for radiological issues.
- 7.4 Health Physics Technicians (HPT) The HPT performing air sampling analysis are responsible for knowing and complying with this procedure.

8.0 INSTRUCTIONS

- 8.1 Initial Preparation
 - 8.1.1 Select the air sampler to be used for the type of sample to be used and verify that the instrument has a currently valid calibration. If the work area contains radioiodine or tritium, contact the radiation safety officer for special sampling procedures before proceeding.
 - 8.1.1.1 Area air samples are normally collected with a low volume air sampler having normal airflow of 1 CFM to 5 CFM.
 - 8.1.1.2 Breathing zone air samples are normally collected using lapel air samplers, which have a normal airflow of 1 to 5 liters per minute.
 - 8.1.1.3 All air sampling devices shall be calibrated to ensure accurate sample volumes are collected. The frequency of calibration shall not exceed one (1) year.

- 8.1.2 Attach the air sampling head to the intake of the low volume sample pump or to the tygon tubing of the Lapel sampler.
- 8.1.3 Obtain the filter paper to be used in the sample and mark the backside of the filter with a unique number, which will represent the sample. During the collection and handling of air sample filter papers, caution must be used to prevent the samples from being contaminated by other radioactive materials.
- 8.1.4 Place the filter paper in the holder and position the sampler as indicated below.
 - 8.1.4.1 Area air samples are collected by placing the sample head at a distance of 3 to 6 feet above the floor and as close to the work area as practical. If there is airflow in the work area, the sampler should be placed "down wind" of the area where workers will be resuspending radioactive particulates into the workers atmosphere.
 - 8.1.4.2 Lapel air samples are collected from workers breathing zone. The sample head is attached to the shoulder of the worker with the sample head facing forward. The tygon tubing connecting the sample head to the pump is run down the back of the worker with the sample pump attached to the workers belt.

8.2 Collecting the sample

- 8.2.1 When the sample head is in position, start the sample pump and adjust the flow rate to the highest flow rate, which can be maintained without flow rate fluctuations.
- 8.2.2 Record the time the sample was started and the initial flow rate of the sample pump on Form OP-002-01, Air Sample Data Sheet.
- 8.2.3 If possible, identify the radionuclides, which will be encountered in the work area and record the radionuclides along with the DAC for each radionuclide in the space provided on the Air Sample Data sheet. If a mixture of radionuclides is present, the DAC used in the calculations of DAC-Hours will be the most restrictive concentration.
- 8.2.4 Collect the sample for the maximum time possible, which represents the exposure encountered by the worker.
- 8.2.5 At the end of the collection period, note the flow rate of the sample pump and record this flow rate and the time, which the sampling stopped on the Air Sample Data sheet.

CAUTION: Be sure not to remove activity from the sample surface. Handle the filter with care.

- 8.2.6 Remove the sample filter and place the filter in an individual envelope or poly bag to ensure no possibility of contamination by other sources of radioactivity.
- 8.2.7 Record the names of workers who were in the area and the time spent in the work area on the Air Sample Data sheet.
- 8.2.8 Determine the average sample flow rate by adding the initial sample flow rate and the final sample flow rate and dividing by 2. Record the average flow sample flow rate in the space provided on the Air Sample Data sheet.
- 8.2.9 Calculate the total air volume sampled by multiplying the average flow rate in cubic centimeters per minute by the total minutes the sampler operated using the indicated spaces on the Air Sample Data sheet.
- 8.3 Determining minimum detectable activity (MDA) During calculations or air concentrations in the following sections, the MDA for each analysis is calculated to determine the statistical significance of the calculated air concentrations.
 - 8.3.1 For each air concentration calculation (alpha and beta) in the following sections, calculate the MDA using the following formula:

MDA in
$$\mu Ci/cm^3 = \frac{k_{\alpha}^2}{T_{s+b}} + 2\left[k_{\alpha}\right]\sqrt{\frac{R_b}{T_b} + \frac{R_b}{T_{s+b}}}$$

$$(2.22 \times 10^6)(E)(V)$$

Where:

E = Counter efficiency in CPM/DPM

R_b = Background Count Rate in CPM

T_b = Background Counting Time in Minutes

T_{s+b} = Sample Counting Time in Minutes

V = Sample Volume in cm³

2.22X10⁶ = Disintergrations per minute per microCurie (DPM/uCi)

- $k_{\alpha} = 1.645$ for a confidence level of 95% and 1.96 for a confidence level of 99%
- 8.3.2 If the MDA is larger than 10% of the Derived Air Concentration, recount the background for a longer time and/or increase the sample count time to lower the MDA. (The maximum count time should not exceed 1 hour for background and 30 minutes for the sample). Enter the MDA for each air concentration calculated in the space provided on the Air Sample Data sheet.
- 8.4 Initial Air Sample Analysis The initial analysis of air sample provides the air concentrations for short-lived radionuclides and a first estimate of the long-lived air concentrations. In situations where there is a potential for worker intakes to exceed 40 DAC-Hours in a week or if the radionuclides of interest are short-lived, air samples should be available before work resumes the following day.
 - 8.4.1 Air particulate samples are to be analyzed as a minimum for gross alpha and gross beta activity using a Ludlum Model 2929 Dual Channel Scaler or equivalent.
 - 8.4.2 Place the air sample collection media in the sample counter with the upstream collection side toward the detector. Count the air sample and calculate the sample activity and record results on appropriate form(s).
 - 8.4.3 Record the Alpha and Beta sample DPM results in the Air Sample Data sheet.
 - 8.4.4 Calculate the alpha and beta air concentrations using the following formula. Adjustment due to alpha self absorption are made as appropriate.

Air Concentration
$$(\mu Ci/cc) = \frac{\alpha \text{ or } \beta \text{ DPM}}{(2.22 \times 10^6 \text{ DPM} / \mu Ci)(Sample Volume(cm}^3))}$$

- 8.4.5 Enter the alpha and beta air concentrations on the Air Sample Data sheet in the space provided for the initial air concentrations.
- **NOTE:** If the air sample concentration is greater than 10% of the DAC value, notify the RSO or duly authorized representative for further instructions.
 - 8.4.6 If the air concentration is less than 10 percent of the most restrictive DAC, no further analysis of the air sample is required. If the air

concentration exceeds 10% of the DAC concentration, proceed with the analysis in section 8.5.

- 8.5 Air sample analysis for long-lived radionuclides This analysis allows for decay of naturally occurring radionuclides and provides for correcting air concentrations for naturally occurring radionuclides.
 - 8.5.1 Air particulate samples are analyzed following 12 hour decay, and again at 72 hours if necessary to allow for decay of radon, for gross alpha and gross beta using a Ludlum Model 2929 Dual Channel Scaler or equivalent.
 - 8.5.2 Place the air sample in the sample counter with the collection side toward the detector. Count the air sample and calculate the sample activity and record results on appropriate form(s).
 - 8.5.3 Record the Alpha and Beta sample DPM results in the Air Sample Data sheet.
 - 8.5.4 Calculate the alpha and beta air concentrations using the following formula. Adjustments due to self absorption are made as appropriate.

Air Concentration
$$(\mu Ci/cc) = \frac{\alpha \text{ or } \beta \text{ DPM}}{(2.22 \times 10^6 \text{ DPM} / \mu Ci)(Sample Volume(cm}^3))}$$

- 8.5.5 Enter the alpha and beta air concentrations on the Air Sample Data sheet in the space provided for the 12-hour decay concentrations. If the 12-hour decay air concentrations is below 10% of the DAC no further analysis is required.
- 8.5.6 If the 12-hour air concentration is above 10% percent of the DAC value, recount the air sample following 72 hours of decay from the time the sample was stopped. Calculate the air concentration using the formula in step 8.5.4 and record the air concentrations in the space provided for the 72-hour decay air concentration on the Air Sample Data sheet. If the 72-hour air concentration is below 10% of the DAC value, no further analysis is required.
- 8.5.7 If the air concentrations exceed 10% of the DAC values, notify the RSO or duly authorized representative for further instructions. Save the air sample for possible further analysis. For air samples, which

exceed 10% of the DAC values, an exposure is assigned to the workers residing in the area where the sample was taken.

- 8.6 Assignment of DAC-Hour exposures to workers
 - 8.6.1 For air samples which exceed 10% of the DAC values, calculate the workers DAC-Hour exposure using the following formula:

Exposure in DAC-Hours =
$$\frac{A \times B}{C}$$

Where:

A = Area or Lapel air sample concentration in uCi/cm³

B = Hours worker was in the calculated air concentration

C = DAC air concentration in uCi/cm³ from regulatory reference.

8.6.2 Enter the DAC-Hour exposure on the column provided on the Air Sample Data sheet. If respiratory protection was used during the exposure period, contact the RSO or duly authorized representative for the protection factor used to adjust DAC-Hour exposure.

9.0 QUALITY ASSURANCE/RECORDS

- 9.1 Quality Assurance
 - 9.1.1 The alpha and beta counter used to count air samples will be calibrated daily when in with a known radioactive source with activity traceable to the National Institute of Standards and Technology (NIST).
- 9.2 Records
 - 9.2.1 Documented information shall be legibly written in ink.
 - 9.2.2 Data shall not be obliterated by erasing, using white-out, or by any other means. Incorrect entries shall be corrected by striking a single line across the entry. The correction shall be entered, initialed, and dated.
 - 9.2.3 The health physics technician performing air sampling and analysis shall ensure that this procedure is the most current and approved revision.

- 9.2.4 The health physics technician performing air sampling and analysis shall review all applicable forms for accuracy and completeness.
- 9.2.5 Entries on and any other pertinent forms must be dated and initialed by the health physics technician performing the air sampling and analysis to be valid.
- 9.2.6 The RSO or duly authorized representative shall review any applicable completed forms. The review shall be for accuracy and completeness.

10.0 ATTACHMENTS

| OP-002-01 | Air Sample Data Sheet |
|-----------|-------------------------|
| OP-002-02 | Daily Air Sample Record |

OP-002-03 Contamination Limits

OP-002-01 Air Sample Data Sheet

| Sample # Date | | | | | | |
|--------------------------------|-----------|------------|-----------|--|--|--|
| Description: | | | | | | |
| Radionuclides: | D/ | AC value: | | | | |
| - | D/ | AC value: | | | | |
| | D/ | AC value: | | | | |
| Initial sample flow rate: | Time sar | npler on: | | | | |
| Final sample flow rate: | Time san | npler off: | | | | |
| Average sample flow rate: | Total sam | nple time: | hours | | | |
| Total sample volume: | cm³ | | | | | |
| Initial Air Concentration: | | | | | | |
| Alpha = | μCl α/cm³ | Beta = | μCi β/cm³ | | | |
| MDA = | μCi α/cm³ | MDA = | μCi β/cm³ | | | |
| 12 Hour Decay Air Concentratio | | Beta = | μCl β/cm³ | | | |
| MDA = | μCi α/cm³ | MDA = | μCi β/cm³ | | | |
| 72 Hour Decay Concentration: | | | | | | |
| Alpha = | μCi α/cm³ | Beta = | μCi β/cm³ | | | |
| MDA = | μCi α/cm³ | MDA = | μCi β/cm³ | | | |
| Performed By: | | Date: | | | | |

OP-002-02 Daily Air Sample Record

| Worker Name | Sample Date | Final Count Date | Time In | Time out | Total time (Hrs.) | Concentration (uCi/cm ³) | DAC-Hour Exposure |
|-------------|----------------|------------------------|------------|-------------|-------------------------|---|----------------------|
| | | | | | | | |
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OP-002-03

Contamination Limits from Table 1 of RPM

| RADIONUCLIDE | ČONITA | EESURFAGE MINATION (OD-CM3) |
|--|-----------|-----------------------------------|
| | REMOVABLE | FIXED + REMOVABLE |
| Transuranics, Ra-226, Ra-228, Th-230, Pa-231, Ac-227, I-125, I-129 | 20 | 100 |
| Th-Natural, Th-232, Sr-90, Ra-223 Ra-224, U-232, I-126, I-131, I-133 | 200 | 1000 |
| U-Natural, U-235, U-238, and associated Decay products | 1000 | 5000 |
| Beta-Gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. | 1000 | 5000 |

Appendix G:

Instrumentation Calibration Certificates



GTS Instrument Services 2045 Route 286 Pittsburgh, PA 15239-2839 724/733-1900 Fax: 724/327-8189

CALIBRATION CERTIFICATE

| | ISTOMER INFORM | accompanied by G | | INSTRUMENT INFORMATION | | | |
|--|--|-----------------------------|--|--|--|--|--|
| Customer Name: GTS INSTRUMENT SERVICES Customer Address: 2045 Rt. 286 Pittsburgh, PA 15239 | | | Instrument Manufacturer Lud1um Model 19 Serial Number 87132 (44 External Probe(s) Serial # | | | | |
| Customer P.O.# Work Order # | | | Calibratio | n Method <u>137 Pulser s/n 101500</u> Cs s/n 10263 200mC | | | |
| | /11 | STRUMENT CALL | BRATION INFORM | ATION | | | |
| Instrument Range | Calibration Standard Value | Instrument Before Calib. | Response After Calib. | Comment | | | |
| 25 | 2.25K CPM | | 10 uR/hr | All Calibrations Btn. + & - 103 | | | |
| | 4.5K | | 20 | Battery: OK | | | |
| 50 | 2.25K 9K | | 10 40 | Mechanical Zero: OK | | | |
| 250 | 0.05 mR/hr 0.1 | | 52 100 | Response: OK | | | |
| | 0.2 | | 190 | Reset: OK | | | |
| 500 | 0.1 | | 100 | Audio: OK | | | |
| | 0.2 | | 380 | Light: OK | | | |
| 5000 | | | 1,000 | High Voltage = 718 Volts | | | |
| | 2 4 | | 2,000 3,950 | 1000 uR/hr = 225K CPM | | | |
| | | | | | | | |
| · | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | <u> </u> | STATEMENT (| OF CERTIFICATIO | ON | | | |
| Manufacturers | s published operating I Institute of Standard | specifications. We fu | rther certify that our | ior to shipment and that it met all of the Calibration Measurements are traceable for damage incurred during shipment or | | | |
| nstrument Calibra | ated by: +P | (Signed) | coffily that | the above information is correct: 09-07-00 trative Coordinator Date | | | |



GTS Instrument Services

2045 Route 286

Pittsburgh, PA 15239-2839

724/733-1900 Fax: 724/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

| This Certificate will be accompanied by Cali | | | Indiation Charts o | INSTRUMENT INFORMATION | |
|---|---|-----------------------------|------------------------------------|---|--|
| CUSTOMER INFORMATION | | | INS | HOMERE IIII ON MATERIA | |
| Customer Name: Customer Address: Customer P.O.# Work Order # | GTS INSTRUMENT SERVICES 2045 Rt. 286 Pittsburgh, PA 15239 | | Model External P Calibration | n Method —99 Pulser s/n 101500 137 Cs s/n 10263 200mCi | |
| | IN | STRUMENT CALIE | BRATION INFORM | MATION | |
| Instrument Range | Calibration Standard Value | Instrument Before Calib. | Response After Calib. | Comment | |
| X1 | 100 CPM 200 400 | | 100 CPM 200 400 | All Calibrations Btn. + & - 10; Battery: OK Mechanical Zero: OK | |
| X10 | 1K 2K 4K | | 2K 4K | Response: OK Reset: OK | |
| X100 | 10K 20K 40K | | 10K 20K 40K | Speaker: OK Alarm: OK | |
| XIK | 100K 200K 400K | | 100K 200K 400K | High Voltage = 900 Volts 1 mR/hr = 3K CPM in Cs fiel | |
| | | | | Tc Efficiency = 10.4% | |
| | | STATEMENT | OF CERTIFICAT | ION | |

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

| the state of the s | certify that the apope information is correct: |
|--|--|
| Instrument Calibrated by: | Mello 102 09-07-00 |
| Calibration Date: 109-07-01 Next Calibration Due: 109-07-01 | Administrative Coordinator Date |
| | |



GTS Instrument Services 2045 Route 286 Pittsburgh, PA 15239-2839 724/733-1900 Fax: 724/327-8189

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable INSTRUMENT INFORMATION **CUSTOMER INFORMATION** Instrument Manufacturer Lud1um GTS INSTRUMENT SERVICES Customer Name: 113563 (259) Model _____ Serial Number _ 2045 Rt. 286 Customer Address: External Probe(s) 44-9 Serial # _ 150396 (451) Pittsburgh, PA 15239 Pulser s/n 101500 Calibration Method 137 99 S/n 10263 200mCi Customer P.O.# Work Order # Tc s/n S1256 INSTRUMENT CALIBRATION INFORMATION Instrument Response Calibration Instrument Comment After Calib. Before Calib. Standard Value Range All Calibrations Btn. + & - 10% 100 CPM 100 CPM x1200 200 2 Battery: OK 400 400 Mechanical Zero: <u>1K</u> 1K X10 2K 2K · OK Response: 4K 4K Reset: OK 10K X100 10K 20K 20K 10 OK Speaker: 40K 40K 12 OK Alarm: 100K 100K 200K 200K High Voltage = 900 Volts 400K 400K 15 37 Cs field I mR/hr = 3.2K CPM in 99 Tc Efficiency = 10.4% 20 22 . 23.

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all of the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology (We are not responsible for damage incurred during shipment or use of this instrument).

| Instrument Calibrated by: | L'certify that the above information is correct: |
|-------------------------------------|--|
| Calibration Date: 09-07-00 (Signed) | MUSAU 09-07-00 |
| Next Calibration Due: 1 09-07-01 | Administrative Coordinator Date |



Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 915-235-5494 ; 501 OAK STREET FAX NO. 915-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

| CUSTOMER CABRERA SERVIC | ES | | ORDER NO. | |
|---|--|---|--|--|
| Ludium Magsureme | ents Inc. Model | 2929 | Serial No | ? |
| Mfa Ludium Measureme | nts, Inc Model | 43-10-1 | Serial No. <u> </u> | 2 |
| Cal. Date 30-Aug-00 | Cal Due Date | 30-Aug-01 Cal. | Interval 1 Year Meterfa | ce 202-014 |
| Chack mark Mannies to applica | ible instr. and/or detector IAW | mfg. spec. T. <u>76</u> °F | RH33_ % Alf | 702.8 mm Hg |
| New Instrument Instrumer | it Received 🔲 Within Toler. + | ⊦-10% ☐ 10-20% ☐ Out of Tol. | Requiring Repair Ot | her-See comments |
| | Window Operation | | | |
| 🗹 Audio ck. | Alpha Sensitivity 175 | _ mV Beta Sensitivity4 | mV Beta Window 50 | mV |
| Meter Zeroed | | | rdance with LMI SOP 14.9 rev 1 | |
| Calibrated in accordance wi | 1- 3.47 on High Volt | | with detector connected. | |
| Instrument Volt Set 875 | Ref./Inst487 | | nst. 2019 / | 2000V |
| | Ret./Inst | 7 7 | | |
| COMMENTS: | | | | |
| | | | • | |
| | | | | |
| | | | | |
| | | | | |
| Gamma Calibration: GM detectors positioned perp | endicular to source except for M 44-9 in which | the front of probe faces source. | | |
| Gallina Gallinasoni. Gill dalectic periodi | REFERENCE CAL POINT | INSTRUMENT RECEIVED | INSTRUMENT METER READ | NG* |
| Alpha Channel | REPERENCE CALL OUT | | | |
| Digital Readout | 400K cpm | | 400958 | · |
| | <u>40K cpm</u> | | 40010 40102 | • |
| | 4K cpm | | 4008 | - |
| | 400 cpm | | 401 | • |
| | 40 cpm | | 40 | _ |
| | | | | |
| Beta/Gamma Channel | REFERENCE CAL POINT | INSTRUMENT RECEIVED | INSTRUMENT METER READ | NG* |
| Digital Readout | 400K cpm | | 400996 | - |
| | 40K cpm | | 40087 | · - |
| | | | 4005 | |
| | 4K cpm | | 40l | - |
| | 400 cpm | | 701 | - |
| | 40 cpm | | <u>40</u> | - |
| *Uncertainty within ± 10% C.F. within Ludium Measurements, inc. certifies that the | | weterstands traceable to the National Inc | libite of Standards and Technology, or to | the calibration facilities of |
| Ludium Measurements, inc. certifies that the other International Standards Organization in The calibration system conforms to the requi | | | ts or have been derived by the ratio type State of Texas Calibrat | of calibration fechniques. ion Ucense No. LO-1963 |
| Reference Instruments and/o | | 110000000000000000000000000000000000000 | | |
| Cs-137 Gamma S/N ☐1162 ☐ G1 | | ☐ 1879 ☐ E552 ☐ E551 | ☐ Neu | ron Am-241 Be S/N T-304 |
| ✓ Alpha S/N Pu239 s | | C14 s/nl659 | | C-99 s/n635/83 |
| M m 500 S/N12103 | | ppe S/N | Multimeter S/N | 61341135 |
| <u> </u> | • 1 0 | | | |
| Calibrated By: | e someon | sonDa | 3(1.1 | |
| Reviewed By: | | Do | ite | |
| This certificate shall not be reproduced ex FORM C25 12/29/1999 | cept in full, without the written approva | of Ludium Measurements, Inc. | Passed Dielectric (HI-Pot) ar | nd Continuity Test |



Designer and Manufacturer of Scientific and Industrial Instruments

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 915-235-5494 501 OAK STREET FAX NO. 915-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

| | | | Serial No | PR1713 | 22 | | Orde | er# | 252317 |
|----------|---------------|------------|----------------|--------|--------------------|---------------|-------------------------|--------------|--------------------|
| Custo | mer CAE | RERA SERVI | CES | | | Alpha | Input Sensitiv | ity | /75 m\ |
| Coun | ter | 2929 | Serial No. 16. | 3827 | | Beta | Input Sensitiv | /ity | <u>4</u> m\ |
| Coun | t Time1 | Minute | | | | | Beta Winc | low | 50m\ |
| Othe | er | | | | | Distance Sour | ce to Detect | or tra | ران |
| | | | | | | | | - | 6 |
| Hiç | gh | Вас | kground | | C14 155,824Cp1 | | <u>и239</u> 5,700срт | | TC-99 14 300cpm |
| Vo- | ltage | Alpha | Beta | Alpha | Beta | Alpha | Beta | Alpha | Beta |
| | 850 | 0 | 53 | 0 | 21072 | 12259 | 482 | 6 | 8079 |
| <u> </u> | 875 | 0 | 62 | 0 | 25306 | 12491 | 387 | 15 | 8741 |
| | 900 | 0 | : 71 | 0 | 28765 | /2232 | 429 | 17 | 9164 |
| • | 925 | 0 | 95 | 1 | 32/27 | 12289 | 554 | 10 | 9315 |
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| | | | | • | _ | | | | |
| | | | | | 0% after 15 hour s | | | alpha/beta (| counter. |
| Sianatı | ire Pr | n | James | • | | | Data | 3n A. | 10.50 |

CALIBRATION CERTIFICATE



A Division of RSCS, Inc.

CUSTOMER NAME:

Cabrera Services, Inc. 809 Main Street

East Hartford, CT 06108

COMPANY CONTACT:

Jason Marsden PHONE: 860-289-1885

INSTRUMENT MAKE:

LUDLUM Model: 2221 Serial Number: 161581

| | PRECIS | ION CHECK | | |
|--------|--------|-----------|------|-----------|
| TEST 1 | TEST 2 | TEST 3 | MEAN | SAT/UNSAT |
| 99.0 | 100.0 | 100.0 | 99.7 | SAT |

| | ACCURAC | Y CHECK | |
|------------|--------------------------|-------------|-------------------------|
| SCALE | EXPOSURE RATE | AS FOUND | AS LEFT |
| X1000 | 400.00 Kcpm | 400.23 Kepm | 400.23 Kcpm |
| | 100.00 Kcpm | 99.89 Kepm | 99.89 Kcpm |
| X100 | 40.00 Kcpm | 39.99 Kcpm | 39.99 Kcpm |
| | 10.00 Kcpm | 9.97 Kcpm | 9.97 Kcpm |
| X10 | 4.00 Kcpm | 3.99 Kcpm | 3.99 Kcpm |
| | 1.00 Kcpm | 1.00 Kcpm | 1.00 Kcpm |
| X 1 | 400.00 cpm 100.00 cpm | 399.00 cpm | 399.00 cpm 99.00 cpm |

All readings are within +/- 10% unless otherwise noted All scale(s) were calibrated using a pulser Calibrated with 43-89 (010955) Efficiency with spacers for Sr/Y-90=0.1546 C/D (high voltage set at 820 Volts)

CALIBRATED BY:

ON: 09/14/00 EXPIRES ON: 03/14/01

This calibration was performed using a NIST Traceable radiation source, in conformance to MIL-STD 45662.
RSCS New Bangshire Radioactive Haterial License Number: 381R, Cesium Calibration Source: Tech Ops Mod 773.
Serial Number 58, Activity 112 millicuries on 9/9/92.
RSCS recommends that their customers remit a check source with their meters for calibration. If supplied, the check source will be characterized at the time of calibration.



Calibration Certificate

A Division of RSCS, Inc. Customer Name:

Cabrera Services, Inc.

809 Main Street

East Hartford, CT 06108

Company Contact: Instrument Make:

Curtis Hales

Ludlum

Model:2221

Phone: 718-298-8613

Serial Number: 161581

| | | Precision Check | | • |
|--------|--------|-----------------|------|-----------|
| Test 1 | Test 2 | Test 3 | Mean | Sat/Unsat |
| 100 | 100 | 100 | 100 | Sat |

| | Accurac | y Check | |
|-------|---------------|-------------|------------------|
| Scale | Exposure Rate | As Found | As Left |
| X1000 | 400.00 Kcpin | 400.05 Kcpm | 400,05 Kcpm |
| | 100.00 Kcpm | 99.93 Kcpm | 99.93 Kcpm |
| X100 | 40.00 Kcpm | 39.89 Kcpm | 39.89 Kcpm |
| | 10.00 Kcpm | 9.96 Kcpm | 9.96 Kcpm |
| X10 | 4,00 Kcpm | 4.01 Kcpm | 4.01 Kcpm |
| | 1.00 Kcpm | 1.00 Kcpm | 1.00 Kcpm |
| . X1 | 400.00 cpm | 399,30 cpm | 399.30 cpm |
| | 100.00 cpm | 99.7 cpm | 99. 7 cpm |

All readings within +/- 10% unless otherwise noted. All Scales were calibrated using a pulser. Calibrated with a 43-89 probe (S/N 118277)

See attached sheets for Efficiency Plateaus. All efficiencies performed at 1cm.

Window Off, HV = 925 selected

Efficiencies:

Sr/Y-90 = 0.1252 Counts/Decay

Pu-239 = 0.1604 Counts/Decay

Calibrated By:

Date: 11/17/00

Expires On: 5/17/2001

This calibration was performed using a NIST Traceable radiation source, in conformance to MiL-STD 45862. RSCS New Hampshire Radioactive Material License Number: 381R; Cesium 137 Calibration Source: Tech Ops Model 773, Serial Number 58, Activity 112 milliouries on 09-09-92. RSCS calibration services are performed in accordance with the RSCS Radiation Protection Program Manual and all applicable sections of 10 CFR 21.The Services provided on Cabrera Services (RMA # 2000-023) were provided in compliance with RSCS, Inc. Quality program: Radiation Protection Program, Rev 3 Dated 1/1/96.

Radiation Safety & Control Services, Inc.

91 Portsmouth Avenue • Stratham, NH 03885-2468

1-800-525-8339 • (603) 778-2871 • Fax (603) 778-6879 • www.radsafety.com







A Division of RSCS, Inc.

CUSTOMER NAME:

Cabrera Services, Inc. 809 Main Street

East Hartford, CT 06108

COMPANY CONTACT:

Jason Marsden PHONE: 860-289-1885

INSTRUMENT MAKE:

LUDLUM Model: 2221 Serial Number: 163673

| | PRECIS | ION CHECK | | |
|--------|--------|-----------|------|-----------|
| TEST 1 | TEST 2 | TEST 3 | MEAN | SAT/UNSAT |
| 100.0 | 100.0 | 99.0 | 99.7 | SAT |

| | ACCURAC | Y CHECK | |
|-------|---------------|-------------|-------------|
| SCALE | EXPOSURE RATE | AS FOUND | AS LEFT |
| X1000 | 400.00 Kcpm | 398.72 Kcpm | 398.72 Kcpm |
| | 100.00 Kcpm | 99.73 Kcpm | 99.73 Kcpm |
| X100 | 40.00 Kcpm | 39.88 Kcpm | 39.88 Kcpm |
| | 10.00 Kcpm | 9.98 Kcpm | 9.98 Kcpm |
| X10 | 4.00 Kcpm | 3.99 Kcpm | 3.99 Kcpm |
| | 1.00 Kcpm | 0.99 Kcpm | 0.99 Kcpm |
| X1 | 400.00 cpm | 399.00 cpm | 399.00 cpm |
| | 100.00 cpm | 100.00 cpm | 100.00 cpm |

All readings are within +/- 10% unless otherwise noted All scale(s) were calibrated using a pulser Calibrated with 43-89 (S/N 171386) Efficiency with spacers for Sr/Y-90 = 0.2234 C/D (high voltage set to 800 Volts)

CALIBRATED BY:

ON: 09/14/00 EXPIRES ON: 03/14/01

This calibration was performed using a NIST Traceable radiation source, in conformance to MIL-STD 45662. RSCS New Bampshire Radioactive Material License Number: 381R, Cesium Calibration Source: Tech Ops Mod 773. Serial Number 53, Activity 112 millicuries on 9/9/92. RSCS recommends that their customers remit a check source with their meters for calibration. If supplied, the check source will be characterized at the time of calibration.

Radiation Safety & Control Services, Inc.

91 Portsmouth Avenue • Stratham, NH 03885-2468

1-800-525-8339 • (603) 778-2871 • Fax (603) 778-6879 • www.radsafety.com



Designer and Manufacturer Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 915-235-5494

FAX NO. 915-235-4672

501 OAK STREET SWEETWATER, TEXAS 79556, U.S.A.

| CUSTO | OMERCABRERA : | SERVICES | | | | ORC | ER NO. | 257129/2 | 52367 |
|---------------|--------------------------------|--|--|-------------------|-------------------------|---------------------------------------|--------------------|---|---------------|
| Mfg. | Ludlum Mea | surements, Inc. 1 | Model | 2221 | | | 1636 | | |
| | | surements, Inc. | | | | | PR 17 | | |
| | | Dec-00 Cal D | | | | | | | 200.150 |
| Check | mark Mannlies to a | pplicable instr. and/or | detector IAW mia and | 21 DCC-01 | COI. II II C | | | | |
| | | | | | | KH | | df711.8 | 2_ mm Hg |
| | | rument Received | | | | | | • | ments |
| | echanical ck. S Resp. ck | ✓ Meter Zero ✓ Reset ck. | |] Backgrour | nd Subtract | | 📝 Input Se | | |
| | odio,ck. | Alarm Settir | nack E | ☑ Window O | peration 1in. Volt) | 4.4.1/000 | ✓ Geofrop | oism | |
| | | nce with LMI SOP 14.8 re | | | in accordance | | 2 1 4 9 rov 12 | /10/0n | |
| | | V Input Sens | | | | | | | , m |
| | | | | | | | | | _4 |
| | | is) Ref./Inst | 797 | 500 | _ V Ref./Inst | 2009 | / | 2000 | V |
| | MENTS: | ed with a 5'cabl | | | | | | | |
| | | th detector conn | | | | | | | |
| Overl | oad checked but | t not set. | ecteu. | | | | | | |
| | are version 261 | | | | | | | | |
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| . į | | | | | | | | | |
| • • | • | • | | | | | | | |
| | | | | | | | | | |
| Gamma Call | ration: GM detectors positione | ed perpendicular to source except t | for M 44-9 in which the front of pr | obe faces source. | | | | | |
| | DANGERME | | FERENCE | | RUMENT REC | | NSTRUME | 1 1 | |
| <i>.</i> | RANGE/MULTI | | L. POINT | "AS F | OUND READ | ING" I | METER REA | NDING* | |
| | X 1000 X 1000 | | | | 400 | | | 00 | _ |
| | X 1000 | 40 K c | | | 100 400 | | | | • |
| | X 100 | 10 K c | | | | | , . | iv | - |
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| | X_10 | | pm | | <i>JU</i> V | | | | • |
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| | X1 | 100 c | pm | | 100 | | | 0 | |
| | | | | - | | | | | |
| ·. | *Uncertainty within ± 1 | 00° C E within ± 200° | | | | | () A III | | |
| | REFERENCE | INSTRUMENT | INICTON ACAST | | | · · · · · · · · · · · · · · · · · · · | | aled Electron | ically |
| | CAL, POINT | RECEIVED | INSTRUMENT METER READING* | | ERENCE L. POINT | INSTRUM | | INSTRUMEN | |
| Digital | | | - | | L. POIN | RECEIVE | D | METER REAL | JING* |
| Readout | <u>400 K cpm</u> 40 K cpm | 40046 6 | 40046 10 | Log Scale | 500 K cpm | | | SOOK | |
| | 4 K cpm | <u>4005</u> | <u> 400 S</u> | <u></u> | 50 K cpm | | | SOK | |
| • | 400 cpm | 40 | 40 | | 5 K cpm 500 cpm | <u>5</u> | | <u> </u> | , |
| | 40 cpm | 4 | 4 (| | ooo cpiii | | | | |
| udlum Meas | vrements, Inc. certifies that | the above instrument has been | en calibrated by standards to | raceable to the N | alional Institute of St | andards and Tec | hnology or lott | a collibration (aci | Ellos al |
| he calibratio | n system conforms to the re | on members, or hove been de equirements of ANSI/NCSL 1540 | Prived from accepted values 1-1-1994 and ANSI N323-1978 | of natural physic | al constants or have | peen derived b | v the ratio lype (| of calibration tect on License No. 1 | mianae |
| Referen | ce Instruments and | d/or Sources: | | | | ordie of it | axus Cullbruth | on ticeuse No. 1 | .U-1903 |
| Cs-137 Ga | mma S/N 🔲 1162 🔲 | G112 M565 D5105 | 5 T1008 T879 T |]E552 | 1 | | Noute | on Am-241 Be S | /N T 204 |
| | | Ø | | | #4016 | o ii | | OII 7(II)-241 BB 3 | /N 1-304 |
| | | | | | _ | | | • | |
| √ m 5 | 00 S/N | 648 🔲 | Oscilloscope S/N | • | Z | Multimeter S | /N | 61730074 | |
| Calibrate | . // | ' | | | | 21-Dec | | | |
| Reviewe | d 8 1 | 11/1 | | | | | | | |
| | | MOrrow I except in full, without the wri | Han anneal attaches to | | Date <u>এ</u> ⁄ | Deco | 0 | | |
| FORM C22A | 12/29/1999 | | ren abblosat of friginity We | asurements, inc. | ☐ P | assed Dielectr | ic (Hi-Pot) and | l Continuity Ter | + |



FORM C22A 12/29/1999

Designer and Manufacturer of Scientific and industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 915-235-5494 501 OAK STREET FAX NO. 915-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

| CUSTOMER CABRERA SERVICES | | | | ORDER NO | . / |
|--|--|-----------------------------|------------------------------|---|--|
| tdi.m. Mogairements I | nc Model | 2224-1 | Serial i | No. 162420 | |
| Audium Measurements. | nc. Model | 43-89 | Serial | No. <u>fr171381 </u> | |
| Cal. Date 11-Aug-00 | Cal Due Date | 11-Aug-01 | Cal. Interval | 1 Year Meterfo | ace 202-848 |
| Check mark applies to applicable i | instr. and/or detector IAW m | a. spec. T. | 74_ °F RH | 39 % Alt | 702.8 mm Hg |
| Check mark applies to applicable to applic | notived TWithin Toler +-10 | 1% ∏ 10-20% ∏ Ou | t of Tol. Requirin | | |
| • | | 2 background 9 | ubtract | □ Input Sens | : Linearity |
| W MOSILEMENT | Meter Zeroed Reset ck. | Window Oper | ation - | ✓ Geotropis | |
| ☐ F/S Resp. ck ☑ Audio ck. ☐ | Alam Setting ck. | Batt. ck. (Min. | Volt)2.2_VDC | ; | |
| Calibrated in accordance with LA | | Calibrated in a | ccordance with LM | | 19/89. |
| Instrument Volt Set 675 V Ing | out Sens, Comment mV De | t. Oper. 675 | V at Comment m | Threshold nV Dial Ratio | =mv |
| | | | | | |
| ☑ HV Readout (2 points) Ref., | Inst. 500 / | V | Ker./Inst | / | 1000 |
| COMMENTS: | | | | | |
| Firmware version: 390096 | | | | | |
| Alpha Threshold: 120mv. Beta Threshold: 3.5mv | | | | | |
| Beta Window: 30mv. | | | | | |
| Overload checked but not se | t. | | | | |
| High Voltage set with the d | etector disconnected. | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Gamma Calibration: GM detectors positioned perpendicular | r to source except for M 44-9 in which the fro | nt of probe faces source. | | | |
| Odilina Odilina | REFERENCE | INSTRU | MENT REC'D | INSTRUMEN | |
| RANGE/MULTIPLIER | CAL. POINT | "AS FO | JND READING" | METER REA | |
| x1000 | 800kcpm | | | | |
| x1000 | 200kcpm | | | 2 00 200 | |
| <u>x100</u> | 80kcpm | | | | |
| <u> x100</u> _ | 20kcpm | | | 2 <u>00</u> | |
| <u> </u> | 8kcpm 2kcpm | | | 20, | |
| <u>x10</u> | 800cpm | | | _ | |
| <u>x1</u> | 200cpm | | | 200 | |
| | | | | | |
| | | | | | |
| *Uncertainty within ± 10% C.F. v | vithin ± 20% | | AL | _ Range(s) Calib | rated Electronically |
| Care a superior and the | RUMENT INSTRUMEN | T REFE | RENCE IN | STRUMENT | INSTRUMENT |
| | EIVED METER REAL | DING* CAL. | POINT RE | CEIVED | METER READING* |
| Digital | 801104 | Log Scale | | | |
| Readout 800kcpm 80kcpm | Rom | | | | |
| | 8012 | | | <u></u> | |
| 800cpm | 300 | | | | |
| 80cpm | <u>8</u> 5 | | | | |
| Lucium Measurements, Inc. certifies that the above other international Standards Organization member | instrument has been calibrated by str | andards traceable to the Na | tional Institute of Standard | s and Technology, or to derived by the ratio type | the calibration facilities of a of calibration techniques. |
| other international Standards Organization members The calibration system conforms to the requirement | is of ANSI/NCSL 2540-1-1994 and ANSI | N323-1978 | St | ate of Texas Calibra | lion License No. LO-1963 |
| Reference Instruments and/or So | urces: | | | | |
| Cs-137 Gamma S/N 1162 G112 |] M565 🗌 5105 🔲 T1008 🔲 | T879 🗌 E552 🔲 E551 | | - · · | otron Am-241 Be S/N T-304 |
| ✓ Alpha S/N | Beta S/N | 635/83 Tc99, 8050 Sr | 70Y90 Othe | r | |
| | | | | | |
| √ m 500 S/N 94940 | [] Oscilloscope | 2\l <u>N</u> | WIUIIII | meier Nix | 00100/30 |
| Calibrated By: Aman D Reviewed By: This certificate shall not be reproduced except it | Show | | Date [[Au a | ıa | |
| Culibrated by MATTER | | | 1/2 | _ | - |
| Reviewed By: | | | _ Date <u>/44</u> | 1.19-00 | |
| This codificatio shall not be reproduced except i | n full, without the written approval of t | udium Measurements, Inc. | I Parroa | Klalactic INI. PAT A | nd Continuity Test |

| | Automated Engineering & Electronic Services 1423-376-0229 Services Www.fadprobe-aees.com | | | | | | | | | | | | | | | | |
|---------------|---|----------|------------|------------------------|-------------------|----------|---------------------|-----------------------|--------------|--|----------------|----------------|------------|-----------|-----------|--------------------------------------|-----------|
| | 165 Deer R | un Ridge | RD. | | ennessee | | | | | x 1-423-37 | 6-0229 | | | www.radp | 100e-aces | s.com | |
| | | | | Cert | ifica | te | of | Cal | ibra | tion | | | | | | | |
| | | | | | | | For | | | | - EL-M-40 | 3 | | | | | |
| | | | | | | | | <u>Scalar</u> | | , | Tŷpe | 4 | 0-b | | | | |
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| 1 100 | 100 | 0.00 | 100 | 0.00 | 0.1 | : | | • | 1700 | 3 | 118 | 115 | | | | | |
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| | NA | | | | ſ | | Time | Test Val. | | d Variance | | Variance | | 1000 | 1005 | : 1005 | |
| | - Y.A | <u> </u> | | | <u> </u> | ERR | 0.1 | 1000 1000 | 1000 | 0.00 | 100 1000 | 0.00 | | 1500 | 1505 | 1505 | |
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| , | NA. | | | | ſ | ERR | 10 | 1000 | | -1.00 | NA | -1.00 | | 2500 | NA . | NA . | |
| PROS-100 Ampl | | ns | | Proce | dures | | | est 💎 | | MATE | *** | Due Date | λ | M&TE | SN. | Due Date. | |
| PROS-200 Coun | | | | Com Port | | No | Geotropi | c Tested: | Yes | | | | | | | | |
| PROS-300 Supp | | | | Repairs p | erformed: | No | Thermo | Tested: | No | | | | | | • | | |
| PROS-400 No | | | | Response | Tests: | Yes | Function | al Tests: | Yes | MP-1 | 132 | 6-20-20 | 01 | | | | |
| PROS-500 Geot | ropic Tests | | | Speaker | Festsed: | Yes | Timer Te | ested: | Yes | ESV | 17231 | 2-07-20 | | | ure in De | | 78. |
| PROS-600 Prob | e Calibrations | | | Battery Lo | svel: | 5.2 | Alpha th | | NA . | Scope | 2850 | 6-26-20 | 01 | | in mm/hg | <u></u> | 745 57 |
| PROS-800 No | ot Required | | | | | 100+ | Beta thre | | 50 | ــــــــــــــــــــــــــــــــــــــ | | Т | To | Relative | DPM | Cal Due C | |
| Sources | Source | SN. | DPM | Cal Due (| Date | i | Source | SN. | DPM | Cal Due | Date | J | Source | SN. | | Cal Due C | -410 |
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| | | | | | | | | | h. | - / ` | | | | | | ···································· | |
| Remarks: | <u></u> | Source | Geometry | during plate | aus was 0. | .5 inche | s from my | lar surface | . Flow rat | e set at 10 | 0 cc/min | | | | | | |
| | - | | | purge time a | | | | | | | | min. | | | | | |
| | | | | | | | | | | | | | | Not Used | MONA = | Not Req. o | rneeded |
| ı | erforme | d By: | history | Sth | Muy | dy. | | _ | | 16-20 | | _ | | | | | |
| | Reviewe | d By: | | Dom | sh | | | Date | <u>: 3:</u> | -16-6 | 7/ | | | | | | |

File Name format: model_sn_date_(probe model_probe sn)

APPENDIX C WASTE CHARACTERIZATION FORMS WASTE SHIPPING MANIFESTS WASTE STORAGE LOG

RADIOACTIVE WASTE PROFILE RECORD

(EC-0230)

Revision 2

| Gene | rato | Name: U.S. Army Corps of Engineers ; Generator #/Waste Stream #: 4032-01; Volume of Waste Material: 1200F3 |
|-------|--------|--|
| Cont | racto | r Name: Franklin Env. Services, Inc. ;Waste Stream Name: Demolition Rubble ;Delivery Date:~ 10/30/00 & 11/3/00 |
| Chec | k apį | propriate boxes: Licensed Y N N; NORM/NARM ; LLRW N; MW Treated ; MW Needing Treatment |
| | | PCB Radioactive Y □ N ☒; PCB Mixed Waste Y □ N ☒; DOE □ |
| Origi | inal ! | Submission: Y N; Revision # 0; Date of Revision 09/25/00 |
| Name | e & 7 | itle of Person Completing Form: Greg Copeland VP Operations/Zehgrie Zhagrus Env. gle 1/1/00 Phone: 801-595-0239 |
| A. | | STOMER INFORMATION: |
| | Was | NERAL: Please read carefully and complete this form for one waste stream. This information will be used to determine how to properly manage the should there be any questions while completing this form, contact Envirocare at (801) 532-1330. WASTES CANNOT BE ACCEPTED ENVIROCARE UNLESS THIS FORM IS COMPLETED. If a category does not apply, please indicate. |
| | 1. | GENERATOR INFORMATION |
| | EPA | ID# "Not Applicable" EPA Hazardous Waste Number(s) (if applicable): "Not Applicable" |
| | Mail | ing Address: USACE, Baltimore District, Attn: CENAB-EN-HI, 10 South Howard Street, Baltimore, MD 21201-1715 |
| | Pho | ne: (410) 962-9184 Fax: (410) 962-4972 |
| | Loca | tion of Material (City, ST): Queens (New York City), New York |
| | Gen | erator Contact: Hans B. Honerlah Title: Health Physicist |
| | Mail | ing Address (if different from abovo): Same as above |
| | Pho | no: Same as above the #17/00 Fax: Same as above the 1/7/00 |
| В. | WA | STE PHYSICAL PROPERTIES (If you have questions about the remaining sections, please contact Envirocare at (801) 532-1330.) |
| | 1. | PHYSICAL DATA (Indicate percentage of material that will pass through the following grid sizes, e.g., 12" 100%, 4" 96%, 1" 74%, 1/4" 50%, 1/40" 30%, 1/200", 5%.) |
| | | 12" 90 % |
| | 2. | DESCRIPTION: Color Varies Odor Varies 4" % |
| | | Liquid Solid <u>99%</u> Sludge Powder/Dust <u>1%</u> 1" 5 % |
| | | 1/4"5 % |
| | 3. | DENSITY RANGE: (Indicate dimensions) 20 60 S.G. 1b./t ³ 1b./y ³ 1/40" % |
| | 4. | GENERAL CHARACTERISTICS (% OF EACH) |
| | | Soil Building Debris 75 Rubble4 Pipe Scale Tailings Process Waste Concrete 19 Plastic/Resin 1 |
| | | Other constituents and approximate % contribution of each 1% polymer cellulose-based water absorbent |
| : | 5. | MOISTURE CONTENT: (Use Std. Proctor Method ASTM D-698, for soil or soil-like materials.) |
| | | • |
| | - | * Optimum Moisture Content: % @ Max Dry Density (lb/ft³): Average Moisture Content: 98.5% of 1/100 |
| | • | *The waste material must not exceed 3 percentage points above optimum moisture upon arrival at Envirocare's disposal site. Moisture Content Range: / % - Z % "/1/20" |
| • | 6. | DESCRIPTION OF WASTE: (Please complete "Attachment B.6, Physical Properties." This attachment must describe the waste with respect to it physical composition and characteristics). |

D.

| RAI | DIOL | OGIC | AL EVAI | UATIO | N. | | | | | | | | | | | |
|-------|---|--|--|---|--|--|---|---|---|---|---|--|--|---|---|-------------|
| 1. | lice | nse assı d isotop | umes that : pes are not | short-live required | d decay to be li | products of | specifie and do no | d isotopes a et require m | re presen anifesting | t in concent | rations ec | ual to | the parent | Consecu | waste. Envirocar uently, these sho "Attachment C.1 | |
| | | Isoto | opes | Conc | entration (pCi/g | _ | per C | ited Avg. ontainer Ci/g) | | Isotopes | c | | tration Ran pCi/g) | | Weighted Avg. per Container (pCi/g) | |
| | a. | Sr- | 90 | 0 | to_ | 2,500 | | 50 | d | | | | | | U | |
| | b. | H- | -3 | 0 | _ to | 487 | | 10 | e | | | | to | | | |
| | c. | | 14 | 0 | _ to _ | 96 | | 10 | · f | | | | | | | |
| 110-1 | | N D | roncy A | mendme | nts Act o | of 1985 or in | DOEO | rder 5820.2 | A, Chapte | r III? If ye | s, check | "LLR | W" block | on line 3 | | |
| 3. | ıΚ |] N□ | license? | ED MA | LEKIA | L: IS the Wa | ste mate | nai listed oi | r included | on an activ | re Nuclea | r Regu | ilatory Con | nmission | or Agreement St | ate |
| | | | | | | NSE: Sour | | _ | | aterial []; | Ву-Р | | ⊠; NC | RM □; | NARM 🗀 | |
| 4. | Υ[|] N⊠ | U-233, P | u-236, P on Certifi | u-238, P cation" | u-239, Pu-2 | 40, Ru-2 | 41, Pu-242, | Pu-243, | or Pu-244? | If YES, 1 | please | complete, | sign and a | radionuclides: attach the "SNM ast be included | |
| CHI | EMIC | CAL A | ND HAZA | ARDOUS | CHAR | ACTERIS? | TICS | | | | | | | | | |
| 1. | | | | | | WASTE | | | | | | | | | | |
| | Ava com land appl info | ilable p mingle l-dispos licable i mation | orocess know d with the sal prohibitionally described analytical described with the contraction of the contr | owledge o waste; a tion or he results in ial Safety | of the wallist of an list of an exardous volving Data Sl | aste. The bany and all ap waste exclusion waste | isis of he oplicable usions, e ition of t ated with | zardous wa EPA Hazar ctensions, e he waste. A the waste. | ste detern dous Wa xemption attach any If a categ | ninations. A ste Numbers s, effective product inf ory on this | A list of the state of the states, van dates, van formation waste Pro | ne che or for riances or tre ofile R | micals and mer; and, a s, or delistic atment star tecord does | materials list of an ugs. Atta idards. A | as generated. used in or y and all applica ch the most recer ttach any produc y, describe why i | nt or et |
| | Plea | se desc | ribe the hi | istory, an | d includ | e the follow | ing: | | | | | | | | | |
| | Y |] N⊠ | Was this thereafte | waste mi r? | ixed, tre | ated, neutral | ized, sol | idified, con | ımingled, | dried, or ot | herwise p | rocess | sed upon ge | eneration | or at any time | |
| | | | | | | orted or oth | | | | | | | | | | |
| | Υ |] N⊠ | Was this CFR 261 | waste de ? | rived fro | om (or is the | waste a | residue of) | the treatn | ient, storage | e, and/or | dispos | al of hazard | ious wast | e defined by 40 | |
| | Y |] N🖂 | Has this | material 1 | been tre | ated at any t | ime to m | eet any app | licable tre | eatment stan | idard? | | | | | |
| 2. | LIS | T ALL | KNOWN | | | E CHEMI | CAL CO | MPONEN | | | US WAS | TE CI | IARACTI | | | |
| | d. g. j. m. p. s. v. y. bb. | Listed Cyanic Pestici Explos Organi Ignitab Antimo Nickel Alcoho Cadmit Mercui | les des sives ics ole ony | | | - | c. Sulh. Her k. Pyr n. Pho co t. Ber w. The z. Ars cc. Chr | crived-From fides bicides ophories molics rosive yllium llium enic omium |) 1 WH": 1 | | | f. i. l. o. r. u. dd, | Toxic Dioxins PCBs** Solvents Infectious Reactive Copper Vanadium Barium Lead Silver | | | |

Other Known or Possible Materials or Chemicals: Zinc

hh. Benzene

kk. Fluoride

qq. Asbestos

nn. Chelating Agents

Nitrite

pp. Pathogenic

mm. Fuel

ii. Nitrate

oo. Biological

li. Oil

^{**} If the waste is regulated by TSCA, please complete, sign, and attach the applicable PCB/Radioactive or PCB/Mixed Waste certification form.

| 3. | ANALYTICAL RESULTS F additional sheets if needed, in | FOR TOXICITY CHARAG dicate range or worst-case r | CTERISTIC. (Pleas esults). | e transcribe results o | n the blank spa | ces provided. A | ttach |
|----------------------|---|---|--|---|---|---|-----------------|
| | Metals (check one): Tota | i (mg/kg) or ⊠ TCLP | (mg/l) Organics | (check one): | Total (mg/kg) | or TCLP | mg/l) |
| | Arsenic ND | Lead 0.773 | Volatile o | organics | ND | • | |
| | Barium ND | Mercury 0.0065 | | organics | | | |
| | Cadmium ND | Sclenium ND | | ilor. Pest. | | | |
| | Chromium ND | Silver ND | | rbicides | | | |
| | | Zinc 24.5 | | | | | |
| 4. | ANALYTICAL RESULTS F sheets if needed). | • | | nscribe results on the | blank spaces p | rovided. Attacl | additional |
| | Soil pH <u>7.5</u> | Paint Filter Pass Liquids Test (Pass/ | (Fail) Cya | eased 0.051 (mg/kg) | | ılfide <u>ND</u> eleased (n | ıg/kg) |
| 5. | IGNITABILITY (40 CFR 26 | 1.21[a][2],[4].) | | | | | |
| | | ஈ□ °C⊠ | | Is the waste a RCF | | | |
| 6. | CHEMICAL COMPOSITIO complete, if necessary.) | N (List all known chemical | l components and che | eck the applicable co | ncentration din | ensions. Use at | tachments to |
| | Chemical Component | Concentration | | hemical Component | Con | centration | |
| | Total PCBs | | /kg ⊠ _ | | | %□ | mg/kg 🗌 |
| | | | | | | %□ | mg/kg 🔲 |
| | | | C | lalogenic Organic compounds (HOC) (S | um of | a. === | |
| | | | | e list of HOCs.) | • | | mg/kg 🔲 |
| 7. | TREATMENT STANDARDS Hazardous Waste Numbers and wastewaters), treatment standar exemptions, exclusions, variant formatted as below. | I information with respect to rds and concentrations or te | o the waste's subcate chnology (e.g. 5.7 m | gory (c.g., low mercu g/l selenium extract o | ry subcategory or INCIN fincin |), treatability green | oup (e.g. non- |
| | EPA HW St Number | ubcategory | Treatability Group | Treatability Sta Concentrations | | Any Exemption Extensions or E (List 40 CFR re | xclusions |
| | | | | | | Υ□ и□ _ | |
| | | | | | | Ү□ И□ | |
| qual state ANA | QUIRED CHEMICAL LABOR ified laboratory for the following ments. Attach all analytical rest ALYSES, CHECK WITH ENV R ALL WASTE TYPES: CHE | g analytical parameters unle ults and QA/QC documentat TROCARE AND LABOR. | ss nonapplicability or tion. (CAUTION: F ATORY REGARDI | f the analysis for the PRIOR TO ARRAN NG UTAH LABOR | waste can be st GING FOR LA ATORY CER | ated and justified ABORATORY FIFICATIONS. | in attached |
| 1. | MINIMUM ADDITIONAL A | | | • • | - <i>//</i> / | -y | idoj. |
| | | lixed Waste, i.e. LLRW, NC | | | | nc (Zn). | |
| | | now why me waste is nazar Ialides SW-846 9020/9022) | • • | | | difTO¥ >200 c | na/ka\ |
| | (2) Applicable concentrati | ion-based treatment standare | ds | | | - 11 10A - 200 1 | ε,ν . β) |
| | (5) Iouai and Amenable C | yanide, SW-846 9010 or 90 | 112, required if reacti | ve cyanide >20 mg/k | g | | |

THE RESERVE OF THE PERSON OF T

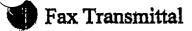
. **E.**

| State or Other Agency Contact Person Lab Contact Person | Generator's State Laboratory's State | Telephone Number Telephone Number |
|---|---|---|
| o. For analytical work done by laboratories which are | not Utah-Certified, please provide the fo | ollowing information: |
| | | |
| If using a non-Utah certified laboratory, briefly describ determination that the laboratory used meets those requ method specific, or involve CLP or other QA data pack analytical results may not be necessary to complete Sec | uirements, especially in terms of whether the rages. Note: When process or project kno | ne requirements are parameter specific. |
| GENERATOR'S STATE LABORATORY REQUIR agency for chemical laboratories. | REMENTS. The laboratory meets the requ | uirements of the generator's State or cognizar |
| GENERATOR'S STATE CERTIFICATION. The legenerator's State insofar as such official certifications a | aboratory holds a current certification for a | the applicable chemical parameters from the |
| ☑ UTAH CERTIFIED. The laboratory holds a current of Health insofar as such official certifications are given, the laboratory's current certification letter for each parameter. | For analytical work done by Utah-cer | tified laboratories, please provide a conv of |
| Note analytical data that is to represent mixed waste the data in item C.1, must be from a Utah-certified l | e must be Utah certified or from the US aboratory. | EPA. All radiological data used to support |
| LABORATORY CERTIFICATION INFORMATION. | | • |
| Envirocare of Utah, Inc., Attn: Sample Control, Tocele Co For Federal Express use Zip Code 84083). Phone: (435) | ounty, Interstate-80, Exit 49, Clive, Utah 8 9 884-0155 | 14029 |
| Once permission has been obtained from Envirocare, pl 2000 form must be included with the sample containers, parameter tolerances and may be analyzed for additional pa unbreakable glass container via United Parcel Post (UPS) o | . These samples will be used to establish t arameters. Send about two pounds (one lit | he waste's incoming shipment acceptance |
| PRE-SHIPMENT SAMPLES OF WASTE TO ENVIRO | CARE | |
| in the waste. Analyze all waste streams by gamma spectros Plutonium, Thorium, or other non-gamma emitting nuclide | scopy. Obtain sufficient samples to ensure s are present in the material, the waste mu | e that results represent the waste. If Uranium st be analyzed using radiochemistry to |
| in Pi de | ithe waste. Analyze all waste streams by gamma spectro lutonium, Thorium, or other non-gamma emitting nuclide etermine the concentration of these additional contaminar | EQUIRED RADIOLOGICAL ANALYSES: Please obtain sufficient samples to adequately deter the waste. Analyze all waste streams by gamma spectroscopy. Obtain sufficient samples to ensure lutonium, Thorium, or other non-gamma emitting nuclides are present in the material, the waste mu etermine the concentration of these additional contaminants in the material. Detailed radiochemistry |

F.

ATION OF REPRESENTATIVE SAMPLES, ANALYTICAL RESULTS FROM QUALIFIED LABORATORIES, USE OF APPROVED ANALYTICAL AND SAMPLING METHODS, AND ARRANGEMENTS FOR TREATMENT OR NON-PROHIBITED DISPOSAL. I certify that samples representative of the waste described in this profile were or shall be obtained using state- and EPA-approved sampling methods. I also certify that where necessary those representative samples were or shall be provided to Envirocare and to qualified laboratories for the analytical results reported herein. I further certify that the waste described in this record is not prohibited from land disposal in 40 CFR 268 (unless prior arrangements are made for treatment at Envirocare) and that all applicable treatment standards are clearly indicated on this form. I also certify that the information provided on this form is complete, true and correct and is accurately supported and documented by any laboratory testing as required by Envirocare of Utah, Inc. I sertify that the results of any saidlesting have been submitted to Envirocare of Utah, Inc.

Generator's Signature: Title: Health Physicist (Sign for the above certification)



No. of
Pages:
4
(Including this Cover Sheet)

Date:

7 Nov 2000

The state of the s



From: Hans Honerlah

Office: CENAB-EN-HI

Fax No.: 410-962-9184

CORPS OF ENGINEERS

Phone No: 410-962-4972

 To:
 Greg Copeland
 Office:
 2hagris

 Fax No.:
 801-595-8805
 Phone No.:
 801-595-0239

MEMO:

Gred

Attached is is the updated attachment (including PCB statement) for the St Albans waste stream. Moisture range 1 to 2 %. If you need anything please give me a call Thanks

Hans Honerlah

DRIVEN BY A VISION to be the best!

WASTE PROFILE PACKAGE 1 SAINT ALBANS VERTERANS ADMINISTRATION EXTENDED CARE CENTER (VAECC) Remediation Waste

CONTRACTOR SECTION

SITE BACKGROUND

The VAECC facility located in Queens, NY currently maintains a US Nuclear Regulatory Commission (NRC) Possession Only" Byproduct Material License No 31-02892-06, Docket 030-34751, Control No. 125705. The License was issued for residual Strontium 90(Sr-90) contamination resulting from laboratory research performed in the early 1960s. Conditions of the license require that several areas of the VAECC be secured from routine access and placed under radiological control due to elevated levels of Sr-90 surface contamination and bulk material concentrations. The license also requires the Decontamination and Decommissioning (D&D) of the facility.

Stone & Webster, on behalf of the USAACE-NYD is currently conducting D&D activities to support the termination of the NRC license. The waste presented in this Waste Profile represents wastes generated from this D&D activity. Waste will primarily consist of miscellaneous debris (equipment, giassware, furniture, piping, floor tiles), personal protective equipment (PPE), concrete and soil. There has been to freestanding liquids, associated with the former Laboratory activities, encountered during the Dani D Activity. Ale WASTE PROFILE YEAL to by direction of Hans Honerlan

This profile characterizes the demolition debris generated during the decommissioning at the St. Albans VA facility. Approximately 1200 cubic feet of waste will be generated. The debris will packaged into 55 gallon drums and transported via box truck to the disposal facility.

RADIOLOGICAL

Numerous samples for Sr-90 were collected from in-situ materials for volumetric Sr-90 analysis. The results of the sampling indicate that Sr-90 is present in bulk materials at concentrations up to 2500 pCi/g. The characterization survey conducted in preparation for the decommissioning plan also included the use of field instruments and wipe samples. The field instruments were utilized to determine the area of Sr-90 contamination. The wipe samples were utilized to determine the presence of other isotopes typically utilized in a nuclear medicine clinic and the potential for removable contamination. Wipe samples for H-3 and C-14 were analyzed by LSC and wipe samples for Sr-90 were analyzed for gross beta. Table 1 summarizes the maximum results in dpm/100 cm2 for the direct reading instruments and wipe samples. The only notable contamination was in the form of fixed Sr-90 detected by the field instrument, all other isotopes were below NRC "Acceptable License Termination Screening Values" published in the Federal Register Volume 63, Number 222, dated 18 November 1998.

Table 1 - Summary of Maximum Characterization Results

| 2,898,917 |
|-----------|
| 2.746 |
| 25,413 |
| 5,000 |
| |

THE PARTY OF THE P

The maximum range for the isotopes listed in the profile were calculated utilizing the information from Table 1 with the following assumptions and equations;

a) The field instrument utilized for Sr-90 was capable of detecting the beta energies associated with Sr-90 and Y-90. The rule of thumb for range of beta particles is equal to; $R = [E_{max}/2]/(g/cm^3)$. The E_{max} is associated with Y-90 (2.28 MeV). The density of concrete is 2.35 g/cm³. The max range for the beta energy is 2.5 cm. Utilizing a more conservative range of 1 cm to calculate the volumetric concentration can be calculated with the following equation;

EO 1:

$$\frac{pCi}{g} = \frac{dpm}{cm^3} \bullet density \frac{cm^3}{g} \bullet conversion 1 \left(\frac{1m}{60s}\right) \bullet consversio n2(27.03)$$

dpm/cm³ = dpm/100cm² field reading and 1cm depth assumption concrete density = 0.426 cm³/g conversion 1 - converts dpm to dps or becquerel conversion 2 - converts becquerel to pCi

Sr-90 Field Instrument Conversion

$$5,738 \frac{pCi}{g} = 2,989,917 \frac{dpm}{100 cm^3} \bullet 0.426 \frac{cm^3}{g} \bullet \left(\frac{1m}{60s}\right) \bullet (27.03)$$

b) The Sr-90, H-3 and C-14 wipes can be converted utilizing equation 1. The conservative assumptions for input into the equation are identified below:

dpm/cm³ = dpm/100cm² wipe area and 1mm depth assumption concrete density = 0.426 cm³/g

Sr-90 Wipe Sample Conversion

$$52.7 \frac{pCi}{g} = 2,746 \frac{dpm}{10cm^3} \bullet 0.426 \frac{cm^3}{g} \bullet \left(\frac{1m}{60s}\right) \bullet (27.03)$$

H-3 Wipe Sample Conversion

$$487 \frac{pCi}{g} = 25,413 \frac{dpm}{10 cm^3} \bullet 0.426 \frac{cm^3}{g} \bullet \left(\frac{1m}{60s}\right) \bullet (27.03)$$

C-14 Wipe Sample Conversion

$$96\frac{pCi}{g} = 5,000\frac{dpm}{10cm^3} \bullet 0.426\frac{cm^3}{g} \bullet \left(\frac{1m}{60s}\right) \bullet (27.03)$$



CHEMISTRY

的复数 网络的比较级的 化多克尔氏性 网络克姆尔 人

One composite sample was originally collected for TCLP analysis in addition to other waste disposal The composite sample consisted of wall and ceiling material, concrete, wood, glass and piping. The TCLP result indicated a cadmium exceedance of TCLP Regulatory Level. The result was 3.78 mg/l, which exceeded the regulatory limit of 1.0 mg/l, this exceedance indicates a hazardous waste. Eleven additional grab samples, of materials originally included in the composite sample (plus tile, paint, were collected for TCLP cadmium analysis, to determine the actual source of the cadmium. These samples, however, did not detect cadmium. The laboratory also reextracted the original composite sample and reanalyzed for TCLP cadmium, to determine if a laboratory error may have occurred. The result. however, indicated a cadmium presence 15 mg/l TCLP. All individual components of the waste stream have been analyzed for cadmium and no cadmium has been detected. Therefore, the original composite sample is not considered a representative sample of the waste stream, and the waste should not be considered a hazardous waste. The samples were analyzed for PCB's to determine that there were no elevated levels above regulatory guidelines. There were several small transformers located within the facility and the facility being occupied by the U.S. Navy may have utilized a paint that could have contained small quantities of PCB's. All PCB results indicated trace quantities well below regulatory limits.

The waste also contains asbestos containing materials including; vinyl asbestos tiles, mastic and transite board.

TRANSPORTATION AND DISPOSAL

Transportation of the waste will be conducted by Franklin Environmental. Their "Carrier Safety Rating" as of September 19, 2000 is satisfactory. The waste will be disposed of at Envirocare in Utah, under the USACE existing contract with the facility (DACW41-98-D-9003).

SHIPPING DOCUMENTATION AND CONTAINER LABELING

Attached are the waste profiles for demolition debris. Based upon current field scanning result it is anticipated that this waste will be disposed of as a Surface Contaminated Object (SCO) waste. The waste manifests will be prepared in accordance with the profiles. A USACE representative will be required to sign the manifests on the day of shipment.

The material will be labeled and placarded in accordance with the shipping documentation.



P'04

11-04-2000 14:07

PDE_CHIPMENT SAMPLE PROFILE RECORD

| 12/1 | 5/94 | E-SIII MENI | (EC-2000) | TILE RECOID | Revision 0 |
|-------------------------------|--|---|---|--|---|
| Ger | nerator Name: <u>U.S. Army Co</u> | rns of Engineers : (| Generator #/Waste Stream #: | 4032-01 ; Volume of Was | te Material : 2,138 ft ³ ; |
| Co | ntractor Name: Franklin Envir | ronmental Services. Inc | : : Waste Stream Name: Del | molition Rubble ; I | Delivery Date: <u>12/13/00;</u> |
| | cck appropriate boxes: Licensed_ | | | | |
| | ginal Submission: X Y; N | | | | |
| | ne & Title of Person Completing I | | | | Inc. |
| _ | | | | | - |
| *** SIT | SPECIFIC APPROVAL BY AN ENI E. UNAUTHORIZED SAMPLES TH | VIROCARE PROJECT MANA IAT ARE DELIVERED WILL I | GER <u>MUST</u> BE OBTAINED B. BE REFUSED.*** | EFORE <u>ANY</u> SAMPLES ARE S | HIPPED TO THE ENVIROCARE |
| ear and the SA TH | is form is to be completed by the greefully and complete this form describly and dispose of your samples. It sample package, if possible. Simples CANNOT BE ANALY IIS FORM IS COMPLETED. Pleath 84029. | ribing the samples sent for on This form should <u>not</u> be end Should you have any questic ZED FOR THE INCOMI | e waste stream. This informati closed in the sample containe ons while completing this for NG-SHIPMENT FINGERP | ion will be used to determine ho rs or package but should acco m, contact Envirocare at (801 RINT PARAMETERS OR (| w to properly and sately manage, mpany the samples, attached to) 532-1330. PRE-SHIPMENT OTHER ANALYSES UNLESS |
| 1. | CHEMICAL/SAFETY OFFICER | INFORMATION | 3. SAMPLI | E COLLECTION | |
| | Chemical/Safety Officer: Mar | rc Bianco | Sample (| Collection Contact Person | Marc Bianco |
| | Title of Chemical/Safety Officer: | | | Contact Person Site QC | /Safety Manager |
| | Phone <u>(718)298-8613</u> Fir | | *************************************** | | ne & Webster Engineering |
| 2. | Sample Return Street Address (Do | o not use P.O. Box Number): | 4. Waste St | ream Name <u>Demolition</u> | Rubble |
| | Stone & Webster c/o St. | . Alban's VAECC | EPA Haz | zardous Waste Number(s)N | lone- |
| | 179th Street and Linden | Boulevard, Jamaica, N | Y 11425 Y N | Is this a sample of Mixed Waste | ? . |
| 5, | Indicate (Y or N) the expected or PLEASE CIRCLE "Y" or "N" | possible analytical results, ch | naracteristics or components of | any sample of this waste stream | below: |
| | Y N Soil Ph > 12.5 | Y N Soil pH < 2 | YN Volatile Organics | Y N Concrete | Y N Alkaline Materials |
| | <u> </u> | Y N Reducing Agents | YN Dissolved Metals | Y N Organic Halides | Y N Shock Sensitive |
| | Y N Cyanides | Y N Sulfides | Y N Air Reactive | Y N Free Liquids | Y N Pyrophoric |
| | Y N Acids | Y N Caustic Materials | Y N Organic Compounds | Y N Inorganic Compounds | Y N Water Reactive |
| | | Y N Explosives | YN Solvents | Y N Corrosives | Y N Infectious |
| | | Y N Corrosive Materials | Y N Reactive Materials | Y N Manganese | Y N Copper |
| | Y N Mercury | Y N ³ H, ¹⁴ C, ¹²⁹ I or ⁹⁹ Tc | YN OthersAsbestos | | |
| 6, | List major isotopes of concern and | 1 activities: <u>Sr-90 = 2,50</u> | 0 pCi/g max; C-14 = 96 | 5 pCi/g max; H- 47 pCi/g | max |
| 7. | During analyses, our analysts wil nitric and glacial acetic), salt solutions. Please list the associate | utions (including potassium | iodide, potassium nitrate, sodi | um thiosulfate, sodium sulfite), | starch, iodine, and buffered pH |
| .En | ENERATOR'S CERTIFICATION virocare of Utah, Inc., for pre-shipm ENERATOR'S AUTHORIZATION of the precautions described in 6. a | nent analyses. ON THAT SAMPLES MAY | - | • | |
| au the | ENERATOR'S AUTHORIZATIO thorize that Envirocare of Utah, Inc. generator and generator's applicab disposal within 3 months of sam | ., may return these samples to le associates in this project in | the address in 2, above prior to | o or following analysis and prior | r to disposal. I hereby certify that |

Title Civil Engineer

Date 12 Dec 00___

Generator's Safety Officer's Signature

T
(Sign for the above certifications and authorizations.) On Behalf of USACE FUDS Program

PRESHIPMENT SAMPLE AUTHORIZATION

To: Rob Tess

From: Bret Rogers, Envirocare

Date: 12/12/00

PLEASE SEND 5 PRESHIPMENT SAMPLES FOR PROJECT

NUMBER: 4032-01

WASTE STREAM NAME: Demolition Rubble

TO:

ENVIROCARE OF UTAH, INC. US I-80, EXIT 49 TOOELE COUNTY, CLIVE, UT 84029 84083 -IF USING FEDEX

SITE PH: (435) 884-0155

SEND THE FOLLOWING FORMS, AS A MINIMUM, WITH THE SAMPLE: (1). A <u>COMPLETED</u> EC-2000 FORM, (2). A STANDARD SAMPLE CHAIN-OF-CUSTODY, (3). ATTACH A COPY OF THIS AUTHORIZATION TO THE SHIPPING CONTAINER ALONG WITH THE OTHER FORMS REQUESTED.

THE SAMPLE RETURN ADDRESS <u>MUST</u> BE COMPLETED ON THE EC-2000 FORM IN ITEM #2. THE SAMPLES WILL NOT BE ACCEPTED WITHOUT THIS ADDRESS.



SHIPPING CHECKLIST

The following checklist has been developed to assist generators in shipping radioactive waste to Envirocare of Utah (Envirocare). This information is also contained in the "Waste Acceptance Guidelines" document available on Envirocare's website at www.envirocareutah.com.

| Scheduling: Must be established at least 5 working days in advance of requested arrival date |
|---|
| A "Notice to Transport" has been issued by Envirocare for the Waste Profile. Submitted "5 Working Day Advanced Shipment Notification" form to request shipping schedule. Email form to sstory@envirocareutah.com or fax to (435) 884-3549 Shipping schedule has been confirmed by Envirocare. Envirocare's Shipping & Receiving Scheduler: Sandra Story, (435) 884-0155 ext. 1131 |
| Advanced Manifesting: Must be submitted prior to releasing each shipment/conveyance |
| Manifested information is consistent with the approved Waste Profile. Verify that all manifested radionuclides are listed in item C.1 of the approved Waste Profile and that manifested concentrations do not exceed the approved ranges. Verified consignee information on manifests (see below). Consignee: Envirocare of Utah, Inc. Contact: Shipping and Receiving Clive Disposal Site Phone No.: (435) 884-0155 Interstate 80, Exit 49 Clive, UT 84029 Verified Shipment ID Number (XXXX-YY-ZZZZ) XXXX is the generator number, YY is the waste stream number, and ZZZZ is the shipment number (starting with 0001 for the first shipment/conveyance and incrementing by one for each additional shipment/conveyance). If a Hazardous Waste Manifest is submitted, include the Shipment ID Number in Block 15. Submitted manifests to Envirocare at least three days prior to the shipment arrival date. If using Low-Track to generate the Uniform Low-Level Radioactive Waste Manifests (NRC Forms 540/541), please export the manifests and send via email to manifest@envirocareutah.com. Otherwise, fax manifests to "Shipping and Receiving — Manifest" at (435) 884-1721. Low-Track is available at no charge from the National Low-Level Waste Management Program's website at http://mims.inel.gov/web/owa/LTindex. |
| Shipment Paperwork and Inspection |
| □ The original shipping paperwork/manifests plus four copies accompany each shipment (conveyance). Only one copy of the 540/541 is required with the shipment if the electronically signed copy is submitted via email 3 days prior to the shipment arrival date. □ If applicable, a completed and signed copy of the SNM Exemption Certification form has been included with the shipping papers. □ Containers have been inspected and comply with DOT's strong, tight packaging requirements. □ Containers do not contain free standing liquids. |

NOTICE

"RADIOACTIVE MATERIAL LIMITED QUANTITY OF EXCEPTED PACKAGE / MATERIAL?

CAUTOZ

RADIOACTIVE MATERIAL

| 4a Express Package Service Factor province Factor Service Factor Serv | Faults 2Day" Faults Equess Saver Faults Equess Saver Hadbanustey Peatress Freight Services Faults 2Day Freight Faults | | Oly HOLD Week Priority at Feder Los Operator Profest Brown Profest Over | No Yes Separation of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of C | | S 100 Tourisative series in Statumiers you choolers a ligher value. See beach for dealth. Feelight is Day Release Signature Serie and notice addessy malvon chambron chambron segment. | By signing you authoritou us to dealer the subgrant unthoughout obtaining a signature and earne in adamaty and had us harmless tong say resulting chains. The Date I Life what it stalls to least-as processing the control of the Case I Life what it stalls to least-as processing the control of the Case I Life what it stalls to least-as processing the control of the Case I Life what it stalls to least-as processing the control of the Case I Life what it stalls to leave the control of the Case I Life what it stalls to leave the control of the Case I Life what it stalls the control of the Case I Life when I Life what it stalls the control of the Case I Life when I Life what it stalls the control of the Case I Life when I Life what it stalls the control of the Case I Life when I Li | Citarionas Document | 4a Express Package Service Observ.combientamental 159 lbs. — RedEx Place Committee TeelEx Standard Overnight TeelEx Stan | FadEx 20ay* Strandbacket day Ned backets to | 4b Express Freight Service FedEx 1Day Freight* FedEx 2Day Freight Standbusset day Control of the Contr | 5 Packaging 'Desend what seeken 'Desend what seeken 'Seeken de what seeken seek | 6 Special Handling Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery Surday Surday Dalivery | Does this subprant contain datageness goods? No Yes Y | Bill fo: Email Fed Sk. Acct. No. or Dredit Card No. Lakoya. | Total Packages Total Weight Total Declared Value 1/02 | S .00 - Tour lability is limbed to S100 unless you declare a higher value. Sue bockfor details. Fedicities Outp. 8 Releases Signature |
|--|---|----------|--|--|---|---|--|-------------------------------|--|---|--|--|--|--|--|---|--|
| FECEX USA Airbill rects B12785215274 1 From Presentational Senter's Fedex Date 12-12-00 Account Number | COMPANY STONE & Webster Erg. @ ST AllBANS V.A. | State NV | Hat is described to spise of Rocine. To Recipient's SAMAPLE (CAN HTD) PI | OF UTAH., IN | ENTITY HOSE BOOK STATE I-80, EXIT 49 CIN CIVE State UT 219 84083 | Questions? Call 1-800-Go·FedEx" (800-463:3339) Visit our Web site at www.fedex.com | By using the Alabili you agree to the service conditions on the back of this land in our current Sarvice Guide, including terms that kind our Robility. | . USA Airbill mais B212775029 | 1 From Prince poly and preschort Sender's FedEx Date 2 - 2 - 0 Account Number | <u> </u> | Company STONG & Wobster Eng OST. ALBANS VA | Gity QUEENS State NY 21P /1425 | 2 Your Internal Billing Reference Fraxobscound approximate 3 To Recipient's Symple (00 ft) Phone (435) 884-0155 Name | RE OF UTA | Address Topele County The complete to the Desitivo Control Transcription | State of IVE State UT ZIP 84083 | Questions? Call 1-800-Go-FedEx* (800-463-3339) |

Questions? Call 1·800·Go·FedEx[®] (800-463-3339) Visit our Web site at www.fedex.com

By using this Authil you saynes to the seavice conditions on the beack of this Authil and to our current Seavice Outdo, Frethafong terms that limit our fielding.

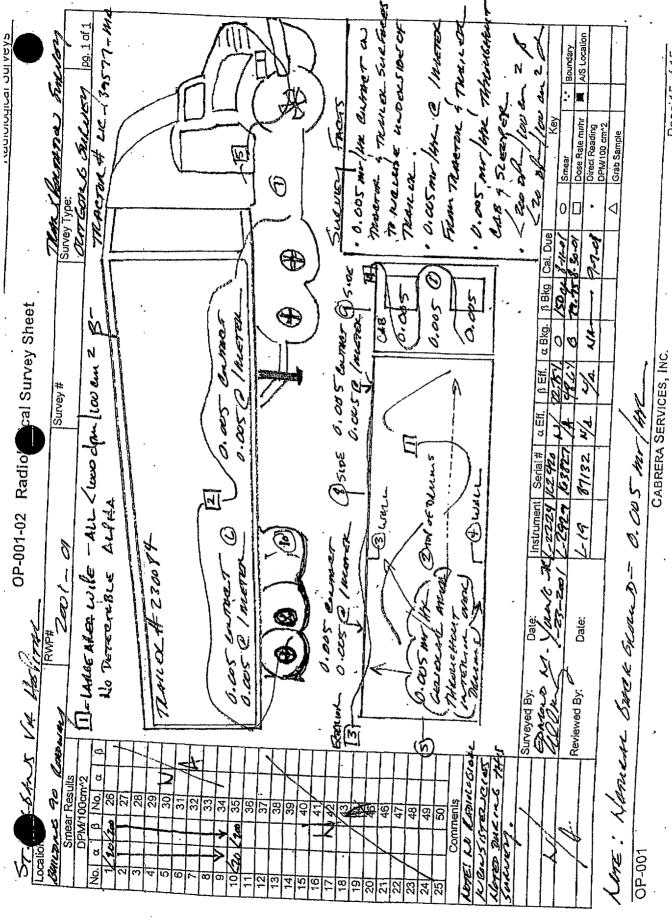
By signing you authorize us to deliver this silipment widrout obtaining a signal and and egases to kindemisity and hold us hemakso from any resuring claims.



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|---|---|--|--|---------------------------------------|--|------------------------------|--|------------------------|--|---|--|--|---|
| | | | | • • • • | | | | | | | | | |
| UNIFORM LOW-LEVEL RADIOACT WASTE MANIFEST | Envirocare of Utah, Inc | CENAE-EN-H 10 South How | | .ny | | SH | PMENT LD. NUMBER 4032-01-002 COLLECTOR PROCESSOR | 7. | FORM 540 AND 540A FORM 541 AND 541A FORM 542 AND 542A ADDITIONAL INFORM | • | OF 7 PAGE(S) 24 PAGE(S) None PAGE(S) None PAGE(S) | 8. MANIFEST NUI (Use this numbe pages) 4032-01 | r on all continuation |
| SHIPPING PAPER | | USER PERMI | IT NUMBER | | MENT NUMB | ER X | GENERATOR T | YPE 9. | . CONSIGNEE - Name : | and Facility Address | *** | CONTACT | |
| EMERGENCY TELEPHONE NUMBER (Include Area Code) 800-428-9878 | , | CONTACT Mr. Hans H | | | | TEI | EPHONE NUMBER | C | invirocare of Litah, inc. live Disposal Site | • | | Shipping and Recei | nng FR (Include Area Code) |
| ORGANIZATION Franklin Environmental Services | | | | | | . (41) | 110-962-9184 | ä | ileratate 80, Exit 43 live, UT 84029 | | | (435)884-0155. | |
| 2. : 'IS THIS AN "EXCLUSIVE USE" SHIPMENT? 3. TOTAL NUMBER OF PACKAGES IDENTITIONS OF THE PACKAGES IDENTITIONS OF | FIED | 6. CARRIE Franklin Envi 185 Industrial | R — Name and Address frompental Service I Road | | | EP/ MA | A LD. NUMBER D084814136 | SI | IGNATURE - Authorize | id consignee acknowle | dging waste receipt | DATE | |
| YES ON THIS MANIFEST | | Wrentham, M. | A 02093 | | | | PPING DATE | | | | CERTIFICATION | | |
| 4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY X NO | | CONTACT Rober | rt Tess | | | TEI | EPHONE NUMBER Juda Area Code) 00-426-9878 | COST | unos unau uno mauenais a | ire classified. Dackage | C. marked, and labeled | described, packaged, mar ons of the Department of I and are in proper condition orts 20 and 61, or equivale | n fo <i>r</i> transnortation and |
| THIS SHIPMENT? If "Yes," provide Manifest Number | | SIGNATURE | - Authorized carrier ec | knowledging wash | • | DA* | | | UTILIORIZED SIGNATUI | RE PAL | TITLE | _ | DATE |
| 11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number. | 12. | 13. | 14. | | - - | | 15. | (/ z | BEHARTON | - ErsACE 16 | PROJECT 1 | SAGINESE. 18. TOTAL WEIGHT | Z4 JAV O/ 19. IDENTIFICATION |
| and any additional information | DOT LABEL "RADIOACTIVE" | TRANSPORT INDEX | PHYSICAL CHEMICAL | L AND FORM | | R | INDIVIDUAL ADIONUCLIDES | | TOTAL PA | ACKAGE ACTIVITY MCI | LSA/SCO CLASS | OR VOLUME (Use appropriate units) | NUMBER OF PACKAGE |
| Radicactive material, excepted package-limited quantity o material, 7, UN2910 | | NA | Solid /NA | | C-14 | H-3 | Sr-90 | | 2.3510E-01 | 6.3540E-03 | NA NA | 245. LBS; 7.35 FT3 | 001 |
| Radioactive material, excepted package-limited quantity o material, 7, UN2910 | | NA | Solid /NA | | C-14 | H-3 | Sr-90 | | 1.1759E-01 | 3.1780E-03 | NA | | 002 |
| Radioactive material, excepted package-limited quantity o material, 7, UN2910 | f NA | NA | Solid /NA | | C-14 | H-3 | Sr-90 | | 1.1759E-01 | 3.1780E-03 | NA NA | 145. LBS; 7.35 FT3 | 003 |
| Radioactive material, excepted package-limited quantity o material, 7, UN2910 | f NA | NA | Solid /NA | | C-14 | H-3 | Sr-90 | | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 | 004 |
| Radioactive material, excepted package-limited quantity o material, 7, UN2910 | f NA | NA | Solid /NA | | C-14 | H-3 | Sr-90 | | 1.1759E-01 | 3.1780E-03 | NA NA | FT3 145. LBS; 7.35 | 005 |
| Radioactive material, excepted package-limited quantity o material, 7, UN2910 | NA NA | NA . | Solid /NA | | C-14 | H-3 | Sr-90 | | 1.1759E-01 | 3.1780E-03 | NA NA | FT3 145, LBS; 7.35 | 006 |
| Radioactive material, excepted package-limited quantity o material, 7, UN2910 | r NA | NA . | Solid /NA | ., | C-14 | H-3 | Sr-90 | | 2.3510E-01 | 6.3540E-03 | NA NA | FT3 245, LBS; 7.35 | 007 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA . | Solid /NA | | C-14 | H-3 | Sr-90 | | 2.3510E-01 | 5.3540E-03 | NA NA | FT3 245, LBS; 7.35 | 008 |
| FOR CONSIGNEE USE ONLY | | <u> </u> | | - | | | | | <u> </u> | | | FT3 | |
| | Record Waste Descr Contamination or Le | • | uate |). TERMS AND C A. HAZAR hazardi | CONDITION RIDOUS MAT Ious waste, ti ation as requ | ERIALS: G | enerator represents & tis also accompanied | warrants by a sep | s that Waste Material parate and completed ha | is (or) is no | ot a hazardous waste a st, along with the appro | s defined in 40 CFR 261. priate land-disposal restri | Where the material is a story notice and/or |
| | Unexpected Exposur | | | B. TITLE: | Upon accer | stance at the | disposal site by Fou | imcare of | filiah ing and all anne | | | te Material which conform | |
| | Labels, Markings, etc | | | , operato | AH001019 1101 | Can per reper char | membots trateates stolls | Generato | ar and be vested in Envi | rocare of Utah, Inc. | | • | |
| | . Container Integrity In | • | | C. WASTE all resp | E MATERIAL pects and in a | : Generato | r represents and warr with all applicable gov | ants that remments | all data set forth in this al laws, rules, regulation | (UNIFORM LOW-LEV | EL RADIOACTIVE WA | STE MANIFEST) are true | and correct in |
| | Other , | | ļ | D. INDEM | MIFICATION | . Canamin | r narese to indemnite | Condense. | | | | | arch losses or |
| | No Violations Detect | ed on this Shi | pment. | Rability MANIFI | results from EST,) or if th | the failure o is shipment | of the Weste Material fails to meet the stan | to confor dards pre | m in all material respect escribed by the Departm | s to the data supplied ent of Transportation o | on the (UNIFORM LOV or any governmental ag | and Sability whatsoever if V-LEVEL RADIOACTIVE \ ency having jurisdiction o | VASTE er such matters. |

FORM 540 (10-96)

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Page 15 of 15

FORM 540A UNIFORM LOW-LEVEL RADIOACTIVE Envirocare of Utah, Inc.

2.3510E-01

2.3510E-01

7.0448E-01

5.8608E-01

6.3540E-03

6.3540E-03

1.9040E-02

1.5840E-02

NA

NA

NA

245. LBS; 7.35

645, LBS; 7,35

545. LBS; 7.35

245. LBS; 7.35 037

043

FT3

FT3

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FT3

MANIFEST NUMBER (Use this number on all continuation pages) 4032-01-002

| | • | | SHII | PPING PAPER (CONT | INUATIO | 4) | | | | | PAGE 2 0 | F 7 PAGES |
|-----|--|-----------------------------------|---------------------------|--------------------------------------|---------|-------------|------------------------------|------------|------------------------------|-------------------------|--|--|
| | U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional knormation. | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | INC RADI | 15. DIVIDUAL ONUCLIDES | TOTAL PAG | 16. CKAGE ACTIVITY mCi | 17. LSA/SCO CLASS | 18, TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER-OF PACKAGE |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA ' | NA . | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 011 |
| • | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 012 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 014 |
| _ | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | . Solid /NA | C-14 | H-3 | Sr-90 . | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 015 |
| • . | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-91 | 6.3540E-03 | NA NA | 245, LBS; 7.35 FT3 | 016 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 018 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 020 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA | Solid /NA | C-14 | н-з | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 022 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 024 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 026 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 030 |
| | Radicactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 031 |
| | Radicactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 032 |
| | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 033 |
| | Charles At a second of the sec | | | | | | | | | | | |

H-3

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C-14

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Sr-90

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WASTE MANIFEST

Solid INA

Solid /NA

Solid /NA

Solid /NA

FORM 540A (10-98)

material, 7, UN2910

material, 7, UN2910

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Radioactive material, excepted package-limited quantity of

Radioactive material, excepted package-limited quantity of

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| FORM 540A | | | | | | | | Envir | Envirocare of Utah, Inc. | ₆₀ | MANIFEST NUMBER Clear this number on all confinished |
| <i>:</i> | | UNIF | FORM LOW-LEVEL RADIOACTIVE | OACTIV | щ | | | | ; | pages) 4032-01-002 | 002 |
| | | | WASTE MANIFEST | | | | | | | | |
| | | HS. | IPPING PAPER (CONTINUATION) | UATION | _ | | | | | PAGE 3 OF | 7 PAGES |
| 11. U.S. DEPARTHENT OF TRANSPORTATION DESCRIPTION (Including proper stipping rame, board class, UN ID number, and bay additional formation | 12. DOT LABEL "RADIQACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | INDIVI RADIONI | 15. INDIVIDUAL RADIONUCLIDES | TOTAL PAC | 16. FOTAL PACKAGE ACTIVITY MBq mCI | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use soxociate units) | 19, IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | ₹ | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | | | 045 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΑN | Solid //A | C-14 | £3 | Sr-30 | 3.5224E-01 | 9.5200E-03 | NA | 345, LBS; 7.35 FT3 | 052 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | C-14 | ? I | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥ | 345. LBS; 7.35 FT3 | 053 |
| radoactive material, excepted package-limited quantity of material, 7, UN2910 | AN. | ¥ | Solid /NA | C-14 | ¥ | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 054 |
| Nationactive material, excepted package-limited quantity of material, 7, UN2910 | Ş. | ≨ | Solid MA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 990 |
| radioacuve material, excepted package-limited quantity of material, 7, UN2910 | NA A | ğ | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | 245. LBS; 7.35 FT3 | 950 |
| ratioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA. | Solid MA | <u> </u> | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 058 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA NA | Solid MA | 24 44 | Ŧ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 059 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | \$ | Solid INA | C-14 | ¥ | 06-rs | 2.3510E-01 | 6.3540E-03 | AN | 245. LBS; 7.35 FT3 | 061 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA. | A A | Solid MA | C-14 | Н-3 | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | 245. LBS; 7.35 FT3 | 790 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ¥ | Solid /NA | 24 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 063 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | AA A | ¥. | Solid /NA | <u>2</u> | ĩ | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | | 064 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | AN AN | ≨ | Solid /NA | <u>2</u> | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | AA A | 245. LBS; 7.35 FT3 | 065 |
| National of material, excepted package-imited quantity of material, 7, UN2910 | ¥ | ₹ | Solid MA | C-14 | £. | Sr-90 | 2.3510E-01 | 6.3540E-03 | AN M | 246. LBS; 7.35 FT3 | 990 |
| radioactive material, excepted package-umited quantity of material, 7, UN2910 | ΑN | ş | Solid /NA | <u>7</u> | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | Ā | 245, LBS; 7.35 FT3 | 068 |
| radioactve material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ₹. | Solid MA | 4 | ¥ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | + | 690 |
| Nadioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid INA | ? 4 | ? <u>+</u> | Sr-90 | 2.3510E-01 | 5.3540E-03 | ΑN | 1 | 071 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | T | 074 |
| FURAL SALA (10-96) | | | | | | | | | | | |

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| FORM 540A | | | | | | | | Envi | Envirocare of Utah, Inc. | 85 | MANIFEST NUMBER (Use this number on all continuation |
| <i>±</i> . | | CNIFC | FORM LOW-LEVEL RADIOACTIVE | OACTIVE | | | | | | · 4032-01-002 | 902 |
| | | | WASTE MANIFEST | | | • | | | • | | |
| | | 出 | PPING PAPER (CONTINUATION) | UATION) | | | | | | PAGE 4 OF | 7 PAGES |
| 11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper elépping name, hazard class, UN ID number, pard existent description and only excluded information. | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | 16, INDIVIDUAL RADIONUCLIDES | UAL | TOTAL PA | 16. TOTAL PACKAGE ACTIVITY MB0 | 17. LSA/SCO | 18, TOTAL WEIGHT OR VOLUME | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | | ₽ | Solid /NA | 244 | £. | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 | 9.20 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid INA | C-14 | 2 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 1 | 078 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | Į | ? | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 880 |
| Kadloactive material, excepted package-limited quantity of material, 7, UN2910 | W. | NA | Solid /NA | C-14 4 | H-3 | Sr-80 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.36 FT3 | 093 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | Υ _Α | ΝΆ | Solid /NA | C-14 | ĩ | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 094 |
| katioacuve material, excepted package-limited quamtity of material, 7, UN2910 | NA | ¥ | Solid INA | C-14 | r F | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 246. LBS; 7.35 FT3 | 102 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | C-14 | £. | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA A | 245. LBS; 7.35 FT3 | 103 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | | ¥. | Solid /NA | 6.14 | r T | Sr-90 | 2.3510E-01 | 8.3540E-03 | ¥ | 245. LBS; 7.35 FT3 | 108 |
| Radioactive material, excepted peckage-limited quantity of material, 7, UN2910 | | ΑM | Solid MA | C-14 | £ | Sr-90 | Z.3510E-01 | 6.3540E-03 | AN A | 245. LBS; 7.35 FT3 | 110 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | | NA | Solid INA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 346, LBS; 7.35 FT3 | 112 |
| Hadioactive material, excepted package-limited quantity of material, 7, UN2910 | | AN. | Solid MA | C-14 | ? ? | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥ | 345. LBS; 7.35 FT3 | 113 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | | NA. | Solid MA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥. | 345. LBS; 7.35 FT3 | 119 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ΑN | ΑA | Solid MA | 2 | 2 2 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 123 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥. | ≨ | Solid MA | l | 2 | Sr-90 | 3.5224E-01 | 9.5200E-03 | ŃĄ | 345. LBS; 7.35 FT3 | 124 |
| Kadocardve material, excepted package-limited quantity of material, 7, UN2910 | ₹ | \$ | Solid MA | 4 | r T | Sr-90 | 3.5224E-01 | 9.5200E-03 | WA | 345. LBS; 7.35 FT3 | 125 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | \$ | Solid MA | 41-7 | 2 2 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 346. LBS; 7.35 FT3 | 126 |
| Nadioactive materia, excepted package-limited quantity of material, 7, UN2910 | NA | \$ | Solid MA | 4 | 2 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 146. LBS; 7.36 FT3 | 128 |
| rantoactive material, excepted package-limited quantity of material, 7, UN2910 Fow. 6504 40.00 | V. | \$ | Solid /NA | C-14 | 2 2 | Sr-90 | 1.1759E-01 | 3.1780E-03 | AN | 145. LBS; 7.35 FT3 | 129 |
| (gen) Your way. | | | | | | ļ. | | | | | |

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| FORM 540A | | | | | | | | Envi | Envirocare of Utah, Inc. | zó | MANIFEST NUMBER (Use this number on all continuation |
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| | | UNIFORM | | IOACTIV | ш | | | | | pages) 4032-01-002 | -002 |
| | | SHIPPIN | WASTE MANIFEST PING PAPER (CONTINUATION) | UATION | | | | | | PAGE S OF | 7 PAGES |
| 11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hezard dass, UN 10 number, and any additional information | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | ļ | 15. INDIVIDUAL RADIONUCLIDES | S CLIDES | TOTAL PAC | 16. TOTAL PACKAGE ACTIVITY MBq mCi | 17. LSASCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | \$ | Solid /NA | C-14 | #3 | Sr-90 | 3.5224E-01 | 9.6200E-03 | NA | 345. LBS; 7.35 FT3 | 139 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ₹. | Solid /NA | C-14 | H3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA N | 345. LBS; 7.35 FT3 | 140 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid MA | C-14 | £3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA A | 345. LBS; 7.35 FT3 | 143 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | C-14 | ? <u>`</u> | Sr-90 | 3.5224E-01 | 9.5200E-03 | Y. | 345. LBS; 7.35 FT3 | 145 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ψ | Solid /NA | 2-7-7- | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | AN | 345. LBS; 7.35 FT3 | 150 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid MA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | AM | 346, LBS; 7.35 FT3 | 163 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΔN_ | Solid /NA | 7. | ? | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA A | 345, LBS; 7.35 FT3 | 167 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA. | Solid INA | ₹ | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 168 |
| Radioactive material, excepted package-limited quantity of materia, 7, UN2910 | NA | NA | | 7. | 뜻 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 170 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΔA | Solid INA | 2 | ? | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 171 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | AA A | ΑA | Salid INA | C-14 | £ ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | Ą | 345. LBS; 7.35 FT3 | 172 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA_ | Solid MA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | 345. LBS; 7.35 FT3 | 174 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid MA | <u>2</u> | ? | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 181 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | <u>2</u> | Ĩ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA A | 345, LBS; 7.35 FT3 | 182 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ΑĀ | NA. | Solid /NA | C-14 | | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥ | 345. LBS; 7.35 FT3 | 189 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | 5-7 4 | £ | Sr-90 | 3,5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 192 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Α× | NA | Solid MA | 5-14 | Ŧ | Sr-90. | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 195 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ≨ _ | Solid INA | C-14 | Н-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 | 198 |

FORM 540A

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

Envirocare of Utah, Inc.

MANIFEST NUMBER
(Use this number on all continuation pages)
4032-01-002

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| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | RADI | 15. DIVIDUAL ONUCLIDES | TOTAL PAG MBq | 16. CKAGE ACTIVITY MCI | 17. LSA/SCO CLASS | 18, TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19, IDENTIFICATION NUMBERIOF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA . | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 205 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | · NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA NA | 545. LBS; 7.35 FT3 | 208 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA. | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | 645. LBS; 7.35 FT3 | 236 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA NA | 545, LBS; 7.35 FT3 | 238 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 244 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545, LBS; 7.35 FT3 | 248 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA NA | 545. LBS; 7.35 FT3 | 256 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA . | 445. LBS; 7.35 FT3 | 258 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA . | 146. LBS; 7.35 FT3 | 279 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | Н-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 281 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | , NA | 445. LBS; 7.35 FT3 | 282 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 289 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | . NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 290 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA . | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | - NA | 445. LBS; 7.35 FT3 | 291 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445, LBS; 7.35 FT3 | 292 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | | 296 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 298 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 FORM 540A (10-98) | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | . NA | 1 * * * | 307 |

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

Envirocare of Utah, Inc.

MANIFEST NUMBER
 (Use this number on all continuation pages)
 4032-01-002

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| 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. ADUAL NUCLIDES | TOTAL PA | 16, CKAGE ACTIVITY mCi | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19, IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145, LBS; 7.35 FT3 | 308 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA · | NA | Solid /NA | C-14 | H-3 | Sr-90 | - 3.5224E-01 | 9.5200E-03 | NA . | | 310 - |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 311 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | | 312 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA . | NA | Solid /NA | C-14 | Н-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 313 |
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FORM 541 Envirocare of Utah, Inc. NUMBER OF PACKAGES/ DISPOSAL CONTAINERS 2. MANIFEST NUMBER PECIAL NUCLEAR MATERIAL (grams) NET WASTE 4032-01-002 NET WASTE VOLUME WEIGHT U-235 **UNIFORM LOW-LEVEL RADIOACTIVE** 11.233 TOTAL 3. PAGE 1 OF 24 PAGE(S) 21.63 kg 13335 R WASTE MANIFEST 103 NP NP NP NP 757.05 ton 4. SHIPPER NAME. 14.70 CONTAINER AND WASTE DESCRIPTION ACTIVITY U.S. Army Corps Of Engineers ALL NUCLINES TRITIUM SOURCE C-14 To-99 1-129 Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste 3.4523E+01 4.9320F+00 MBq 4.9320E+00 ALD (kgs) SHIPMENT ID NUMBER MA 9.3307E-01 1.3330E-01 1.3330E-01 mCi MD NP 4032-01-002 (tons NA DISPOSAL CONTAINER DESCR EACH WASTE TYPE IN CONTAINER IS WASTE PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 15. RADIOLOGICAL DESCRIPTION CLASSIFI SURFACE 8. WASTE 11. 12. APPROXIMATE 13. CATION AS-Class A CONTAINER AND CONTAINER SURFACE CONTAMINATION WASTE WASTE SOLIDIFICATION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBg) AND IDENTIFICATION CONTAINER VOLUME M8g/100 cm2 Stable AU-Class A RADIATION DESCRIPTOR OR STABILIZATION CHEMICAL FORM VOLUME(S) IN CHEMICAL FORM %
CHELATING AGENT CHELATING CONTAINER TOTAL: OR CONTAINER TOTAL ACTIVITY NUMBER / DESCRIPTION WEIGHT LEVEL (See Note 2 CONTAINER MEDIA AND RADIONUCLIDE PERCENT GENERATOR (See Note 1 & Unstable (m3) (F13) R Note 241 (See Note 3) AGENT B-Class B C-Class C ID NUMBER(S) mSv/hr Note 1A) AL PHA GAMMA RADIONUCLIDES pCl/gm 1.00000E+01 1.00000E+01 5.00000E+01 001/1 29,39-H 3.3559E-02 3.3559E-02 1.6798E-01 9.0700E-04 9.0700E-04 4.5400E-03 NA NONEMP AS 0.2 111.13 <8.0000E-05 3.3400E-06 0.20 H-3 Sr-90 NP 7.35 0.12 <8.000E-03 2.0000E+02 7.36 Subtotal 6.3540E-03 2.3510E-01 Total 2.3510E-01 6.3540E-03 002/1 39-H 4.5400E-04 NONE/NP .00000E+01 1.6798E-02 0.21 65.77 <8.0000E-05 3,3400E-08 0.20 H-3 Sr-90 1.00000E+01 5.00000E+01 1.6798E-02 8.3990E-02 4.5400E-04 2.2700E-03 NP 7.35 0.07 <8.000E-03 2.0000E+02 7.35 Subtotal 1.1759E-01 3.1780E-03 Total 1.1759E-01 3,1780E-03 003/4 NONFINE NΔ 1.00000E+01 1.6798E-02 4.5400E-04 65.77 2A.3000B.AS 0.21 3.3400E-06 0.20 H-3 Sr-90 1.00000E+0 5.00000E+0 1.6798E-02 8.3990E-02 4,5400E-04 2,2700E-03 NP 7.35 0.07 <8.000E-03 2.0000E+02 7.35 Subtotal 1.1759E-01 3.1780E-03 Total 1.1759E-01 3.1780E-03 NOTE 1: Container Description Codes. For containers/ Note 1A: Bulk Packaging Description Codes NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.) Note 2A: Specific Waste Description Note 3: Solidification and Stabilization Media Codes. (Choose up to hoose one code as may be applicable.) waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP." troose all applicable codes.) three which predominate by volume.) For media meeting disposal site 20. Charcoal 29. Demolition Rubble 38. Evaporator Bottoms/Sludges/ structural stability requirements, the numerical code must be followed A Gondola 21. Incinerator Ash 30. Cation Ion-exchange Media Concentrates by "-S" and the media vendor and brand name must also be identified in item 13. Code 100=NONE REQUIRED Wooden Sox or Crate 9. Demineralizer
 Metal Box 10, Gas Cylinder B intermodal C End-dumo 22. Soil 23. Gas 31. Anion Ion-exchange Media 39, Compactible Trash Dewetered 32. Mixed Bed for-exchange Media 40. Noncompactible Trash Solid 3. Plastic Drum or Pail 11. Bulk, Unpackaged Waste D Roll-off 24. Oil 25. Aqueous Liquid Contaminated Equipment Combustible 41. Animal Carcass Soliditication . Metal Drum or Pail 12. Unpackaged Components 34. Organic Liquid (except oil) 42. Biological Material (except Non-combustible 90. Cement 94. Vinvi Ester Styrena i. Metal Tank or Liner 13. High Integrity Container 26. Filter Media 35. Glassware or Labrage animal carcass) Air Filtration Filters 91. Concrete 99, Other, Describe i. Concrete Tank or Liner 19. Other Describe in Item 6 27. Mechanical Filter 28. EPA or State 36. Sealed Source/D 37. Paint or Plating Sealed Source/Device 43. Activated Material Asbestos (encapsulation) 92. Bitumen in item 13, or Polyethlene Tank or Liner or additional page,

Hazardous

59. Other, Describe in item 11,

or additional page

8. Fiberglass Tank or Liner FORM 541 (10-96)

additional page

100, None Required.

93. Vinyi Chlorida

| FO | RM | 54 | 1/ |
|----|----|----|----|

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| | | | | CONTAINE | R AND WAS | TE DESCR | IPTION (CONTINU | IATION) | | | | | 3. PAGE 2 OF 24 | 4 PAGE(S) | |
|--|--|---------------------|--|-------------------------------------|---|-------------------------|---|--|-----------------------|--|-------------|---|---|--|---|
| | DISPOSAL CO | VIAINER DESC | RIPTION | | , | | | | WASTE DESCRIPTA | ON FOR EACH WAS I | E TYPE IN C | | | 16 | 6.WASTE |
| 5, CONTAINER IDENTIFICATION . NUMBER / GENERATOR ' | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (f3) | 8. WASTE AND CONTAINER WEIGHT | 9, SURFACE RADIATION LEVEL | 10. SURF CONTAM MB0/10 dpgs/10 | INATION 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (IT3) (FT3) | 13, SOLIDIFICATION | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL RADIONI CONTAINER TOTAL: | NOGICAL DESCRIPTION UCLIDES AND ACTIVITY (ME OR CONTAINER TOTAL ACT DIONUCLIDE PERCENT | Bq) AND AS | CLASSII CATIOI AS-Clas Stable AU-Clas Unstail B-Class |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (F13) | (200 1100 2) | | IF>0.1% | RADIONUCLIDES T DC | Vgm MBq | mci d | C-Class |
| 004/1 | 4 | 0.21 | 65.77 | <8,0000E-05 | NP | 3.3400E-06 | 39-H | 0.20 | NA | NONE/NP . | NP | C-14 1.000 | 00E+01 1.6798E-02 00E+01 1.6798E-02 00E+01 8.3990E-02 | 4.5400E-04 | AS |
| | | 7.35 | 0.07 | , <8.000E-03 | NP | 2.0000 E+ 02 | | 7.35 | | | | Subtotal | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | | Total | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | l | | | | | | | | |
| 006/1 | 4 | 0.21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-H | 0.20 | NA NA | NONE/NP | NP | C-14 1.000 H-3 1.000 Sr-90 5.000 | 00E+01 1.6798E-02 00E+01 1.6798E-02 00E+01 8.3990E-02 | 4.5400E-04 4.6400E-04 2.2700E-03 | A\$ |
| | | 7.35 | 0.07 | <8.000E-03 | NP | 2.0000E+02 | | 7.36 | | | | Subtotal | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | | Total · | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | <u> </u> | | | | | |
| * GOB/1 | 4 | 0,21 | 65,77 | <8.0000E-05 | NP | 3.3400E-66 | 39-H | 0.20 | NA | NONE/NP | KР | H-3 1.000 | 00E+01 1.6798E-02 00E+01 1.6798E-02 00E+01 8.3990E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | , | 7,35 | 0.67 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 1.1759E-01 | 3.1780E-03 | |
| | : | | , | | | | | | | | | Total | 1.1759E-01 | 3.1780E-03 | |
| | | l i | | | | | | | | ! | | | -] | i 🚺 | |
| 007/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 00E+01 3.3559E-02 00E+01 3.3559E-02 00E+01 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7,35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | , | | Subtotal . | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | Total | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | | | | |
| 008/1 | • | 0.21 | 111,13 | <8,0000E-05 | NP | 3,3400E-06 | 39,29-H | 0.20 | NA | NOMEND | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 00E+01 3.3559E-02 00E+01 3.3559E-02 00E+01 1.6798E-01 | 9.0700E-04 A 9.0700E-04 4.5400E-03 | AS |
| | | 7,35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 11 | 6.3540E-03 | |

FORM 541A (10-96)

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|-------------|---|------------------------|--------------------------------|---------------|--|-----------------------------|---------------------------|--|--|------------------------------------|---|----------------|--------------------------|--------------|---|--------------|-------------------------------------|
| • | VI L | | | _ | UNIFOR | M LOW-LEVE Wastf ma | LEVEL F | UNIFORM LOW-LEVEL RADIOACTIVE WASTF MANIFEST | IVE | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER 4032-01-002 | UMBER 102 | |
| | • | | | | | | | 3 | | | | | | L | - | | |
| 11 | | DISPOSALCON | DISPOSAL CONTAINER DESCRIPTION | 1 1 | CONTAINE | R AND WAS | TE DESCRI | CONTAINER AND WASTE DESCRIPTION (CONTINUATION) | HATION | | - 1 | | | | 3. PAGE 3 OF 24 PAGE(S) | 24 PAGE(S) | |
| | vis | t | | | | <u>_</u> | | | PHYSICAL DESCRIPTION | WAS TE DESCRIPTI | 10N FOR EACH WASTE TYPE IN CONTAINER 14. CHEMICAL DESCRIPTION | E TYPE IN CO | | | | | 16.WASTE |
| | CONTAINER IDENTIFICATION NUMBER / | CONTAINER DESCRIPTION | YOUUME | AND CONTAINER | SURFACE RADIATION | CONTAMINATION MBd/100 cm2. | NACE INATION 00 cm2 | WASTE DESCRIPTOR | 12. APPROXIMATE WASTE VOLUME(S) IN | SOLIDIFICATION OR STABILIZATION | | WEIGHT % | | RADIONUCLIDE | 19. MADIONUCLOES AND ACTIVITY (MBq) AND CONTAINER TOTAL OF CARTAINED TOTAL ACTIVITY | (Bq) AND | CATION AS-Class A Stable |
| | GENERATOR ID NUMBER(S) | (See Note 1 & Note 1A) | (ET) | 3 | m\$vlh | | BETA | & Note 2A) | CONTAINER (m3) (FT3) | MEDIA (See Note 3) | CHELATING AGENT | AGENT AGENT | | AND RADIONUC | LIDE PERCENT | | AU-Class A Unstable B-Class B |
| | | | | | TOTAL STATE OF THE PARTY OF THE | | GAMMA | | | | | | RADIONUCLIDES | pCi/gm | MBq | Н | C-Class C |
| | | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3 | |
| , , | | | | | • | - | | - | | | | | • | | | | |
| - | 8 173 | 4 | 0,21 | 111,13 | 3 <8.0060E-05 | 물 | 3.3400E-06 | 39,29-H | 0.20 | ¥ | NONENP | | C-14 H-3 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 | AS |
| | | | 7.35 | 0.12 | 2 <8.000E-03 | S. | 2.0000E+02 | | 7.38 | | | <u>a</u> | 2r-90 | 6.00000E+0 | | | |
| L | | | | | | | | | | | | | Subtotal | | 2:3510E-01 | | |
| | | | | | | | | | | | | | Į į | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | _ | | | | | | |
| <u>- ·</u> |) 1214 | * | 0.21 | 111.13 | <8.0000E-05 | 2 | 3.3400E-06 | 39,28-H | 020 | NA | NONEINP | | C-14 H-3 | 1.00000E+01 | 1 3.3559E-02 | 9.0700E-04 | SY |
| | | | 7.35 | 0.12 | <8.000E-03 | ď | 2.00006+02 | | 7.38 | | | Š. | | 5.00000E+0 | | | |
| |] | | | | | | | | | | | | eutrotal | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | | Total | | 2.3510E-01 | 6,3540E-03 | |
| | | | | | | | | | | | | - | | | | | |
| | DIAIT | * | 9.21 | 111,13 | <8.0000E-05 | Q. | 3.3400E-08 | 38,29-H | 0.20 | NA | NONE/NP | | C-14 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 | AS |
| | | - | 7.35 | 0.12 | <8.000E-03 | 身 | 2,00006+02 | | 7.38 | · · · · · · | | <u>s</u> | ī | 5.00000E+0 | | | |
| | | | | | | | | | | | | | Total | | | | |
| | • | | | | | | | | | | | • | | | 2.3010E-01 | 5.334UE-U3 | |
| | 015/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | £ | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONEMP | OI | C-14 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 | AS |
| | | · l | 7,35 | 0.12 | <8.000E-03 | Đ. | 2,0000E+02 | | 7.35 | | | 8 0 10 | EB | 5.00000E+01 | | | |
| | _ | | , | | | | | | | | | 181 | Patrick 1 | | | | |
| | | | | | | | | | | | | | | | 2.3510E-01 | 6.3540E-03 | |
|]¤ | FORM 541A (10-86) | | | | | | | | | | | | | | | | |

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| | DISPOSAL CON | TAINER DESC | RIPTION | CONTAINE | R AND WAS | STE DESCR | IPTION (CONTINI | JATION) | | | | | 3. PAGE 4 OF | 24 PAGE(S) | |
|--|---|------------------------|--|---|-----------------------|--|---|--------------------------|---|-----------------|-----------------------------------|---|--|--|---|
| | | | | · · | T | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAS | TE TYPE IN C | ONTAINER | | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBERS) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (f3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL mSv/hr | CONTA MBo/ dom/ | FACE MINATION 100 cm2 100 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT % CHELATING AGENT | INDIVIDUAL RADIONI CONTAINER TOTAL | LOGICAL DESCRIPTION JCLIDES AND ACTIVITY (A DR CONTAINER TOTAL A DIONUCLIDE PERCENT | /Bq) AND | CLASSIFI- CATION AS-Class / Stable AU-Class Unstable |
| | | () | (kg) (loa) | mrem/hr | ALPHA | GAMMA | | (F13) | 1 | | IF>0.1% | RADIONUCLIDES DC | ter I to | · · · · · · · · | B-Class 6 C-Class 0 |
| 016/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 1.000 | 49m MBq 00E+01 3.3559E-0 00E+01 3.3559E-0 00E+01 1.6798E-0 | mCi 9:0700E-04 9:0700E-04 | i I |
| · | | 7,35 | , 0,12 | . <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | l ar | Subtotal | 2,3510E-0 | -l | _ |
| | | | | | | | | | | | | Total | 2.3510E-01 | 6.3540E-03 | |
| 018/1 | 4 | | | | | | | | | | | · | | | |
| | | 0.21 | 247.21 | <2.5000E-04 | NP | 3.3400E-06 | 39,29,40-HL | 0.20 | NA. | NONE/NP | NP | C-14 1.000 H-3 1.000 Sr-90 5.000 | 00E+01 8.3990E-02 00E+01 8.3990E-02 00E+01 4.1810E-01 | 2.2700E-03 | : [|
| | | 7.35 | 0.27 | <2.500E-02 | NP | 2,0000E+02 | | 7,35 | | | | Subtotal | 5.8608E-01 | - | .1 |
| ٠ | | | | | : | | | | | | | Total | 5.8608E-01 | 1.5840E-02 | |
| 020/1 | · 4 | | | | | | | | | | | | | | |
| | | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0,20 | NA. | NONE/NP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 3.3559E-02 0E+01 3.3559E-02 0E+01 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2,0000E+02 | | 7.35 | | | | Subtotal | 2.3510E-01 | 6.3540E-03 | |
| | } | | | | | | | | | | | Total | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | | | | |
| 022/1 | 4 | 0.21 | 111,13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-11 | 0.20 | NA. | NONEMP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 3.3559E-02 0E+01 3.3559E-02 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | MP | 2.0000E+02 | | 7.35 | | | | Subtotal 5.0000 | 0E+01 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | |
| | | | | | | | | | | | | Total | 2.3510E-01 | 6.3540E-03 | |
| 07414 | | | | | | | | | | | | | | | |
| 024/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | МP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 3.3559F-02 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS . |
| FORM 541A (10-96) | | 7,35 | 0.12 | <8.000E-03 | NP | 2.0000€+02 | | 7.35 | | 1 | 1. | Subtotal | 2.3510E-01 | | : |

FORM 541A

| | | | 16.WASTE | CATION AS Class A Stable AU Class A | B-Class B C-Class C | | | AS | | | | AS | | | | AS | | :\: | AS | | | |
|-----------------------------------|-----|--|---|--|------------------------|-------------|-------------|--------------------|------------|------------|---|----------------|--------------------------|------------|---|----------------------|------------|-------------|-----------------------------|------------|----------------|---|
| MBER 2 | 0,1 | PAGE(S) | | q) AND IVITY | . [| 6.3540E-03 | | 9.0700E-04 | 6.3540E-03 | 6.3540E-03 | | 9.0700E-04 | 4.5400E-03 6.3540E-03 | 6.3540E-03 | | 9.0700E-04 | 4.5400E-03 | 6.3540E-03 | 9.0700E-04 | 6.3540E-03 | 6.3540E-03 | |
| 2. MANIFEST NUMBER 4032-01-002 | | PAGE 5 OF 24 PAGE(S) | MOTOR | 40 ACTIVITY (MB INSER TOTAL ACT | | 2.3510E-01 | ¥ | 3.3559E-02 | 2.3510E-01 | 2.3510E-01 | | 3.3559E-02 | 1.6798E-01 | 2.3510E-01 | | 3.3559E-02 | | 2.3510E-01 | 3.3559E-02 | | 2.3510E-01 | |
| | , | 3.5 | 15 BADIO OCIONI DICEOCOM | INDVIDUAL RADIONUCLIDES AND ACTIVITY (REG) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY (REG) AND ADDIONUCLIDES AND ACTIVITY (REG) AND RADIONUCLIDE PRESENT | wo!!Jos | | | 1.00000E+01 | 101200000 | | - | 1.00000E+01 | | | • | 1.00000E+01 | | | 1.00000E+01 | | | - |
| Envirocare of Utah, Inc. | | | 14 | INDIVIDUAL RA | 830 | | | | - | | | | ··· | | | | | | 4-4-1 | 9 | | |
| | | | NFAINER | | RADIONUCLIDES | Total | | 0.14 1.3 1.3 | Subtotal | Total | | 4.5.4 4.3.4 | Subtotal | Total | | 0.44 1.34 1.34 | Subtotal | Total | 0.7.7.4 0.7.7.4 0.3.4 | Subtotal | Total | |
| | , | | SCRIPTION | WEIGHT | AGENT IF >0.1% | | | 9 | | ٠. | | | } | | | 9 | | 11172 | 9 | | - | |
| | , | 3000 | 14. CHEMICAL DE | CHEMICAL FORM | : | | | NONEMP | | | | NONEMP | | | | NONEINP | | | NONE/NP | | | |
| | | Omoreo see | WASTE DESCRIPTION FOR EACH WASTE I THE INCONTAINER PTION 14. CHEMICAL DESCRIPTION 1 | 13. SOLIDIFICATION OR STABILIZATION MEDIA | (See Note 3) | | | NA | | | | NA | | | | NA | | | ď | | | |
| | | | SICAL DESCRIPTION | 12. APPROXIMATE 13. WASTE SOLII VOLUME(S) IN OR STA | (F13) | | | 0.20 | 7,35 | | | R R | 7.35 | | | 0.20 N | 7.35 | · | 0.20 NA | 7.36 | | |
| L KADIOACIIVE NIFFST | | CONTAINER AND WASTE DESCRIPTION (CONTINUATION) | PHY | WASTE 12, A USESCRIPTOR V (See Note 2 | | | | <u> </u> | | | | _ | | | | | | | | • | | |
| KAU IFFST | 2 | NOLL AIR | | ±, ₩, | • | | | 39,29-H | 64 | | | 39,29-11 | - 2 | | 1 | 39,29.H | - 2 | | 39,29-H | 21 | ··· | |
| WASTE MANIFFST | | STE DESC | | FACE MINATION 100 cm2 100 cm2 | BETA- GAMMA | | | 3.3400E-06 | 2.0000E+62 | | ļ | 3.3400€-06 | 2.0000E+02 | | | 334005-06 | 2.00005+02 | | 3.3400E-06 | 2.0000E+62 | | |
| UNITORIM LOW-LEVE WASTF MA | | S AND WAS | | 10. SURFACE CONTAMINATION MBq100 cm2. dpm/100 cm2. | ALPHA | | | СEV | <u>C.</u> | | | 92 | 92 | | | Ϋ́ | Ŗ | | ₽ | Ϋ́ | | |
| | | CONTAINE | | 9. SURFACE RADIATION LEVEL | mSvftr | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8,0000E-05 | <&.000E-03 | | <8.0000E-05 | <8,000E-03 | | |
| י | | ١ | | 8. WASTE AND CONTAINER WEIGHT | (kg) | | | 111.13 | 0.12 | | | 111,13 | 0.12 | | | 111.13 | 0.12 | | 111.13 | a.12 | | |
| | • | TAINER DESCRI | | ш | (Ca) | | | 전 | 7,35 | | | 20 | 7,38 | | | 120 | 7.38 | | 0.21 | 7.35 | - | |
| | | DISPOSAL CONTAINER DESCRIPTION | | CONTAINER DESCRIPTION (See Note 1 & | Note 1A) | • | | 4 | | | | 4 | | • | | 4 | | | ₩ | | | |
| | | | | CONTAINER IDENTIFICATION NUMBER/ GENERATOR | ID NUMBER(S) | | | 0261 | | | | 030/1 | | - | | 631/1 | | - | 1/250 | | | |

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

3. PAGE 6 OF 24 PAGE(S

| | | | | CONTAINE | R AND WAS | TE DESCR | IPTION (CONTINU | IATION) | | | • | | 3 | , PAGE 6 OF 2 | 4 PAGE(S) | |
|--|---|----------------------|--|---|---------------|---------------------------------------|---|---|-----------------------|--|-------------|--------------------------------|-----------------------------|--|--|---|
| | DISPOSAL COI | NTAINER DESC | RIPTION | | | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAS | E TYPE IN C | | | | | 16,WAST CLASSIF |
| S. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7, VOLUME (m3) (fi3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL mSv/hr | MBa/ dpm/1 | FACE WINATION 100 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (#3) (F13) | 13. SOLIDIFICATION | 14. CHEMICAL DE CHEMICAL FORM CHELATING AGEN | WEIGHT | INDIMOLIAL RAI CONTAINER TO | DIONUCLIDES OTAL; OR CON | L DESCRIPTION AND ACTIVITY (ME ITAINER TOTAL ACT LIDE PERCENT | GQ) ANO | CLASSI CATIO AS-Class Stable AU-Clas Unsta B-Class C-Class |
| 033/1 | 4 | 0.21 | (kg) | membr | ALPHA" | GAMMA | 39,29-H | - | NA . | NONE/NP | 220.1% | RADIONUCLIDES 1 | pCi/gm .00000E+0 | M8q 1 3.3559E-02 | mCi 9.0700E-04 | AS |
| • | | | 111,13 | | NP. | 3.3400E-06 | | 0.20 | Ì | | NP | | .00000E+0 | | | ٠l |
| | | 7.35 | 0.12 | <8.000E-03 | - NP | 2.0000E+02 | | 7.35 | | ļ | | Subtotal | | 2.3510E-01 | 6.3540E-03 | |
| | | | | ļ | | | | ļ | - | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| 034/1 | 4 | - | | | | ļ | 39,29-H | | NA. | MONEGO | | 044 | | | 0.0505 | |
| | | 0.21 | 111.13 | <8,0000E-05 | NP | 3.3400E-06 | - water | 0,20 | I NA | NONEMP | NP | C-14 1 H-3 1 Sr-90 5 | .00000E+0 .00000E+0 | 1 3.3559E-02 1 3.3559E-02 1 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7,35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | |
| · | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | | | | | |
| 037/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-Н | 0.20 | NA | NONE/NP | NP | IH-3 1. | .00000E+0 | 1 3.3559E-02 | 9.0700E-04 9.0700E-04 4.5400E-03 | :1 |
| | | 7,35 | 0,12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | ·I |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | | | | | |
| 043/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | | H-3 1. | .00000E+01 | 1 1.0064E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | NP | Subtotal 5. | .00000E+01 | 7.0448E-01 | 1.9040E-02 | ·I |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | | | | |
| 044/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | | H-3 1. | 00000E+01 | 8.3990E-02 | 2.2700E-03 2.2700E-03 | AS |
| | | 7.35 | 0.27 | <8.000£-03 | NP | 2.00000€+02 | | 7.35 | | | | Sr-90 5. Subtotal | 00000E+01 | 4.1810E-01 5.8608E-01 | 1.1300E-02 1.5840E-02 | |
| DRM 541A (10-96) | L.,, | | | | | | · | <u> </u> | | | L | <u> </u> | | | | <u> </u> |

FORM 541A (10-96)

| FORM 541A | | | - | NIFORM | UNIFORM LOW-LEVE | -4.5 | RADIOACTIVE | ΛĒ. | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER | JMBER | |
|----------------------------------|---------------------------|--------------------------------|--|-------------------------------------|---|--|---|--|---|-----------------|--------------------------|--------------------------|----------------------------------|---|--------------------------|--|
| | | | | | WAS IE MA | MANIF | VITEGI VITEGI | | | | | | <u> </u> | 200 | * | |
| | DISPOSALCO | DISPOSAL CONTAINER DESCRIPTION | | CONTAINER | CONTAINER AND WASTE DESC | T DESCRIP | CRIPTION (CONTINUATION) | MOLTAL | | | | | £ | 3. PAGE 7 OF 24 PAGE(S) | _ | |
| | | | | | | | | PHYSICAL DESCRI | PTION 1 | 14. CHEMICAL | 14. CHEMICAL DESCRIPTION | | 15 RADIOLOGICAL DESCRIPTION | NOTTOROUS | | 6.WASTE CLASSIFI- |
| CONTAINER DENTIFICATION NUMBER / | CONTAINER DESCRIPTION | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURFACE CONTAMINATION MEG/100 cm2 dom/100 cm2 | MATON PER PER PER PER PER PER PER PER PER PER | 11. WASTE DESCRIPTOR (See Note 2 | 12. APPROXIMATE WASTE VOLUME(S) IN | 13. SOLIDIFICATION OR STABILIZATION | CHEMICAL FOR | WEIGHT % | | RADIONUCLIDES R TOTAL: OR CON | INDIVIDUAL RADICINUCLIDES AND ACTIVITY (MBQ) AND CONTAINER TOTAL ACTIVITY | | CATION AS-Class A Stable AU-Class A |
| GENERATOR ID NUMBER(S) | (See Note 1 & Note 1A) | (M3) | (kg) | mSvftr | ALPHA | BETA- GAMMA | & Note 2A) | (FT3) | (See Note 3) | AGENT F>0,1% | AGENT F>0.1% | RADIONUCLIDES | איט השטוטאורנו | JUE PERCENI | Ę | Unstable P.Class B C.Class C |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | ļ. |
| | , | | | | | | • | | | | | | | | , | |
| 945/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | ₽. | 3,3400E-06 | 29,39-H | 07.20 | NA | NONE/NP | . 9 | C-14 H-3 | 1.00000E+01 | 8.3990E-02 | 2.2700E-03 | AS |
| | | 25.7 | 0.27 | <8.000E-03 | g. | 2.0000E+02 | | 7,35 | | | <u></u> | Subtotal | 200000 | | | |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | , | | | | | , | | |
| 1/250 | 4 | 12.0 | 156,49 | <8.0000E-05 | ₽X | 3.34006-06 | 39,23,L-HL | 0.20 | AN | NONEMP | 5 | C-14 H-3 2-3 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | S. | 2.0000E+0.2 | | 7,36 | T | | ž | Subtotal | a.ouedus= | | | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | · | | | | | | | | | | | | | ~ 1 | | |
| NC50 | 4 | 0.21 | 156.49 | <8.0000E-05 | N. | 3.3400E-06 | 39,29,L-HL | 6.20 | NA N | NONE/NP | 9 | 7-7-4 7-3-4 8-3-3 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | ď | 2.0000E+02 | | 7.35 | | | | Subtotal | 200000000 | | | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | - | | | | | | | |
| 054/1 | 4 | 629 | 65,77 | <8.0000E-05 | <u>d</u> | 3,3400E-06 | 7H-7'6€ | 0.20 | NA | NONENP | 2 | C-14 H-3 Sr-90 | 1.00000E+01 | 1.6798E-02 1.6798E-02 8.3990E-02 | 4.5400E-04 4.5400E-04 | St. |
| | | 7.35 | 0.07 | <8.000E-03 | NP 2 | 2.0000E+02 | | 7.35 | | | | Subtotal | | | 3.1780E-03 | |
| : | | | | | | | | | | | | Total | : | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | | | | | | |
| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

1 ---

a

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

FORM 541A

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| | | | | | WASI | E MANI | FEST | | | | | | 4032-01-0 | WZ | |
|--|--|------------------------|---|-------------------|-------------|--|---|---|---|---|-------------|--------------------------------------|---|--|--|
| | : DISPOSAT CO | NTAINER DESCI | PIOTIVNI | CONTAINE | R AND WAS | STE DESCR | PIPTION (CONTINU | JATION) | • | | | | 3. PAGE 8 OF | 24 PAGE(S) | |
| | | • | KIP) KUN | 1 | <u> </u> | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAS | E TYPE IN C | | | | 16.WASTI CLASSIF |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (tt3) | 8. WASTE AND CONTAINER WEIGHT: | LEVEL | CONTA | FACE MINATION 100 cm2 100 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION | 14, CHEMICAL DE CHEMICAL FORM CHELATING AGENT | WEIGHT | INDIVIDUAL RADION CONTAINER TOTAL | DLOGICAL DESCRIPTION UCLIDES AND ACTIVITY (N OR CONTAINER TOTAL AC DIONUCLIDE PERCENT | IRo) AND | AS-Class Stable AU-Class Unstable |
| | | (17.3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | GAMMA | 1 | (F13) | (227.22, | | IF>0.1% | RADIONUCLIDES of | | ··· | 8-Class C-Class |
| 056/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29,L-HL | 0.20 | NA | NONE/NP | | C-14 1.000 H-3 1.000 | Wgm MBq 00E+01 5.0320E-02 00E+01 5.0320E-02 | mCi 1.3600E-03 1.3600E-03 | AS |
| | | 7.36 | 0,17 | , <8.000€-03 | NP | 2.0000E+02 | | 7,35 | 1 | | NP | Sr-90 5.000 Subtotal | 00E+01 2.5160E-01 3.5224E-01 | 6.8000E-03 9.5200E-03 | <u> </u> |
| • | | | | | | | | | | | | Total | 3.5224E-01 | 9,5200E-03 | |
| 056/1 | 4 | | | | | ļ | 39,29-H | | NA. | NONE/NP | | C-14 1 000 | 005.04 0.005 | | |
| | , | 0,21 | 111.13 | - | NP | | 1 | 0.20 | 1 | , AGI, SIL | NP | H-3 1.000 Sr-90 5.000 | 00E+01 3.3559E-02 00E+01 3.3559E-02 00E+01 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | 11 |
| | | 7,35 | 0,12 | <8.000E-03 | NP | 2.0000E+02 | ļ | 7.35 | | | | Subtotal | 2.3510E-01 | 1 | 1 |
| • | | | • | | | - | | <u> </u> | - | | | Total | 2.3510E-01 | 6.3540E-03 | |
| 058/1 | 4 | 0.21 | | | | | 39,29,L-HL | | NA NA | NONE/NP | | C-14 1.000 | 00E+01 5.0320E-02 | 1.3600E-03 | AS |
| : | | 7.35 | 156,49 | | MP | 3,3400E-06 | | 0.20 | | | NP | | 00E+01 5.0320E-02 00E+01 2.5160E-01 | 1.3600E-03 6.8000E-03 | |
| | | 1.33 | 0.17 | Ca.uuue-us | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | <u> </u> | | | | | | Total | 3.5224E-01 | 9.5200E-03 | |
| 059/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29,L-HL | 0.20 | NA NA | NONE/NP | | C-14 1.000 | 0E+01 3.3559E-02 | 9.0700E-04 | AS |
| | | 7,35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | H-3 Sr-90 Subtotal | 3.3559E-02 1.6798E-01 | | |
| | | | | | | | | | | , | | Total | 2.3510E-01 2.3510E-01 | 6.3540E-03 | |
| | | | | | • | | | | | | | | 2.33102-01 | 6.3540E-03 | |
|)61/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | , NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | | H-3 1.0000 | 0E+01 3.3559E-02 0E+01 3.3559E-02 | 9.0700E-04 9.0700E-04 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2,0000E+02 | | 7.35 | | | - 1 | Sr-90 Subtotal | 0E+01 1.6798E-01 2.3510E-01 | 4,5400E-03 6,3540E-03 | ĺ |

| 8. MANIPEST NUMBER (Use this number on all continuation pages) 4032-01-002 | CONTACT Shipping and Receiving TELEPHONE NUMBER (Incide Area Code) | (435)884-0168 | DATE | ibed, packaged, marked, and labeled and are | in proper condition for transportation according to the applicable requisitions of the Department of Transportation. This also conditions that the melecials are classified, peradoged, marked, and lebeled and a to improve condition for transportation and applicable the melecials and applicable in accordance with the requisiments of 10 CFR parts 20 and 61, or equivalent state inguisitions. | DATE 24 JANO | 18. TOTAL WEIGHT 19. IDENTIFICATION OR VOLUME NUMBER OF PACKAGE | 245. LBS; 7.35 001 FT3 | 145. LBS; 7.35 002 FT3 | 145. LBS; 7.35 003 FT3 | 145. LBS; 7.35 004 FT3 | 145. LBS; 7.35 005 FT3 | 145. LBS; 7.35 006 | 246. LBS; 7.35 007 FT3 | 245. LBS; 7.35 008 FT3 | TERNS AND CONDITION A HAZARDOUS MATERIALS. Generator represents & warrants that Weste Malerial is (cr). Bind a hazardous waste as defined in 40 CFR 251. Where the material is a hazardous waste as defined in 40 CFR 251. Where the material is a hazardous waste this shipment is also accompanied by a separate and completed hazardous waste with the appropriate land-disposal restriction notice and/or confidention as required by 40 CFR 258.1. | TITE. Upon acceptance at the disposal site by Emirocare of Utah, kro,, and all appropriate regulatory authorities, this to the Waste Material varieth conforms to Generator's representations before stall thereupon transfer from Generator and be vested in Emirocase of Utah, fro. | WASTE WATERUAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEE, RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all sopticable covernmental leve, rules, reputations and Environs and Environs and Environs. | NDEMIFICATION: Consistor agrees to indemnity Envirocare of Ulah, Inc., its officers, employees and agents all asses and teabling whatsoever if such losses or leadily results from the fellure of the Waste Maderial to conform in all material respects to the data supplied on the (UNIFICIAN LOW-LEVEL RADIOACTIVE WASTE MANIFEST) or if this stipment fails to meet the standards prescribed by the Department of Targordation or any government agency havine busistation over such maters. | |
|--|---|---|---|--|--|---|--|--|--|--|--|--|--|--|--|---|---|---|--|------------------|
| 7 PAGE(S) 24 PAGE(S) one PAGE(S) one PAGE(S) | <u> </u> | | · | 10. CERTIFICATION 8 ere properly classified, descri | the applicable regulators of marked, and labeled and imments of 10 CFR Parts 20 | TIME CONTRACTOR | 17. 18. LEANSCO CLASS (Use | NA 245. | NA 14 | NA 145. | NA 145. | NA TE | NA 148 | NA 24 | NA 245. | t a hazardous wasle as delli t, akong with the appropriate | wites, title to the Waste Ma | L RADIOACTIVE WASTEN | nts against all losses and lis n the (UNIFORM LOW-LEV eny governmental agency I | |
| PAGE 1 0 | and Facility Address | | ed consignee acknowlac | 10, erein-named materials e | sportation according to are classified, packaged ocordance with the requi | ATURE COLORAGE MACHINA | 16. TOTAL PACKAGE ACTIVITY MBq mCi | 6.3540E-03 | 3.1780E-03 | 3.1780E-03 | 3.1780E-03 | 3.1780E-03 | 3.1780E-03 | 6.3540E-03 | 5.3540E-03 | is (or) / is no ezerdous waste manifes | ropriate regulatory authority authority. Inc. | (UNIFORM LOW-LEVE are and Environment Little | sers, employees and age as to the data supplied o nent of Transportation or | |
| 7. FORM 540 AND 540A FORM 541 AND 541A FORM 542 AND 542A ADDITIONAL INFORMATION | 9. CONSIGNEE - Name and Facility Address Envirocare of Utah, Inc. Cilve Disposal Site | Interstate 80, Exit 49 Clive, UT 84029 | SIGNATURE - Authorized consignee acknowledging waste reacific | his is to certify that the h | I proper condition for transcribes that the materials isposal as described in a | AUTHORIZED SIGNATURE | | 2.3510E-01 | 1.1759E-01 | 1.1769E-01 | 1.1759E-01 | 1.1759E-01 | 1.1759E-01 | 2.3510E-01 | 2.3510E-01 | nts that Weste Malerial eparate and completed h | of Utah, Inc., and all apparent and be vested in Em | at all data set forth in this nial laws, rules, recutation | care of Utah, Inc., its offic orm in all material respe- rescribed by the Depart | |
| SHIPMENT I.D. NUMBER 4032-01-002 COLLECTOR PROCESSOR | <u>w</u> | ٠ | EPA I.D. NUMBER WAD084814138 | SHIPPING DATE 1/23/01 | TELEPHONE NUMBER (Include Area Code) 800-425-9878 | | 15. INDIVIDUAL RADIONUCLIDES | Sr-90 | rator represents & warrants also accompanied by a s 2008.1. | sposal site by Envirocare pon transfer from Genera | presents and warrants the | prees to indemnify Environ to Waste Material to comfo to meet the standards p | |
| | | (Inchide 410 | EPA I.C | SHIPP | (Include | DATE O 1 | RADIK | ę; | ¥ | ¥ | ? | ? | T T | £ | 7 | ERIALS; Gene ils shipment is: ired by 40 CFR | fance at the da | : Generator re | : Generator ag the failure of th s shipment fails | |
| | SHIPMENT NUMBER 4032-01-002 | : | | 1 | | wasta nacajat | | C-14 | C-14 | 27 | <u>7</u> | <u>?</u> | <u>?</u> | 2 | <u>7</u> | D CONDITION ZARDOUS MAT ZARDOIS WESTE, IT Effication as requ | LE Upon accep resentations hen | STE WATERIAL espects and in a | EMNIFICATION Rity results from NIFEST,) or if thi | |
| ND FACILITY neers 15 | | Honerlath | CARRIER – Name and Addiess Franklin Environmental Service 185 industrial Road | 4A 02093 | CT . Robert Tess | SIGNATURE) Authorized parter acknowledging weste receipt Time III III Commenter | 14. PHYSICAL AND CHEMICAL FORM | Solid /NA | Solid MA | Solid /NA | Solid /NA | Solid MA | Solid /NA | Solid /NA | Solid /NA | £0. | | ď | o. | |
| 5. SHIPPE U.S. Amy C. CENAE-EN + 10 South Ho Ballimore, III | USER PERMIT NUMBER NA CONTACT | . Mr. Hans | 6. CARRIE Franklin Env 185 industrii | Wrentham, IAA 02093 | CONTACT | SIGNATURE | 13. TRANSPORT INDEX | NA | ξ | NA | NA | ΑN | VΑ | ΑN | NA. | iption Inadex Ikage Detec | Rates Det | : Inadequate adecuate | d on this St | |
| Envirocaři of Utah, Inc. TVE | | | | 103 | | | 12 DOT LABEL "RADIOACTIVE" | NA | NA | | NA | NA | NA | NA | NA | Record Waste Description Inadequal Contamination or Leakage Detected | Unexpected Exposure Rates Detected | Labels, Markings, etc. Inadequate Container Integrity Inadequate | Other No Violations Detected on this Shipm | |
| OACT | SHIPPING PAPER (Include Ana Code) | | 7 3. TOTAL NUMBER OF PACKAGES IDENTIFIED | ON THIS MANIFEST | EPA MANIFEST NUMBER | ¥ | ATION DESCRIPTION class, UN ID number, mailon | ckage-limited quantity of | ckage-Ilmited quantity of | ckage-limited quantity of | ckage-limited quantity of | ckage-limited quantity of | ckage-limited quantity of | ckage-limited quantity of | ckage-limited quantity of | | F | | | |
| FORM 540 UNIFORM LOW- WAST | SH EMERGENCY TELEPHONE NUMBER (A 800-428-9878 | ORGANIZATION Frankfin Erwironmental Services | IS THIS AN "EXCLUSIVE USE" SHIPMENT? | YES NO | DOES EPA REGULATED YES WASTE REQUIRING A MANIFEST ACCOMPANY | THIS SHIPMENT? If "Yes," provide Manifest Number | U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information. | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Radioactive material, excepted package-limited quantity of material, 7, UN2910 | FOR CONSIGNEE USE ONLY. | | | | FORM 540 (10-96) |

WASTE SHIPMENT RECORD

| | , <u>, , , , , , , , , , , , , , , , , , </u> | | | | | | | |
|--------------|--|---------------------------------------|------------|------------------|--------------|------------|----------------|------------------|
| | 1. Work site (Generator): | | 2,3746 | ner's Name | I | to | Owne lephor | |
| | Name US Army Corps of Engineers-Baltimo | | St. All | ban's VAE | cc | | reprior | 16 110. |
| 100 | Mailing Address CENAE-EN-HI. 10 South Howar City/State/Zip Baltimore, MD 21201-1715 | d Street | | | | | | |
| and the said | the state of the s | | | | | - | Remov | or'o |
| | Remover's name and address: Franklin Environmental Services, Inc. | | | | | | lephot | |
| | 185 Industrial Road, PO Box 617 | | | | | | 384- | |
| | Wrentham, MA 02093 | | | | | (500 | 7904- | OTOT |
| | 3. Waste Disposal Site (WDS) | | WDS | | | | | |
| | Name Envirocare of Utah, Clive Disposa | al Site | teleph | ione no: (4 | ¥35) 88 | 34-0 | 155 | |
| | Mailing Address Interstate 80. Exit 49 | | | onal Inforn | | | | |
| | City/State/Zip Clive, UT 84029 | · ···· | | | | | | |
| | Physical Interstate 80, Exit 49 | | | Profile | No. 4 | 0 | 3 2 | |
| H.C | Site Location Clive, UT 84029 | . • | | | نا | 1 | 1315 | لياندط |
| GENERATOR | 4. Name and address of responsible agency | | ! | | | | | |
| R/ | | | | | | | | |
| 2 | | | | | | | | |
| 병 | | | | • | | | | |
| | 5. Description of materials | | 6. C | ontainers | 7 | ·. T | otal qu | uantity |
| | , | | No. | Тур | e | | m3 (yo | d ³ } |
| | RQ, ASBESTOS, 9, NA2212, III | | 8 | 5 5-9 | W . | a . | o . | .,3 |
| | RQ = 1 LB (ONE POUND) | | O | gruc | っ ' | ~ • | ~ ` | 70 |
| | 8. Special handling instructions and additional info | rmation Inc | ovidad b | · conorato | L | | | |
| | Linited Quenty Radioscher | innarion (br | ovided b | y generato | 1., | | • | |
| | 9. OPERATOR'S CERTIFICATION: I hereby declar | e that the | contents | of this co | nsianm | ent | are fu | lly and |
| - 34 | accurately described above by proper shipping n | ame and are | classifie | d. packed. | marked | . and | d label | ed. and |
| | are in all respects in proper condition for transpo | ort by highw | vay accor | ding to app | olicable | inte | rnation | nal and |
| | government regulations. NOTE: Generator must | retain a cop | by of this | form. | | | | |
| | Printed/typed name & title | 7 | Signature | | Mo | nth | Day | Year |
| | Dubert Text - Provet Manager | whole | $ND \gg$ | S | 0 | | 23′ | 01 |
| | 10. Transporter 1 (Acknowledgment of receipt of ma | terials) | 0 | | | | | |
| | Printed/typed name & title | | Signature | \ | Mo | oth | Day | Year |
| : : | Paul M Colonna | • | Jignature | | Wild | | Day | 1001 |
| | | Λ | 1 / | 20 | ĺ | | | |
| | Franklin Environmental Services Inc. | 16.00 | A for | leewa | 01 | | 24 | 01 |
| H | Address and telephone no. 185 Industrial 1960 800 426 48 78 | juice | in co | Leve | . | | - • | · |
| F. | 100 THOUSTON 1900 800 THE 43 VO | | | | | | | |
| ЬО | Wrentham, MA 02093 | | | | | | | |
| TRANSPORTER | 11. Transporter 2 (Acknowledgment of receipt of ma | terials) | | | | . – | | |
| RA | Printed/typed name & title | | Signature | | Moi | nth | Day | Year |
| | | | . • | | | | • | |
| | • | | | | | | | 1 |
| | Address and telephone no. | | | İ | | | | |
| | , independent to opinions no. | | | | | | | |
| | | | | | | | | |
| L) | 12. Discrepancy indication space | · · · · · · · · · · · · · · · · · · · | | 5 | | | | |
| SITE | -2. Discrepancy mulcation space | | | Rejected: | - , . | \l- | П | 1 |
| · · | 13. Waste disnosal site owner or aparette Cantillant | a af us - alest | af agles : | Yes I | | Vo | ᆜ | |
| j. | Waste disposal site owner or operator: Certification materials covered by this manifest except as noted | in Item 19 | or aspest | os | | | | ſ |
| DISPO | | 10.11 12. | | | | | | |
| Sis | Printed/typed name & title | S | ignature | | Mor | th | Day | Year |
| | | | | | | | | |

ORIGINAL RETURN TO GENERATOR

Envirocare of Utah, Inc. 2. MANIFEST NUMBER 4032-01-002

3. PAGE 9 OF 24 PAGE(S

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

| | DISPOSAL CO | ATTAIN THAT IN THE | | CONTAINE | R AND WA | STE DESCR | IPTION (CONTINI | LATION) | •• | | | | 3. | PAGE 9 OF 2 | 24 PAGE(S) | |
|---|--|--------------------------------|-------------------------------------|-----------------|----------|--|---|---|---|--|--------------|-------------------------------|---|---|--|---|
| | DISPOSAL CO | I MININGK DESC | RAPTION | | | | | | WASTE DESCRIPTI | ON FOR EACH WAS | TE TYPE IN C | | | | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | .7. VOLUME (m3) (ft3) | 8. "WASTE AND CONTAINER WEIGHT (kg) | LEVEL mSv/hr | MBo/ | FACE MINATION 100 cm2 100 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATI WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | E 13. SOLIDIFICATION OR STABILIZATION | 14. CHÉMICAL DE CHEMICAL FORM CHELATING AGEN | WEIGHT | INDIVIDUAL RA CONTAINER TO | ADIONUCLIDES | DESCRIPTION AND ACTIVITY (M FAINER TOTAL AC IDE PERCENT | Bq) AND TIVITY | 16.WASTE CLASSIFI- CATION AS-Class A Stable AU-Class A Unstable B-Class 8 C-Class C |
| | | | (ton) | mrem/hr_ | ALPHA. | GAMMA | | | | <u> </u> | IF>0,1% | RADIONUCLIDES | pCi/qm | MBq | mĈi | C-Class C |
| | , . | | | | | ļ | | | | | | Total | | 2.3510E-01 | 228884222 | |
| 062/1 | 4 | 0,21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0.20 | NA . | NONE/NP | - | C-14 H-3 | 1.00000E+01 1.00000E+01 5.00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 | AS |
| | | 7,35 | 0.12 | <8,000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E+01 | 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | .] |
| | | <u> </u> | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| 063/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | | C-14 1 | .00000E+01 | 3.3559E-02 | 9.0700E-04 | AS |
| | | 7,35 | 0.12 | <8,000E-03 | NP | 2.0000E+02 | | 7,35 | | | NP | H-3 Sr-90 Subtotal | .00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 2.3510E-01 | | |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| L | | | | | | | | | | | | | | | | l |
| 064/1 | 4 | 0.21 | 111.13 | <8.0000E-06 | МР | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | | C-14 1 H-3 1 Sr-90 5 | .00000E+01 .00000E+01 .00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | .000000 | 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | |
| | | | | | | | | | | | | Total . | | 2.3510E-01 | 6.3540E-03 | |
| 065/1 | 4 . | · | | | | | 30.50.11 | | | | · | | | | | |
| | | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-11 | 0.20 | NA . | NONE/NP | ì | C-14 H-3 Sr-90 | 00000E+01 00000E+01 00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| 509M 5414 (10 0c) | | | | | | | | | | 1 | | | | 1 | | |

FORM 541A (10-96)

FORM 541A

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| | | | | • | VVASI | E MANI | LEGI | | | | | | Г | | | |
|---|--|----------------|---------------------------------------|-------------------------------------|-----------|-------------------------------|---|---|-------------------|---|---------|---------------------------|----------------------------------|---|--|--|
| | DISPOSAL CO | NTAINER DESC | elle 10/0W | CONTAINE | R AND WAS | TE DESCR | IPTION (CONTINU | IATION\ | • | •• | | | 1 | 3. PAGE 10 OF | | |
| | UISTUSAL COI | TIMITER DESCR | - 10N · | | r | | | PHYSICAL DESCR | WASTE DESCRIPTION | | | | | | | 16.WASTE |
| S. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) | 8 WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | MBot1 | AINATION 100 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER | | 14. CHEMICAL DE CHEMICAL FORM CHELATING AGENT | WEIGHT | INDIVIDUAL I CONTAINER | RADIONUCL TOTAL: OR | IGICAL DESCRIPTION LEDES AND ACTIVITY (MB CONTAINER TOTAL ACT NUCLIDE PERCENT | Sa) AND | CATION AS-Class Stable AU-Class Unstable |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) | mSv/hr ratem/hr | ALPHA | BETA- | 1 | (F13) | (000 11000 3) | | IF>0.1% | RADIONUCLIDES | -01/- | | | C-Class (|
| 066/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 | 1.00000E 1.00000E 5.00000E | E+01 3.3559E-02 E+01 3.3559E-02 | 9.0700E-04 9.0700E-04 4.5400E-03 | 41 |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | . 7,35 | | | | Subtotal | 0.00000 | 2.3510E-01 | 6.3540E-03 | ~! |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| 068/1 | 4 | 0,21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E 1.00000E | E+01 3.3559E-02 E+01 3.3559E-02 | 9.0700E-04 9.0700E-04 | 4 AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | - | | NP | | 5.000000 | E+01 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | 3 |
| | | | | ļ | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | 3 |
| 069/1 | 4 | 0.21 | 111.13 | <8.0000E-06 | · NP | 3.3400E-06 | 39,29-H | | NA NA | NONE/NP | | C-14 | 1.00000E | E+01 3.3559E-02 | 9.0700E-04 | 4 AS |
| | | 7.36 | 0.12 | | NP | 2.0000E+02 | | 0.20 7.35 | | | NP | H-3 Sr-90 Subtotal | 1.00000E 5.00000E | E+01 3.3559E-02 E+01 1.6798E-01 2.3510E-01 | 9.0700E-04 4.5400E-03 6.3540E-03 | 3 |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | + |
| | | | ; | } | | | , | | | | | | | | | |
| 071/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NР | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | E+01 3.3559E-02 E+01 3.3559E-02 E+01 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7,36 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | -1 |
| | | | | | - | | | | | | | Total | 1 | 2.3510E-01 | 6.3540E-03 | |
| 074/1 | 4 , | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | | NA | NONE/NP | | C-14 | 1.000000 | +01 1.0064E-01 | 2.7200E-03 | AS |
| | | 7,35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | H-3 | 1.00000E 5.00000E | +01 1.0064E-01 +01 1.0064E-01 +01 5.0320E-01 7.0448E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 1.9040E-02 | -1 |

| | | | 16.WASTE | CCASSIT- CATION AS-Class A Stable AU-Class A Unstable | B-Class B C-Class C | | | AS | | | | AS | | | | AS . | | | AS | | | |
|------|--|--|--|--|------------------------|-----------------|-------------|--------------------------|--------------------------|------------|------|-------------|------------|------------|-------------|--------------------------|--------------------------|------------|--------------------------|------------|------------|--|
|) | IMBER 2 | | | | ğ | 1.9040E-02 | | 2.7200E-03 2.7200E-03 | 1.3600E-02 | 1.9040E-02 | | 2.7200E-03 | 1.3600E-02 | 1.9040E-02 | | 9.0700E-04 9.0700E-04 | 4.5400E-03 6.3540E-03 | 6.3540E-03 | 2.7200E-03 2.7200E-03 | 1.3600E-02 | 1 90405-02 | |
| | 2. MANIFEST NUMBER 4032-01-002 | 3. PAGE 11 OF 24 PAGE(S) | | 19, TANINA, DIGIGAL DESCRIPTION INDVIDUAL RADIONUCLIDES AND ACTIVITY; (MRs), AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERGENT | MBq | 7.0448E-01 | | 1.0064E-01 | 5.0320E-01 7.0448E-01 | 7.0448E-01 | | 1.0064E-01 | | 7.0448E-01 | | 3.3559E-02 3.3559E-02 | | 2.3510E-01 | 1.0064E-01 | | 7.0448E-01 | |
| | | 6, | | 15. RADIONUCLIDES AND ACTIVITY (R. TOTAL, OR CONTAINER TOTAL A AND RADIONUCLIDE PERCENT | pCivam | | | 1.00000E+01 | 5.00000E+01 | | | 1.00000E+01 | .00000E+0₁ | | | 1.00000E+01 | | | 1.00000E+01 | | | |
| | Envirocare of Utah, Inc. | İ | | INDIVIDUAL R CONTAINER T | DES | | | | | | | | | | | | | | | | | |
| | ភ្ជ | | CONTAINER | | RADIONUCLIDES | Total | | 7.5.4 4.5.4 | Subtotal | Total | | H-0-14 | Subtotal | Total | | 7.∓. 4.2. | Subtotal | Total | 7.4.5 4.24 | Subtotal | Total | |
| | | | TE TIPE IN CO | WEIGHT " " TCHELATING | (F>0.1% | ,,,, | | Π | ž | | | | 2 | | | | <u>,, 103</u> | | | ± 100 | ii jë | |
| | | | 14 CHEMICAL OF | WEIGHT | | | | NONEMP | | | | NONEMP | | | | NONEINP | | | NONEMP | | | |
| | | | WASTE DESCRIPTION FOR EACH WASTE TYPE IN C | DIFICATION TABILIZATION MEDIA | - 1 | - | · | ¥ | | | | NA | | | | NA NA | | | ٩ | | | |
| | | | SICAL DESCRIPTION | 12. APPROXIMATE 13. VASTE S VOLUME(S) IN OR CONTAINER (m3) | (FT3) | | | 0.20 | 7.35 | | · | 0.20 | 7.35 | | | N 020 | 7.35 | | 0.20 NA | 7,36 | | |
| | UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST | CONTAINER AND WASTE DESCRIPTION (CONTINUATION) | | WASTE 12.1 WASTE DESCRIPTOR (See Note 2.4) | - | ·· | | | | | | | | | | |] | | | | | |
| | RADI | RIPTION | - | ±, ∰%, ≈ | _ | | | H-82,33-H | 22 | | •••• | 29,33-H | | | | 39,29-H | 74 | <u> </u> | H 82 | | | |
| | LOW-LEVEL RADI WASTE MANIFEST | STE DESC | | 10 SURFACE CONTAMINATION MB0/100 cm2 dpm/100 cm2 | BETA- GAMMA | | | 3.3400 E-08 | 2.0000E+02 | | | 3,3400E-06 | 2.00005+02 | , | | 3.3400E-06 | 2.0000E+02 | | 3.3400E-06 | 2.0000E+02 | | |
| | f LOW. Wast | AND WAS | | CONTA CONTA MB0/ | ALPHA | | y | NP | ď | | | dN . | ΝP | | | ď | NP. | | d. | ď | | |
| | NEOR | CONTAINE | | en vù ex | mentr. | | | <8.0000E-05 | <8,000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 | | |
| | | | | 8. WASTE AND CONTAINER WEIGHT | (60) | | | 292.57 | 0.32 | | | 73,52 | 0.32 | | | 111,13 | 0.12 | | 292.57 | 21.0 | - | |
| | ٠. | DISPOSAL CONTAINER DESCRIPTION | | 7. VOLUME (m3) | (#3) | | • | 0.21 | 7,35 | | | 12.0 | 7.36 | | | 0.21 | 7.35 | | 0.21 | 7.35 | : | |
| | | OS TROOPSIO | ĺ | 6. CONTAINER DESCRIPTION (See Note 1 & | Note 1A) | | | 4 | | | | 4 | • | | | 4 | - | | 4 | | | |
| 2000 | A to the second | | | S. CONTAINER IDENTIFICATION NUMBER / GENERATOR | ID NUMBER(S) | | | 076M | | | | 078/1 | | | | 088H | | | М560 | | **** | |

| FORM 541A | | | , | | | | | | |) | | | | |) | |
|---|---|--------------------------------|---------------|-------------------------|---------------------------|------------------|------------------------------------|----------------------|---|--|------------------|--------------------------|------------------------------------|--|--------------------------|------------------------------------|
| | | | - : | NEOR | M LOW- | LEVEL | UNIFORM LOW-LEVEL RADIOACTIVE | ₹ IVE | | | | Envirocare of Utah, Inc. | L | 2. MANIFEST NUMBER | UMBER | |
| | | | | | WASTE MA | E MAN | NFEST | | • | | | | | 4032-01-002 | 26 | |
| ŀ | DISPOSAL CON | DISPOSAL CONTAINER DESCRIPTION | MOTTER | CONTAINER AND WASTE DES | R AND WAS | TE DESCR | CRIPTION (CONTINUATION) | MATION | | | : | - | | 3. PAGE 13 OF 24 PAGE(S) | 24 PAGE(S) | |
| 1¢i | · « | | | | ŀ | | | PHYSICAL DESCRIPTION | WASTE DESCRIPT | WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER PTION | TE TYPE IN CO | NTAINER | | | | 16.WASTE |
| CONTAINER | | : | 8. WASTE | 6 | 10. SUR | ACE | ŧ. | _ | E 13. | | 2001 | | 13. RADIOLOGICAL DESCRIPTION | A DESCRIPTION | | CLASSIFIC |
| IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | VOLUME | CONTAINER | RADIATION LEVEL | CONTAMBATION MBo/100 cm2 | MATION OCCUR. | WASTE DESCRIPTOR (See Note 2 | | SOLIDIFICATION OR STABILIZATION MEDIA | N CHEMICAL FORM % CHEMICAEL FORM | WEIGHT | | L RADIONUCLIDES R TOTAL: OR CON | INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBg) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY | Bqj AND TIVITY | AS-Class A Stable AU-Class A |
| ID NUMBER(S) | Note 1A) | (Ea) | (Rg) | mSvfbr | ALPHA | BETA- GAMMA | & Note 24) | | (See Note 3) | | AGENT IF-0.1% | | AND RADIONUC | LIDE PERCENT | | Unstable B-Class B |
| | | | | | | | | | | | | RADIONUCLIDES | pCl/gm | MBq | mCl | a segment |
| | | | | | | | | | | | ı | Total | | 2.3510E-01 | 6.3540E-03 | |
| _ | | 1 | | | | | | | , | | | | | | | |
| | • | 6.21 | 156.49 | <8.0000E-05 | d. | 3.3400E-06 | H-82'86 | 0.20 | NA NA | NONEMP | 1 | C-14 H-3 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | AS. |
| | | 7.36 | 0.17 | <8.000E-03 | ΝP | 2.0000E+02 | | 7.35 | , | | 2 | Sr-90 Subtotal | 5.00000E+0 | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | · | | 1 0421 | | 3.5224E-01 | 9.5200E-03 | |
| 11371 | | | | | | | | | | | | | | | | |
| | | 621 | 156.49 | <8.0000E-05 | ď. | 3.3400E-06 | H-0'84 | 0.20 | ¥ | NONEMP | | 4.5.5.4. 5.5.4. | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | RS . |
| | | 7.38 | 0.17 | <8.000E-03 | ď | 2.0000E+02 | | 7,38 | | | 2 | Subtotal | 5.00000E+0 | | | |
| | | | | | | | | | | | - 10 | | | 0.000 | 3.3200E-03 | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | • | | | | |
| £ | * | 0.21 | 156.49 | <8.0000E-05 | ЧN | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | T | C-14 H-3 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | AS |
| | | 7,35 | 0.17 | <\$.000E-03 | ď. | 2,0000E+02 | | 7.35 | | | <u>∞ 10</u> | Sr-90 Subtotal | 5.00000E+01 | | | s. C |
| | • | | | - | | | | | | | 11 15 | 7.1.1 | | | | |
| | J | | | | | | | | | | <u>-</u> | ocal Ocal | | 3.5224E-01 | 9.5200E-03 | |
| 1231 | 4 | 장 | 156.49 | <8.0000E-06 | Q. | 3.3400E-06 | 39,29-H | 0.20 | ИА | NONENP | 03 | 41-0-14 | 1.00000E+01 | | 1.3600E-03 | SA. |
| | 1, | 7.36 | 0.17 | <8.000F.03 | 9 | 200005.003 | | | | | e l | | 5.00000E+01 | 5.0320E-02 2.5160E-01 | 1.3600E-03 6.8000E-03 | |
| | | 1 | | | ! | | | 9672 | | | <u>s</u> | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | ! <u>.</u> | | , | | · | | | | | | 12 | Total | | 3.5224E-01 | 9.5200E-03 | ľ |
| | | | | | | | | | | | | | | | | |
| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

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| COLITABLE NAMES MANUEL COLITABLE NAMES M | | | | MECHIN | I WO | 1 - | TOACIOAC | 1,1 | | | | | L | | | |
|--|--------------------------------|-----|-------|-------------|---|--|---|---|--|-------------------------------------|-------------------------|-------------|---|---|-------------|--|
| CONTINUER NAME MASSEE EACH CONTINUER NAME CONTINU | | | õ | | WASTE | JŽ | ADIOACII EST | л | | | | | | MANIFEST N 4032-01-0 | UMBER 32 | |
| Company Comp | DISPOSAL CONTAINER DESCRIPTION | | | CONTAINER | AND WAST | E DESCRIF | PTION (CONTINE | | | | ĺ | | | . PAGE 14 OF | 24 PAGE(S) | |
| Particular Par | - | 1 | Г | ⊨ | | | | PHYSICAL DESCRI | WASTE DESCRIPTION | 14 CHEMICAL DESC | TYPE IN CO. | | | | | 6.WASTE |
| | VOLUME C | ** | oc, | | 10. SURFA CONTAMIN AMBOTIO Apm/100 | NOTE COMPANY C | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (mg) | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | CHEMICAL FORM CHELATING AGENT CI | WEIGHT % HELATING AGENT | | TADIONUCLIDES TOTAL: OR CON | 4 DESCRIPTION S AND ACTIVITY (M TAINER TOTAL AC | | CATION CATION Sections A Stable AU-Class A Unstable |
| Colored No Lange Colored C | | | itoli | шеши | | GAMMA | | ? | | | F-01% | | | | | C-Class C |
| Sizone S | 된 | | | <8.0000E-05 | | 3,3400E-06 | 39,23-H | 0.20 | AN. | NONE/NP | Ţ | MONOCLEASES | 1.00000E+0 | | 1.3600E-03 | AS |
| Colored Colo | 7.35 | | | <8.000E-03 | | 2.0000E+02 | | 7.35 | | | | ta | 5.00900E+0 | | | • |
| Continue | | | | | | | | | | | 101- | itai | | 3.5224E-01 | 9.5200E-03 | |
| Colore C | + | | | | | | | | | | | | | | | |
| Colore C | 0.24 | | | <8,0000E-05 | | 3.3400E-06 | 39,29-H | 0.20 | NA | NONENP | | | 1.00000E+0 | 1 5.0320E-02 | | AS |
| According Nat According Nat According Acco | 7.35 | | 0.17 | <8,000E-03 | | 2.0000E+02 | | 7.35 | | | | <u> </u> | 5.0000000000000000000000000000000000000 | 3.5224E-01 | | |
| Automatical | | | · . | | | | | | | | Πĕ | dai | | 3.5224E-01 | 9,5200E-03 | |
| Course of the course of the | · | | | | | | _ | | | | | | | | | |
| Since Sinc | 12.0 | | | <8.0000E-06 | <u> </u> | 8 | 39,29-H | 0.20 | NA | NONENP | | | 1.00000E+01 | | | AS |
| State Stat | 7.38 | | 0.17 | <8.000E-03 | | Z0000E+02 | | 7.35 | | | | <u>a</u> | 5.00000E+01 | | | |
| GLOOME-05 NP 3.3400E-06 3.3400E-06 ASSOCIATION NAME C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 Subtotal C-14 H-3 H-3 I JO0000E-01 H-3 Subtotal C-14 H-3 H-3 I JO0000E-01 H-3 I JO00000E-01 H-3 I JO0000E-01 H-3 I JO0000E-01 H-3 I JO0000E-01 H-3 I JO0000E-01 H- | | | | | | | | | | | ii ř | Bi | | 3.5224€-01 | 9.5200E-03 | |
| CALODDE-03 NP ST-90 \$7.00 < | 된 | | | 3.0000E-05 | | | 39-H | 0,20 | NA | NONENP | | | 1.00000E+01 | | 4.5400E-04 | AS |
| GR.000E-ds NP 3.3400E-04 A.33 | 7.35 | | 20:0 | <8.000E-03 | | 2.0000E+02 | | 7.35 | | | | Ī | 5.00000E+01 | | 2.2700E-03 | |
| -а.coode-ds NP 3.3400E-de 3.3400 | | | | | | | | | | | 1112 | 29 E | | 1.1759E-01 | 3.1780E-03 | |
| <a.coope.03< th=""> NP SF-90 \$.00000E+0.1 8.3990E+0.2 7.35 Subtotal 1.1759E-0.1</a.coope.03<> | 0,21 | ı 1 | | 8.0000E-05 | | + | 39,L-HL | 0.20 | | NONEMP | | | .00000E+01 | 1.6798E-02 | - 1 | St |
| | 7.35 | | | <8.000E-03 | | .0000E+02 | | 7.38 | | | | Ę | .000000E+01 | 8.3990E-02 | 2.2700E-03 | |

FORM 541A **UNIFORM LOW-LEVEL RADIOACTIVE** Envirocare of Utah, Inc. 2. MANIFEST NUMBER **WASTE MANIFEST** 4032-01-002 CONTAINER AND WASTE DESCRIPTION (CONTINUATION) 3. PAGE 15 OF 24 PAGE(S) DISPOSAL CONTAINER DESCRIPTION WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 15, RADIOLOGICAL DESCRIPTION SURFACE. 8. WASTE CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C CONTAINER AND SURFACE WASTE WASTE SOLIDIFICATION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT IDENTIFICATION CONTAINER VOLUME CONTAINER RADIATION M8a/100 cm2 DESCRIPTOR VOLUME(S) IN CONTAINER OR STABILIZATION CHEMICAL FORM %
MEDIA CHELATING AGENT CHELATING DESCRIPTION (See Note 1 & NUMBER / GENERATOR LEVEL dpm/100 cm2 (See Note 2 & Note 2A) (See Note 3) AGENT ID NUMBER(S) mSv/hr BETA-ALPHA GAMMA RADIONUCLIDES pCi/qm mCl Total 1,1759E-01 3.1780E-03 139/1 39,29-H NONE/NP 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 0.21 156.49 <8.0000E-05 3.3400E-08 0.20 H-3 Sr-90 7,35 0.17 <8.000E-03 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 140/1 4 39,29-H NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 0.21 156,49 <8.0000E-05 3.3400E-06 0.20 7.35 . 0.17 <\$.000E-03 2.0000€+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 143/1 39,29-11 C-14 H-3 Sr-90 NONE/NP 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 0,21 156,49 <8.0000E-05 NP 3.3400E-08 0.20 7.35 0.17 <8.000E-03 20000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 145/1 39,29-H NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 1.3600E-03 1.3600E-03 6.8000E-03 <8.0000E-05 3.3400E-06 AS 0.20 NP 7.35 <8.000E-03 2.0000E+02 7,35 Subtotal 3.5224E-01 9.5200E-03

FORM 541A (10-96)

Total

3.5224E-01

9.5200E-03

| | 541 | |
|--|-----|--|
| | | |
| | | |

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| | DISBUSAL COM | | | | | | PTION (CONTINU | IATIONI. | | | | | | | A PAGE(S) | |
|--|---|-----------------------|--|-------------------------------------|--|-----------------------------|---|-----------------|-------------------|---|---------|-------------------------------------|---|----------------------------------|--|---|
| | DIOPOSAL CONT | TAINER DESCR | RIPTION | | | | | | WASTE DESCRIPTION | | | | | | | 16.WASTE CLASSIFI- |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | 7, VOLUME, (m3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURF CONTAM MBg/10 dpm/10 | INATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI | | 14, CHEMICAL DES CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL RADK CONTAINER TOTA | DIOLOGICAL DESC ONUCLIDES AND A AL; OR CONTAINER RADIONUCLIDE PE | ACTIVITY (MBC | a) AND | CATION AS-Class Stable AU-Class Unstabl |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (F13) | (222 1132 5) | · | IF>0.1% | RADIONUCLIDES | pCi/qm I | MBq | mCi | B-Class 6 C-Class 0 |
| 150/1 4 | | 0.21 | 156,49 | | ХВР | 3,3400E-06 | 39,28-H | 0.20 | NA | NONE/NP | NP | C-14 1.0 H-3 1.0 | 0000E+01 5.0 0000E+01 5.0 0000E+01 2.5 | 0320E-02 0320E-02 5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| · | | 7.35 | 0.17 | , <8.000E-03 | NР | 2.0000E+02 | | 7.35 | | | | Subtotal | | | 9.5200E-03 | .1 |
| | | | | | | - | | | | | | Total | | 5224E-01 | 9.5200E-03 | |
| | | | | | | | • | | | | | | | | | |
| 163/1 4 | | 0.21 | 156,49 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-11 | 0.20 | NA. | NONE/NP | NP | C-14 1.00 H-3 1.00 Sr-90 5.00 | 0000E+01 5.0 0000E+01 5.0 0000E+01 2.5 | 0320E-02 0320E-02 5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | 1 |
| | | 7.35 | 0,17 | <8.000E-03 | КР | 2.0000E+02 | | 7.35 | | | | Subtotal | | 5224E-01 | 9.5200E-03 | . I |
| | | | | | | | | | | | | Total . | | 5224E-01 | 9.5200E-03 | |
| | | | : | | | | | | | | | | | | | |
| 167/1 4 | | 0,21 | 156,49 | <8.0000E-05 | ИР | 3,3400E-06 | 39,29-H | 0.20 | -NA | NONE/NP | NP | C-14 1.0 H-3 1.0 Sr-90 5.0 | 0000E+01 5.0 0000E+01 5.0 0000E+01 2.5 | 0320E-02 0320E-02 5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | 1 |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000€+02 | | 7.35 | | | | Subtotal | 1 | | 9.5200E-03 | .) |
| | | | | | | | | | | | | Total | | 5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | | | | |
| 168/1 4 | | 0,21 | 156.49 | <8.0000E-05 | ИР | 3.3400E-06 | 39,29-H | 0,20 | NA | NONE/NP | NP | C-14 1.00 H-3 1.00 Sr-90 5.00 | 0000E+01 5.0 0000E+01 5.0 0000E+01 2.5 | 0320E-02 | 1,3600E-03 1,3600E-03 6,8000E-03 | AS |
| | | 7.36 | 0.17 | <8.000E-03 | NР | 2.0000E+02 | | 7.35 | | | | Subtotal | 1 | | 9.5200E-03 | |
| | ļ | | | | | | | | | | | Total | | 5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | L. L | | | |
| 170/1 4 | | 0.21 | 156.49 | <8.0000E-05 | NP | .3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | | H-3 1.00 | 0000E+01 5.0 0000E+01 5.0 0000E+01 2.5 | 1320E-02i | 1,3600E-03 1,3600E-03 6,8000E-03 | AS |
| | | 7.35 | 0,17 | <8.000E-03 | MP | 2,00005+02 | | 7.35 | | | i | Subtotal | 1 | - | 9.5200E-03 | |

FORM 541A (10-96)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

FORM 541A

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| •• | | | | | | | | | | | | | 1 | | | |
|---|--|-------------------------------|--|-------------------------------|-----------------|--|---|--|--|-----------------|--------------------------|-------------------------|-------------------------------------|--|--|--|
| | DISPOSAL CO | NTAINER DESC | RIPTION | CONTAINE | R AND WAS | STE DESCR | IPTION (CONTINU | ATION) | WASTE DESCRIPTI | ON FOR EVOLUNIA | | | | 3: PAGE 17 OF | 24 PAGE(S) | |
| 5. | 1_ | 1. | 1 | : | | | | PHYSICAL DESCR | IPTION | 14. CHEMICAL DE | SCRIPTION | | 5 PADIOLOGI | ICAL DESCRIPTION | | 16.WAS |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT | SURFACE RADIATION LEVEL | CONTAI _MBat | FACE MINATION 160 cm2 100 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER | 13. SOLIDIFICATION OR STABILIZATION MEDIA | | WEIGHT % CHELATING | INDIVIDUAL CONTAINER | RADIONUCLIE | DES AND ACTIVITY (MICHIEL AC CONTAINER TOTAL AC UCLIDE PERCENT | Bq) AND TIVITY | CATIO AS-Cla Stab AU-Cli Unist |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | a note Ex | (m3) (FT3) | (See Note 3) | · · | AGENT IF>0.1% | RADIONUCLIDES | 1 | | | 8-Cla C-Cla |
| | | } | | | | | | | | | | 20x==202 | pCl/gm | MBq | | ; |
| - | | | | | | | | | - | | | Total | | 3.5224E-01 | 9.5200E-03 | Ί |
| 71/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3,3400E-08 | 39,29-H | 0,20 | NA | NONE/NP | | C-14 H-3 | 1.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 | AS |
| | | 7.36 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | 1 | 7.35 | | | NP | Sr-90 Subtotal | 1.00000E | +01 2.5160E-01 3.5224E-01 | 6.8000E-03 9.5200E-03 | 3 |
| • | | | | | | | | | | | | Total | <u> </u> | 3.5224E-01 | 9.5200E-03 | + |
| | | | | | | |] ,] | | | | | | | 0.022.12.0. | 0.02002-00 | |
| 72/1 | 4 | · 0.21 | 156.49 | <8.0000E-05 | NP | 3.34008-06 | 39,29-fj | 0.20 | NA . | NONE/NP | | C-14 H-3 | 1.00000E+ 1.00000E+ 5.00000E+ | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7,35 | 0.17 | <8'000€-03 | , MP | 2,0000E+02 | | 7.36 | | | | Sr-90 Subtotal | 5.00000E4 | 3.5224E-01 | 6.8000E-03 9.5200E-03 | . 1 |
| | | | | | | | | | • | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 74/1 | 4 | | | | | | | - | | | | | | | | |
| | | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA | NONEMP | | H-3 | 1.00000E+ 1.00000E+ 5.00000E+ | -01 5.0320E-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+072 | | 7.35 | | | | Subtotal | 0.0000021 | 3.5224E-01 | 9.5200E-03 | |
| | , | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 81/1 | 4 | | | | | | 39-H | | | |] | | | | | |
| | | 0,21 | 65.77 | <8.0000E-05 | NP | 3.3400E-05 | - SU-FI | 0.20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+ 1.00000E+ 5.00000E+ | 01 1.6798E-02 01 1.6798E-02 01 8.3990E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | | 7,35 | 0,07 | <8.000€-03 | NP | 2.0000E+02 | | 7.35 | | | - 1 | Subtotal | | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | - | | | | . | rotal . | | 1.1759E-01 | 3.1780E-03 | |
| İ | | 1 | 1 | ł | - 1 | · | | J | 1 | 1 | i | J | | | i | i |

| | s S | 16.WA | CASSIFI- CATION ASClass A Stable AU-Class A Unstable B-Class B | <u> </u> | 3 2 2 | 3 | | 8 8 8 8 | 3 8 | | | -03 AS | 3 8 | 8 | | 25.53 8 | 취망 | 120 | | 03 AS | 818 | - |
|-----------------------------------|--------------------------|---------------------------|--|------------------------------|-------------------------------|------------|------|--|------------|----------------|----------|--|------------|------------|-----|-------------|-------------|------------|-------------|-------------|-------------|-------------------|
| IUMBER 102 | 24 PAGE | | (Be) AND | 1.3600E-03 | | 9.5200E-03 | | 1.3600E-03 | | 9.5200E-03 | | 1.3600E-03 | | 9.5200E-03 | | 2.7200E-03 | | 1.9040E-02 | | 2.7200E-03 | | |
| 2. MANIFEST NUMBER 4032-01-002 | 3. PAGE 18 OF 24 PAGE(S) | | DESCRIPTION AND ACTIVITY (M AINER TOTAL AC DE PERCENT | 5.0320E-02 | | 3.5224E-01 | | 5.0320E-02 | | 3,5224E-01 | | 5.0320E-02 5.0320E-02 | | 3.5224E-01 | | 1.0064E-01 | | 7.0448E-01 | | 1.0064E-01 | 5.0320E-01 | |
| | <u>ო</u> | | 15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIOLUCIDES AND ACTIVITY (M89, AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIOLUCIDE PERCENT | 1.00000E+01 | 5.00000E+01 | | | 1.00000E+01 | 10.1000000 | | | 1.00000E+01 | 3.0000E+U1 | | | 1.00000E+01 | 5.00000E+01 | | | 1.00000E+01 | 3.00000E+01 | |
| Envirocare of Utah, Inc. | | CONTAINER | | RADIONUCLIDES C-14 H-3 | Ē | Total | | 7-7-7-4-8-4-8-4-8-4-8-4-8-4-8-4-8-4-8-4- | Ē | Total | | 7.5.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4. | īŝ | Total | | C-14 | Į | Total | | 4.5.5 | <u> </u> | |
| | | STE TYPE IN | WEIGHT WEIGHT WAGENT WAGENT | | ₽ | | | 2 | ! | | ·· | ! | ž | | | g | ž | | | | È | |
| | .• | IN FOR EACH WASTE TYPE IN | 14. CHEMICAL DES CHEMICAL FORW CHELATING AGENT | NONE/NP | | | | NONEMP | | | | NONEINP | | | | NONEINP | | | | NONEINP | | |
| | | WASTE DESCRIPTION | 13. SOLDFICATION OR STABILIZATION MEDIA (See Noto 3) | NA | , | | | Ą | | | | ₹. | | | | ĄN | | | ******* | NA | | |
| ш | | | 12. APPROXIMATE 11 VALUMES) IN O CONTAINER (m3) | 0.20 | 7.36 | | | 0.20 | 7.35 | | | 0.20 | 7.38 | | | 020 | 7.36 | | | 0.20 | 7.35 | |
| RADIOACTIVE FEST | RIPTION (CONTINUATION) | | WASTE 12 DESCRIPTOR (See Note 2 & Note 2 | = | | | | } Ŧ | | | <u> </u> | Ŧ | | | | ± | | | | ; | L | |
| コラ | | | - | 38,23-H | . \$ | | | # 8 8 | Ş | | <u> </u> | 39,29-H | 02 | | | 29,39-H | 22 | | | 29,33-H | ä | |
| LOW-LEVEI WASTE MAI | STEDES | | SURFACE CONTAMINATION MEATING CITE CONTAMINATION MEATING CITE CONTAMINATION MEATING ME | | 2.0000E+02 | | | 33400E-08 | 2.0000E+ | | | 3.3400€ | 2.0000E+ | | | 3.3400E-06 | 2.0000E+02 | | | 3.3400E-06 | 2.0060E+02 | |
| M LOW WAS | 3 AND WA | | ¥ | 2 2 | ďN | | | 2 | ₹. | | | N | 충 | | | Đ. | ď | | | N. | gy. | |
| UNIFORM LOW-LEVE WASTE MAI | CONTAINER AND WASTE DESC | | 9. SURFACE RADIATION LEVEL INSWIT | @.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8.00006-05 | <8,000E-03 | |
| 5 | | | 6. WASTE AND CONTAINER WEIGHT (kg) | 156.49 | 0.17 | | | 156.49 | 0.17 | | | 156.49 | 0.17 | | | 292.57 | 0.32 | | | 292.57 | 0.32 | · |
| | | WACK DESCRIPT | 7. VOLUME 8. (m3) (R3) | 0.21 | 7.35 | | | 0.21 | 7.35 | -, | | 6.21 | 7.35 | | | 624 | 7,38 | | | 27 | 7.35 | |
| | | DISPOSAL CONT | G. CONTAINER DESCRIPTION (See Note 1& Note 14) | 4 | 1 | | | 4. | | | | 4 | | | - , | + | | | | - | | |
| FORM 541A | | | CONTAINER DENTFICATION NUMBER / GENERATOR IO NUMBER(S) | 18271 | | | Hook | | | | | 1927 | | | | 195/1 | | | | 1987 | | FORM 541A (10-98) |

| | | | , | | | | L RADIOAC IIVE | ֻיַנ | | | | Environare of than the | _ | 2 MANIFFET NIMBER | 0101 | |
|---|--|--------------------------------|--|-------------------------------------|---------------------------------------|--|--|----------------------|---------------------------------------|-------------------------------------|-----------------|---|--|--|-------------------|--|
| | | • | | | WASTE MAI | EMANI | LIFEST | | | | | | | 4032-01-002 | UMBER 02 | |
| | DISPOSAL CON | DISPOSAL CONTAINER DESCRIPTION | UPTION | CONTAINER AND WASTE DESC | S. AND WAS | TE DESCRI | CRIPTION (CONTINUATION) | HATTON | - | | | | | 3. PAGE 19 OF 24 PAGE(S) | 24 PAGE(S) | |
| | • | • | | | | | | PHYSICAL DESCRIPTION | WASTE DESCRIPTI | ON FOR BACH WASTE TYPE IN CONTAINER | TE TYPE IN C. | MYAINER | | | | 19 |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURB CONTAN MB0/1 dpm/10 | SURFACE CONTAMINATION MEDITORING don/100 cm2 | 11, WASTE DESCRIPTOR (See Note 2 | | LIDIFICATION TABILIZATION MEDIA | - 0 | WEIGHT % | | 15. RADIOLOGICAL DESCRIPTION IL RADIONIJCIDES AND ACTIVITY ER TOTAL, OR CONTAINER TOTAL, | 15. RADIOLOGICAL DESCRIPTION REIMDUAL RADIOMECUDES AND ACTIVITY (MEG) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY | Sq) AND TIVITY | CATION AS-Class A Stable AU-Class A |
| ID NUMBER(S) | Note 1A) | (E) | (kg) (ton) | mSvfrr | ALPHA | BETA- GAMMA | & Note 2A) | (FT3) | (See Note 3) | | AGENT F>0.1% | | AND RADIONUC | LIDEPERCENT | | w c |
| | | | | | | | | | | | | RADIONUCLIDES | pCildm | MBq | Ш | 1 |
| | | | | | | | | | · . | , | | Total | | 7.0448E-01 | 1.9040E-02 | 1 61 |
| 206/1 | 4 | | | | | | 1 01 01 | | | | | | | | | |
| | | 0.21 | 282.57 | <8.0000E-05 | œ. | 3.3400E-08 | +65'57 | 0.20 | Ą | NONEMP | | 124 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | SA SA |
| | | 7.36 | 0.32 | <8.000E-03 | å | 2.0000E+02 | | 7.35 | 1' | | ž | Sr-90 Subtotal | 5.00000E+0 | | | |
| | | | | | | | | | | | | ======================================= | | 10-20-01-01-01-01-01-01-01-01-01-01-01-01-01 | l _ | با. |
| | | | | | | | | | , | | | i otal | | 7.0448E-01 | | • |
| 20811 | 4 | | | | | | | | | | | | 1-1-4 | | | |
| | | 021 | 247.21 | <8.0000E-05 | ₩. | 3.3400E-06 | ##2 | 0.20 | NA NA | NONEINP | | C-14 H-3 | 1.00000E+01 | 1 8.3990E-02 | 2.2700E-03 | ₹ S |
| | | 7.35 | 0.27 | <8.000E-03 | S. | 2.6000E+02 | | 7.35 | | | ₽ | Sr-90 | 5.00000E+0 | | | |
| | | | | | | | | | | | | | | 19-30000°C | 1.3640E-02 | |
| | | | | | | | | | | | <u></u> | Total | | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | - | | | | | |
| 236H | ₹ | 120 | 292.57 | <1.0000E-04 | МP | 3.3400E-06 | 29,39-H | 0.20 | NA | NOMENP | | C-14 H-3 | 1.000006+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 7,35 | 0.32 | <1.000E-02 | ą | 2,0000E+02 | | 7.38 | | | §. | Sr-90 Subtotal | 5.00000E+01 | | 1.3600E-02 | |
| | | | | | | | | | | | 111 | 1.4.1 | | | | |
| | | | | | | | | | | | | 000 | | 7.0448E-01 | 1.9040E-02 | |
| 1,862 | 4 | 0.21 | 247.21 | <1.0000E-04 | 2 | 3.3400E-08 | H-80'81 | 0.20 | NA NA | NONEMP | | C-14 H-3 | 1.00000E+01 | 8.3990E-02 | 2.2700E-03 | ş |
| | | 7.36 | 0.27 | <1.900E-02 | <u>\$</u> | 2.0000E+02 | - | 7.35 | | | <u> </u> | . | 5.00000000 | 4.1810E-01 | 1.1300E-02 | |
| | | | i | | | | , | | | | 111 6 | Total | | | 1.30#05-02 | _ |
| | <u>. </u> | | | | | | | | | | _ | | | 5.8608E-01 | 1.5840E-02 | |

| | | | 16.WASTE | CATION AS-Class A Stable AU-Class A Unstable B-Class B | AS | | | | AS | | | AS | | | AS | | | | AS | |
|-----------|-----------------------------------|--------------------------|---|--|-------------|--------------|-------|------------|-------------|--------------------------|------------|--------------------------------|--------------------------|------------|----------------------------|------------|------------|-----|--------------------------|------------|
| | MBER 2 | | | | 1.8100E-03 | | | 1.269UE-UZ | 2.2700E-03 | 1.1300E-02 | 1 58405-02 | 2.2700E-03 | 1.1300E-02 | 1.5840E-02 | 1.8100E-03 | 9.0700E-03 | 1 2690F-02 | | 4.5400E-04 4.5400E-04 | 2.2700E-03 |
| | 2. MANIFEST NUMBER 4032-01-002 | 3. PAGE 20 OF 24 PAGE(S) | MOLEGICAN | ND ACTIVITY (MB | 6.6970E-02 | 3.3559E-01 | 10000 | 4.03056-01 | 8.3990E-02 | 4.1810E-01 5.8608E-01 | 5.8608F-04 | 8.3990E-02 | 4.1810E-01 5.8608E-01 | 5.8608E-01 | 6.6970E-02 6.6970E-02 | | 4 6953F-01 | | 1.6798E-02 | |
| | | 3. | 15. RADIOLOGICAL DESCRIPTION | INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MEG) AND CONTAINER TOTAL-OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | 1.00000E+01 | 5.000000E+01 | | | 1.00000E+01 | 5.00000E+01 | | 1.00000E+01 1.00000E+01 | 5.00000E+01 | | 1.00000E+01 1.00000E+01 | | - | | 1.00000E+01 | |
| | Envirocare of Utah, Inc. | | | | C-14 H-3 | ī. | Total | | C-14 H-3 | Ī | Total | F74 | tal | Total | 7.7. 3.3. | Į. | Total | · • | F. 7-14 | 5 |
| | | | STE TYPE IN C | WEIGHT % ANTCHELATING AGENT IF>0.1% | | ž | | | | ₽ | | 1 | € | | | Ž | | | | Ž |
| | | | 14. CHEMICAL | CHEMICAL FORM CHELATING AGENT | NONENP | • | | | NONEMP | | | NONEMP | | | NONEWP | | | | NONEMP | |
| | | MARKET NEW PROPERTY | WASTELLESCRIPTION FOR EACH WASTE TYPE IN CONTAINER PTION 14. CHEMICAL DESCRIPTION 1 | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | NA | | | | NA | | | Ą | | | NA NA | | | | NA | |
| | 1 | ATION | PHYSICAL DESCRI | 12. APPROXIMATE 1 WASTE VOLUME(S) IN C CONTAINER (#23) | 0.20 | 25.7 | | | 0.20 | 7.35 | | 0.20 | 7.35 | | 0.20 | 7.36 | | | 0.20 | 7.35 |
| | L RADIOACTIVE NIFEST | CRIPTION (CONTINUATION) | | 11. WASTE DESCRIPTOR (See Note 2 | Z8,39-H | | | | 29,39-H | | | 29,39-H | | | 29,38-H | , | | L | H-88 | L |
| | LEVEL F E MANII | IE DESCRI | | CONTAMUATION MEGIGOOTE CONTAMUATION APPHA CANAMA CANAMA | 3.3400E-06 | 2.0000E+02 | | | 3.3400E-06 | 2.0000E+02 | | 3.3400E-06 | 2.0000E+02 | | 3.3400E-06 | 2.0000E+02 | | | 3.3400E-06 | 2.0000€+02 |
| _ | I LOW-LEVE WASTE MA | SAWD WAS | | 10. SURE CONTAIN MECH APPHA | 2 | ďX | | | ¥ | Ā | | ď | Q. | | N.P | ď. | | | <u>Q.</u> | £ |
| | UNIFORM LOW-LEVE WASTE MA | CONTAINER AND WASTE DES | | SURFACE RADIATION LEVEL mSvhr | <1.0000E-04 | <1.000E-02 | | | <1.0000E-04 | <1.000E-02 | | <1.0000E-04 | <1.000E-02 | | <1.0000E-04 | در.000E-02 | | | <2.6000E-04 | <2.600E-02 |
| | ⊃ | IPTION . | | AND CONTAINER WEIGHT (Kg) | 201.85 | 0.22 | | | 247.21 | 0.27 | | 247.21 | 0.27 | | 201.85 | 0.22 | | | 66.77 | 0.07 |
| | : | DESCR | | VOLUME (m3) | 6.21 | 7.35 | | | . 0.21 | 7.36 | | 924 | 55.7 | | 0.2H | 7.35 | | | 0.21 | 7,36 |
| | | DISPOSAL CONTAINER | 90 | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7 | ť | | | 4 | | | 4 | | | 4 | | | | 4 | |
| EODM EAAA | PONIN SALA | | 8 | CONTANER (DENTIFICATION NUMBER! GENERATOR (D NUMBER(S) | 2447 | | | | 248/1 | | | 258/1 | | | 258M | | | | 279/1 | |

| The color of the | | | | UNIFORM LOW-LEVEL RAD | 1 LOW-L | EVEL R | SADIOACTIVE | VE | | 1 | | Envirocare of Utah, Inc. | Utah, Inc | 2 MANIECET | o di divi | |
|--|---|----------|---------------------|-----------------------|-------------------|-----------------|------------------------------------|---------------------------|---|---------------------------------------|--------------------------|--------------------------|--------------------------|-------------------|---------------|--|
| Second | ÷ | | | | WAST | = MANIF | EST | | | | | | | 4032-01 | MUMBER 002 | |
| Record Converted Fig. Fig. Converted Fig. Fig. Converted Fig. Fig | DISPOSAL CONTAINER DESCRIPTION | E | $\ $ | CONTAINER | AND WAS | EDESCRI | PITON (CONTINE | (ATTON) | WASTERSTON | | | | : | 3. PAGE 21 0 | _ | , |
| Substitute Contribution Contri | 7. 8. WA | 8. WA | STE | 6 | 10 Strock | į | ļ | PHYSICAL DESCRI | | 14. CHEMICAL DE | SCRIPTION | NTAINER | 45 BANIOLOGI | | | 18.WASTE |
| March Marc | CONTAINER VOLUME CON OESCRIPTION VECON (See Nation 1 de 1 de 1 de 1 de 1 de 1 de 1 de 1 d | S S S | CONTAINER WEIGHT | | WBatti Abantic | NATION Dom2. | WASTE DESCRIPTOR (See Note 2 | VOLUME(S) IN CONTAINER | 13. SOLDIFICATION OR STABILIZATION MEDIA | CHEMICAL FORM CHELATING AGENT | WEIGHT * CHELATING | | L RADIONUCLID | ES AND ACTIVITY (| MBq) AND | CATION AS Cless A Stable AU class A |
| No. 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, | - - | *12 | ala | memfy | _ | BETA. GAMMA | (V) Brown | | (See Note 3) | | AGENT IF>0.1% | | ONOROGEN | CLIUCE PERCENT | | Unstable B-Class B |
| 1,1739E-01 3,1739E-02 1,1739E-02 1,1739E-02 1,1739E-02 1,1739E-02 1,1739E-02 1,1739E-02 1,1739E-02 1,1739E-02 1,1739E-03 1,173 | | | | | ···· | | | | | | | POLICIO ES | PCVgm | MBq | Ц., | |
| No. 1 1 1 1 1 1 1 1 1 | • | | | | | | | | | | | | | 1.1759E-0 | | • |
| 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, | 0.21 | | 65.77 | <8.0000E-05 | ż | 3.3400E-06 | 39-H | 620 | NA | NONEINP | | 7.14 | 1.00000E+ | | | AS |
| 1,1758E-01 3,1750E-03 | 7.35 | | 0.07 | <8.000E-03 | | 2.0000E+02 | | 7.35 | | | | 24-30 Caption | 1.00000E+ | | | ł |
| No. 1,100 | | | | | | | | | | | | | | 1.1759E-0 | L | |
| No. | | | | | | | | | | , | | otal | | 1.1759E-0 | | |
| No. | 0.24 | ន | 58 | | | | 29,39-H | 0.20 | NA | NONEINP | | 2.14 | 1.00000E+C | | | AS A |
| March Marc | 7.35 | J | B | <8.00uE-03 | | 2.0000E+02 | | 7.36 | | | | r-90 | 1.00000E+ | | | ! |
| No. 1.000 1.00 | | | -:- | | | | | | | | | | | 4.6953E-0 | | |
| NP 3.3400E-06 36-H Q.200 NA NONENP NP E.14 H-3 1.00000E+01 1.00000E+01 1.00000E+01 1.00000E+01 1.1759E-01 | | | | | +- | | | | | | <u> </u> | otal | ·. | 4.6953E-01 | | |
| No. State | 0.21 | 89 | | <8.0000E-05 | - | | 39-H | 22 | NA | NONEMP | 0; | 14 | 1.00000E+0 | | | |
| NP 3.3400E-40 | 7.35 0. | 6 | 8 | <8.000E-03 | | 0000E+02 | | 7.35 | | | | 7-90 ubfotal | 1.00000E+0 5.00000E+0 | | | |
| 1.1759E-01 3.1780E-03 | | | | | | | | | | | | ich. | | 2000 | 9.17 ave-us | |
| NP 3.3400E-08 200 NA NONENP C-14 1.00000E-01 6.6970E-02 1.8100E-03 NP 2.0000E-01 5.0000E-01 5.0000E-01 3.3559E-02 1.8100E-03 NP 2.0000E-01 5.0000E-01 3.3559E-07 1.2690E-02 NP 2.0000E-01 4.6953E-01 1.2690E-02 Total 7.000 4.6953E-01 1.2690E-02 | | | | | | | 1 | | | | <u></u> | | | 1.1759E-01 | 3.1780E-03 | |
| CLORDE-02 NP Sr-90 1-00000E+01 6.0000E+01 6.0000E+01 9.7700E-03 Subbotal 4.6953E-01 1.2890E-07 9.0700E-03 Total 4.6953E-01 1.2890E-02 | 0.21 20 | 20 | 88. | c1,0000E-04 | | | 29,38-H | +- | | NONEMP | ರಿತ | | 1.00000E+0 | | | S |
| Total 4.6953E-01 | 7,35 | | ZZ | <1.000E-02 | | 00005+02 | | 7.35 | | · · · · · · · · · · · · · · · · · · · | | <u> </u> | 5.00000E+0 | | | |
| 4.6953E-01 | | | | | | | | | : | - | 111.6 | (s) | | *.0222C-01 | 1.2630E-02 | |
| | | | | | | | 1 | | | - | <u>}</u> | 1 | | 4.6953E-01 | 1.2690E-02 | |

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-002

| | <u> </u> | | | CONTAINE | R AND WAS | TE DESCR | IPTION (CONTINU | IATION) | | | | | 3. PAGE 22 OF | 24 PAGE(S) | |
|--|---|----------------|--|-------------------------------------|-----------|---------------------------------------|---|---|-------------------|---------------------------------|--------------|--|--|--|--|
| | DISPOSAL CO | TAINER DESC | ROPTION | , | | | | | WASTE DESCRIPTION | ON FOR EACH WAS | TE TYPE IN C | | | 110 | 16.WASTE |
| | i · | 1 | Į. | 1 | | | | PHYSICAL DESCR | IPTION | 14. CHEMICAL DE | SCRIPTION | 15. RADI | OLOGICAL DESCRIPTION | | CLASSIFI |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | M8a/ | FACE MINATION 100 cm2 00 cm2 | WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | SOLIDIFICATION | CHEMICAL FORM CHELATING AGEN | WEIGHT | INDIVIDUAL RADION CONTAINER TOTAL | UCLIDES AND ACTIVITY (M OR CONTAINER TOTAL AC DIONUCLIDE PERCENT | TIVITY | CATION AS-Class Stable AU-Class Unstable |
| ID NUMBER(S) | Note 1A) | _(m3) (ft3) | (kg) (ton) | mSv/hr mcem/hc | ALPHA | BETA- GAMMA | | (m3) (FT3) | . (455.1 | | ¥F>0.1% | RADIONUCLIDES po | MBq MBq | mCi | B-Class (C-Class (|
| 291/1 | 4 | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-08 | 29,39-H | 0.20 | NA NA | NONEMP | NP | IC-14 1.000 | 00E+01 6.6970E-02 00E+01 6.6970E-02 00E+01 3.3559E-01 | 1.8100E-03 | AS |
| | , | 7.35 | 0,22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | · | | Subtotal | 4.6953E-01 | ·1 | ! |
| • | | | | | | | | | | | | Total | 4.6953E-01 | 1.2690E-02 | |
| 292/1 | 4 | | | | ļ | | | | | | | | | | |
| 234 l | * | 0.21 | 201.85 | <1,0000E-04 | NP | 3,3400E-06 | 29,39-H | 0.20 | NA | NONEMP | NP. | C-14 1.000 H-3 1.000 Sr-90 5.000 | 00E+01 6.6970E-02 00E+01 6.6970E-02 00E+01 3.3559E-01 | 1.8100E-031 | AS. |
| | · · · · · · · · · · · · · · · · · · · | 7,35 | 0.22 | <1.000E-02 | NP | 2.0000E+02 | ļ. | 7.35 | | | | Subtotal | 4.6953E-01 | 1.2690E-02 | |
| | - | | | | | | - | | | | | Total | 4.6953E-01 | 1.2690E-02 | |
| 296/1 | 4 | | | | | | 39-H | | NA | NONE/NP | | C-14 1.000 | 00E+01 1.6798E-02 | 4.5400E-04 | AS |
| | | 0.21 | 65,77 | | NP | 3.3400E-06 | | 0.20 | 1 | | NP | 5.000 | 00E+01 1.6798E-02 00E+01 1.6798E-02 00E+01 8.3990E-02 | 4.5400E-04 2.2700E-03 | MD. |
| | | 7.35 | 0.07 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 1.1759E-01 | 3.1780E-03 | |
| | , | | | | | | | | | | | Total | 1.1759E-01 | 3.1780E-03 | |
| 298/1 | 4 | 0.21 | 201.86 | <1.00005-04 | NP | 3.3400E-06 | 29,39-Н | 0.20 | NA NA | NONE/NP | Ī | IH-3 11.000 | 00E+01 6.6970E-02 00E+01 6.6970E-02 00E+01 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| | | 7.35 | 0,22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | ИÞ | Sr-90 5.000 Subtotal | 00E+01 3.3559E-01 4.6953E-01 | | |
| | | | | | | | | | | | | Total | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | | | | | | . | |
| 307/1 | 4 | 0.21 | 201.85 | <8.0000E-05 | NP | 3,3490E-06 | 29,39-H | 0.20 | NA | NONE/NP | ΝP | H-3 1.008 | 00E+01 6.6970E-02 00E+01 6.6970E-02 00E+01 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| | | 7.35 | 0.22 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 4.6953E-01 | 1.2690E-02 | |

FORM 541A

Envirocare of Utah, Inc. 2. MANIFEST NUMBER 4032-01-002

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

FORM 541A

| | • | | | | | 15th (14) | | | | • | | | | 3. PAGE 23 OF | 24 DAGE(S) | |
|--|---|---------------------|--|-------------------|-----------|-------------------------------|---|--|-------------------|-----------------|------------------|----------------------|-------------------------------------|---|--|--|
| | DISPOSAL CO | NTAINER DESC | RIPTION | LUNIAINE | K AND WAS | HE DESCR | PTION (CONTINU | IATION) | WASTE DESCRIPTION | M EOD EACH INNO | CE TABLE IN C | OMMEN | | 3. FAGE 23 OF | 24 PAGE(5) | |
| 5. | 1 | 1. | | | | | | PHYSICAL DESCR | IPTION | 14. CHEMICAL DE | SCRIPTION | | E DADIOLO | GICAL DESCRIPTION | | 16.WASTE CLASSIFI- |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (f3) | 8. WASTE AND CONTAINER WEIGHT | LEVEL | _MRo/1 | AINATION 100 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER | 13. | | WEIGHT | l | RADIONUCLI | GICAL DESCRIPTION IDES AND ACTIVITY (MI CONTAINER TOTAL AC NUCLIDE PERCENT | Bq) AND TIVITY | CATION AS-Class A Stable AU-Class A Unstable |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (tcn) | nsythr mremthr | ALPHA | BETA- GAMMA | | (m3) (FT3) | (000 1100 3) | | AGENT IF>0.1% | RADIONUCLIDES | | | | B-Class B C-Class C |
| | | | ŀ | | | | | | | | | | pCi/gm | | mCi | ; |
| | , | | | | | | | | _ _ } | | | Total | | 4.6953E-01 | 1.2690E-02 | 1 |
| 308/1 | 4 | 0.21 | 65.77 | <8.0000E-06 | NP | 3,3400E-06 | 39-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 1.6798E-02 +01 1.6798E-02 +01 8.3990E-02 | 4.5400E-04 4.5400E-04 | L) |
| | | 7.35 | 0,07 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | MF . | Subtotal | 5.00000E | 1.1759E-01 | 2.2700E-03 3.1780E-03 | .1 |
| | | | | | | | | | | | | Total · | | 1.1759E-01 | 3.1780E-03 | |
| 310/1 | | | | | | | | | | | | | | | | 1 |
| 3101 | 4 | 0.21 | , 158.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0,17 | <8.000E-03 | ИP | 2.0000E+02 | | 7.35 | - | | | Subtotal | 0.00000 | 3.5224E-01 | 9.5200E-03 | ·l |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | • | ļ | | | |
| 311/1 | 4 | 0.21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 5.000002 | 3.5224E-01 | 6.8000E-03 9.5200E-03 | 1 |
| · | | | | | | | - | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | | | | |
| 312/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0,20 | NA | NONE/NP | - 1 | C-14 H-3 | 1.00000E- 1.00000E- 5.00000E- | +01 5.0320E-02 +01 5.0320E-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Sr-90 Subtotal | 5.00000E | | 6.8000E-03 9.5200E-03 | |
| | | | | | | | | | | · | | Total | | 3.5224E-01 | 9.5200E-03 | |
| FORM 541A (10-96) | | <u> </u> | | | | | | | | | | | | | | , I |

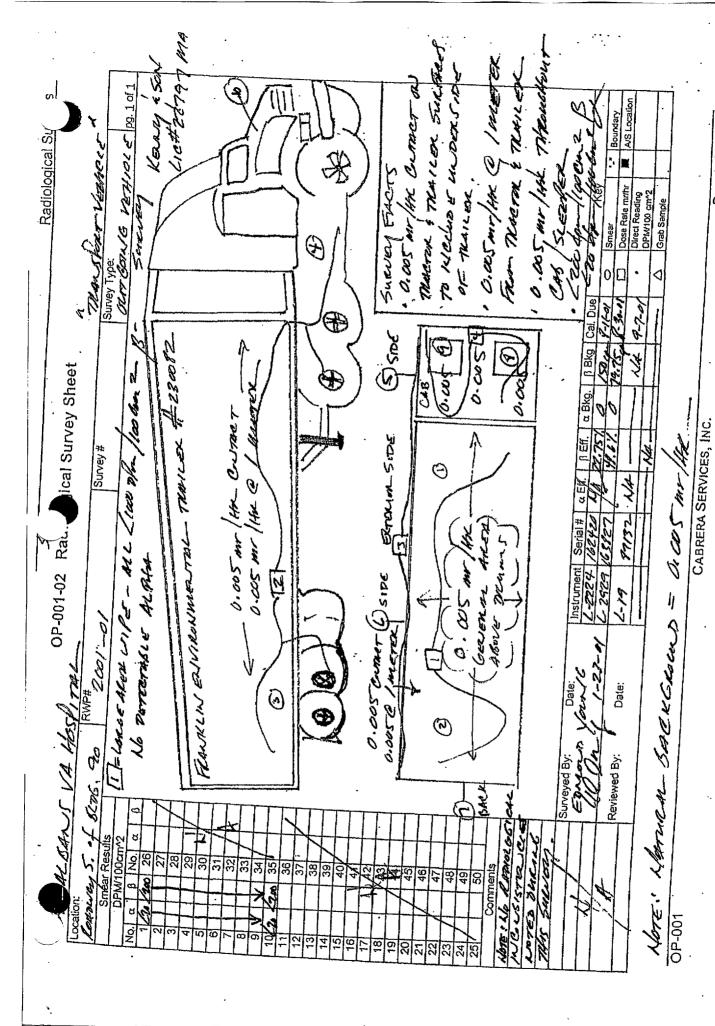
| CONTABLER CONTAB | | · ɔ | UNIFORM LOW-LEVEL WASTE MAN | LOW-LEVEL | | RADIOACTIVE | VE | | | | Envirocare of Utah, Inc. | igsquare | 2. MANIFEST NUMBER 4032-01-002 | MBER 2 |
|--|--------------------------------|--------------------------------|--|--|-----------|--|--|---|--|---|--------------------------|---|---|--|
| 8.00 SES | DISPOSAL CONTAINER DESCRIPTION | | CONTAINER | AND WAST | g DESCRIP | CONT | IATION | | | | | ಣೆ | 3. PAGE 24 OF 24 PAGE(S) | |
| 4 | 7. VOUUME (m3) | AND AND ATAINER EIGHT | 9. SURFACE RADIATION LEVEL MSVIP | 10. SURF CONTAM MBG/11 dpm/fl | | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCR 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (F13) | PTION 1971ON 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | PHYSICAL DESCRIPTION 12. APPROXIMATE 13. WASTE SOLIDIFICATION 14. CHEMICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 15. CHEMICAL DESCRIPTION 16. CHEMI | WEIGHT WEIGHT WEIGHT WEIGHT WEIGHT AGENT FFO.1% | | 15. RADIOLOGICAL DESCRIPTION L RADIOMUCLIDES AND ACTIVITY (R. TOTAL, OR CONTAINER TOTAL / AND RADIONUCLIDE PERCENT | 15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIOMICLIDES AND ACTIVITY (MEG) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND RADIOMUCLIDE PERCENT | TRWASTE CANSSIEN- CATTON AS-Class A NOTY AL-Class A Unisable Unisable B-Class B |
| | 12.0 | 8 7 | v | | 8 8 | 39,25-H | 0.250 | 45 4 | NONEMP | ₽. O±w tw | Sadri | 1.00000E+01 1.00000E+01 6.00000E+01 | MBq 5.0320E-02 5.0320E-02 2.5160E-01 3.5224E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 9.5200E-03 |
| • | | | | | | | | | | II Par | Total | • . | 3.5224E-01 | 9.5200E-03 |
| Shipment Totals | 21.63 | 15438.07 | | 1 | | | | | | | | | 3.4523E+01 | 9.3307E-01 |
| | 757.06 | 16.76 | | | | | | , | | | | | | |
| | | | | | | | | | | | | | | |
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|--|--|----------------------------------|-------------------------------------|--|--|------------------------------|--|--|--|---|---|--|
| FORM 540 UNIFORM LOW-LE | En VEL RADIOACTIV | virocare of Utah, Inc. | 5: SHIPP U.S. Army (CENAB-EN | ER - NAME AND FACILITY Corps Of Engineers | <u> </u> | 8H | PMENT LD. NUMBER 4032-01-003 | 7. FORM 540 AND 540 | A PAGE 10 | OF 7 PAGE(S) | 8. MANIFEST NU | MBER er on all continuation |
| | MANIFEST | _ | 10 South H | -ru oward Street MD 21201-1715 | | <u> </u> | COLLECTOR | FORM 541 AND 541 FORM 542 AND 542 | A A | 24 PAGE(S) None PAGE(S) | pages) 4032-01 | LAGS |
| | ING PAPER | | | MIT NUMBER | | | PROCESSOR | ADDITIONAL INFOR | MATION | None PAGE(S) | 4032-0 | |
| EMERGENCY TELEPHONE NUMBER (Include 1-800-426-8878 | e Area Code) | | NA CONTACT | ALL HORBOCK | SHIPMENT NUMB 4032-01-003 | X | 1 1 1 1 1 | 9, CONSIGNEE - Name | | | CONTACT Shipping and Recei | ving |
| ORGANIZATION | | | | Honerlah | | (tnc | EPHONE NUMBER fude Area Code) | Clive Disposal Site Interstate 80, Exit 49 | | | TELEPHONE NUMB | ER (Include Area Code) |
| Franklin Environmental Services, Inc. | | | 6. CARRI | ER - Name and Address | | | 10-862-9184 | Clive, UT 84029 | | | (435)884-0155 | |
| 2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? YES | TOTAL NUMBER OF PACKAGES IDENTIFIES ON THIS MANIFEST | 102 | Franklin En 185 industri | vironmental Service | • | MAI | ALD. NUMBER D084814136. | SIGNATURE - Authori | zed consignee ecknowle | adging waste receipt | DATE | |
| X NO | ·> | | Wrentham, | MA 02093 | | | PPING DATE /23/01 | | | D. CERTIFICATION | | |
| 4. DOES ETA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? X NO | EPA MANIFEST NUMBER | | | Tess | | TEL (Inc. | EPHONE NUMBER lude Area Code) 08-384-6151 | This is to certify that the hin proper condition for the certifies that the materials disposel as described in a | erein-named materials a asportation according to are classified, package accordance with the requ | are properly classified, the applicable regulated, marked, and labeled sirements of 10 CFR Pa | described, packaged, mar ons of the Department of and are in proper condition of the proper conditions are such as the proper conditions are in proper conditions. | ked, and labeled and are Transportation. This also in for transportation and int state recutations. |
| If "Yes," provide Manifest Number *****> | TVA. | | SIGNATURE | - Authorized carrier acknowledge | ing waste receipt | DAT | - | AHTHORIZED SIGNAT | | TITLE | | DATE |
| 11. U.S. DEPARTMENT OF TRANSPORTATION | DESCRIPTION | 12, | 13. | 14. | | 1/- | 24-01 | ON BENALF OF | USACE | Prosper. | ENAMETE. | 24 30001 |
| (Including proper shipping name, hazard class, U and any additional information Radioactive material, excepted package | | DOT LABEL "RADIOACTIVE" | TRANSPORT INDEX | PHYSICAL AND CHEMICAL FORM | | RA | 15. INDIVIDUAL DIONUCLIDES | TOTAL F | 16. PACKAGE ACTIVITY MCI | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| material, 7, UN2910 | · - | | NA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 | 067 |
| Radioactive material, excepted package material, 7, UN2910 | | NA | NA . | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA NA | FT3 245. LBS; 7.35 | 070 |
| Radioactive material, excepted package material, 7, UN2910 | | NA | NA | Solid /NA | C-14 | H-3 | Sr-98 | 2.3510E-01 | 6.3540E-03 | NA | FT3 245. LBS; 7.35 | 072 |
| Radioactive material, excepted package material, 7, UN2910 | _ | NA | NA | Solid INA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | FT3 645. LBS; 7.35 | 073 |
| Radioactive material, excepted package material, 7, UN2910 | , , , | NA . | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | FT3 645, LBS; 7.35 | 075 |
| Radioactive material, excepted package material, 7, UN2910 | -limited quantity of | NA NA | VA. | Solid /NA | C-14 | H-3 | Sr-90 | 7 2 4 4 5 6 4 | | | FT3 | |
| Radioactive material, excepted package | -limited quantity of | NA NA | NA. | Solid /NA | | | | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 077 |
| material, 7, UN2910 Radioactive material, excepted package | | | VA. | | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 079 |
| material, 7, UN2910 | | | VA | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | | 080 |
| FOR CONSIGNEE USE ONLY | | Record Waste Descri | otion Incoln | 20. TERMS | AND CONDITION | | ~- | | 1 | | FT3 | |
| t satisfic | _ | Contamination or Leaf | | | hazardous waste, the | RIALS: Ge stripment | nerstor represents & warr is also accompanied by a | ranis that Waste Material _ separate and completed h | is (or) is no | ot a hazardous waste a | defined in 40 CFR 261. | Where the malerial is a |
| | | Unexpected Exposure | - | · i | • | | | | | | | |
| | | Labels, Markings, etc. | | | representations here | ence at the in shall ther | disposal site by Enviroca: eupon transfer from Gene | re of Utah, Inc., and all app erator and be vested in Env | ropriate regulatory auth | orlites, title to the Wast | le Material which conforms | to Generator's |
| San San San San San San San San San San | | • | - | | WASTE MATERIAL. | Generator | mananaha and | # = = = 11 . # = = = = 1 . # = 11 . 1 . 1 . 1 . 1 | | T DADIOACTO COLL | | |
| | | Container Integrity Ina Other | dequate | 1 | | | ••• | | THE PROPERTY OF THE PERSON OF | THE REPORT OF THE CHILD SECURITY AND ADDRESS. | 3 , • · · · · · · · · · · · · · · · · · · | · · • |
| The state of the s | | | 4t - Ot | D. 1 | INDEMNIFICATION: liability results from the | Generator re failure of | agrees to indemnify Envir the Waste Material to con | rocare of Utah, inc., its office aform in all material respec | ers, employees and age | enis against all losses a | and liability whatsoever if: | such losses or |
| FORM 540 (10 96) | | No Violations Detected | on this Sh | pment, | MAINIFEST,) or if this | shipment f | alls to meet the standards | morm in all material respect prescribed by the Departm | nent of Transportation of | r any governmental age | rcevet MADICIAC TIVE V Proy having jurisdiction ov | VASTE er such matters. |
| Santa State 1 | | • | | | | | | | | | | |

WASTE SHIPMENT RECORD

| Name US APPLY Corps of teginners - at Linibe and City/State/Zip | | 1. Work site (Generator): Name US Army Corps of Engineers - Baltimor | re Dist. | Owne | er's Name | | Owner ephone | |
|--|----------|---|-----------------------------|-------------------------|-----------------------------|-------------|-------------------|--------------|
| 2. Remover's name and address: Franklin Environmental Services, Inc. 185 Industrial Road Wrentham, MA 02093 3. Waste Disposal Site (WDS) Name Envirocare of Utah- Clive Disposal Site Mailing Address Interstate 80, Exit 49 City/State/Zip Clive, UT 84029 4. Name and address of responsible agency Frontier No. Type 5. Description of materials RQ, ASBESTOS, 9, NA2212, III RQ = 1 LB (ONE POUND) 8. Special handling instructions and additional information (provided by generator.) | | Mailing Address CENAE-EN-HI. 10 South Howard | Road | St. Al | ban'ş VAE | cc | | |
| 185 Industrial Road Nentham, Ma 02093 Name Envirocare of Utah Clive Disposal Site (MDS) Name Envirocare of Utah Clive Disposal Site Malling Address Interstate 80, Exit 49 Additional Information: Additional Information: Clive, UT 84029 Profile No. 4 0 3 2 | | 2. Remover's name and address: | | | | | | |
| S. Woste Disposal Site (WDS) Name Envirocare of Utah- Clive Disposal Site Mailing Address Interstate 80, Exit 49 City/State/Zip Citye. UT 84029 Profile No. Additional Information: Additional Information: Additional Information: City/State/Zip Citye. UT 84029 Profile No. 4 0 3 2 | | 185 Industrial Road | | | | (508 | 384 | -6151 |
| Mailing Address Interstate 80, Exit 49 City/State/Zip Citye, UT 84029 Physical Interstate 80, Exit 49 Site Location Citye, UT 84029 4. Name and address of responsible agency 5. Description of materials RQ, ASBESTOS, 9, NA2212, III RQ = 1 LB (ONE POUND) 8. Special handling instructions and additional information (provided by generator.) Linty Gunh Rulpadius Natural 9. OPERATOR'S CENTIFICATION: I hereby declare that the contents of this consignment are fully and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title Printed/typed name & title No. Type 7. Total quantity m ¹ (yd ²) 9. OPERATOR'S CENTIFICATION: I hereby declare that the contents of this consignment are fully and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title No. Type 7. Total quantity m ¹ (yd ²) 9. OPERATOR'S CENTIFICATION: I hereby declare that the contents of this consignment are fully and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title No. Type 7. Total quantity m ² (yd ²) 9. OPERATOR'S CENTIFICATION: I hereby declare that the contents of this consignment are fully and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title No. Type 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year Address and telephone no. 11. Transporter 2 (Acknowledgment of receipt of asbestos) 12. Discrepancy indication space 13. Waste disposal site owner or operator: | | 3. Waste Disposal Site (WDS) | Site | WDS telepho | ne no: | | | , |
| Physical Site Location C11ve, UT 64029 4. Name and address of responsible agency 5. Description of materials RQ, ASBESTOS, 9, NA2212, III RQ = 1 LB (ONE POUND) 8. Special handling instructions and additional information (provided by generator.) Lingth Quanty Profile No. 1 Profile No. 27 yb 9. OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title Signature Month Day Year 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year Address and telephone no. 12. Discrepancy Indication space Rejected: Yes No 13. Waste disposal site owner or operator: Certification of receipt of asbestos | | Mailing Address Interstate 80, Exit 49 | | Additio | nal Inform | ation: | | |
| 4. Name and address of responsible agency 5. Description of materials RQ. ASBESTOS, 9, NA2212, III RQ = 1 LB (ONE POUND) 8. Special handling instructions and additional information (provided by generator.) Lingth Quenty Polyagist Network 9. OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title Work Test - Proud Network Address and telephone no. 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title Month Day Year Address and telephone no. 12. Discrepancy indication space Rejected; Yes No 13. Waste disposal site owner or operator; Certification of receipt of asbestos | SR. | Physical Interstate 80, Exit 49 | | | Profile N | 10. 4 0 | 3 2 | |
| 5. Description of materials RQ, ASBESTOS, 9, NA2212, III RQ = 1 LB (ONE POUND) 8. Special handling instructions and additional information (provided by generator.) Linity) Quechy (Notice Pound) 9. OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title Printed/typed name & title Signature Month Day Year 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year 12. Discrepancy indication space Rejected; Yes No 13. Waste disposal site owner or operator: Certification of receipt of asbestos | GENERATO | | | | • | | | |
| 8. Special handling instructions and additional information (provided by generator.) Linty Bunch two Machus Malachus Ma | | 5. Description of materials | | | | | otal qu m³ (yd | antity ³) |
| 9. OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title Printed/typed name & title Printed/typed name & title Printed/typed name & title Printed/typed name & title Signature Month Day Year O1 / 23 / O1 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year 1 24 0/ STAUSHON AND 2003 11. Transporter 2 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year Address and telephone no. Signature Month Day Year Address and telephone no. Rejected: Yes No 13. Waste disposal site owner or operator: Certification of receipt of asbestos | | | | 1 | | | <u>ک</u> ا ر | 493 |
| accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations. NOTE: Generator must retain a copy of this form. Printed/typed name & title 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title | | Linited Quenth Andinactive Meter | -141- | | | | | |
| 10. Transporter 1 (Acknowledgment of receipt of materials) Printed/typed name & title Signature | | accurately described above by proper shipping na | ime and are rt by highw | classified ay accord | d, packed, n ding to app | narked, and | i labele | d, and |
| Printed/typed name & title Sence for M. Colonns | | Printed/typed name & title Robort Tes - Project Maraga | We | Japanore | US- | | | |
| Frmkin Engreened Serics Inc. Address and telephone no. 185 Injustral Aj. 800436 4878 Writthan MA 02043 11. Transporter 2 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year Address and telephone no. Page 12. Discrepancy indication space Rejected: Yes \ No \ \ | | | terials) | | | | | |
| Frinkly Engineers Series Inc. Address and telephone no. 185 Injustral Aj. 800436 9878 Writthan MA 02043 11. Transporter 2 (Acknowledgment of receipt of materials) Printed/typed name & title Signature Month Day Year Address and telephone no. Printed: Address and telephone no. 12. Discrepancy indication space Rejected: Yes \ No \ \ | | Printed/typed name & title 15 enneth M. Colonns | 12.5 | ignature | | Month / | • | |
| Address and telephone no. 2 12. Discrepancy indication space 13. Waste disposal site owner or operator: Certification of receipt of asbestos | овтек | 185 Injustral AD. 800 426 9878 | | | | | | |
| Address and telephone no. 2 12. Discrepancy indication space 13. Waste disposal site owner or operator: Certification of receipt of asbestos | NSF | 11. Transporter 2 (Acknowledgment of receipt of ma | terials) | | | | | |
| 12. Discrepancy indication space Rejected: Yes No 13. Waste disposal site owner or operator: Certification of receipt of asbestos | TRA | Printed/typed name & title | S | Signature | | Month | Day | Year |
| Yes No 13. Waste disposal site owner or operator: Certification of receipt of asbestos | | Address and telephone no. | | | | | | |
| Yes No 13. Waste disposal site owner or operator: Certification of receipt of asbestos | | · | | | | | | |
| 13. Waste disposal site owner or operator: Certification of receipt of asbestos materials covered by this manifest except as noted in Item 12. Printed/typed name & title Signature Month Day Year | , TE | 12. Discrepancy indication space | | | • . | □ No | | |
| Printed/typed name & title Signature Month Day Year | 087 | Waste disposal site owner or operator: Certification materials covered by this manifest except as noted | n of receipt in Item 12. | of asbest | | i | | |
| | DISP | Printed/typed name & title | S | Signature | | Month | Day | Year |

ORIGINAL RETURN TO GENERATOR



Page 15 of 15

| Environment of the tree | <u> </u> | SHIPPER | SHIPPER - NAME AND FACILITY | | OH. | MENT IN MIRABED | | | | 1 | 0.00 |
|--|----------|---|---|---|---|--|--|---|--|---|--|
| Kale of Ola | | U.S. Amy Corps of Engine U.S. Amy Corps of Engine 10 South Howard Street Baltimore, MD 21201-1718. | 913 | i | | | 7. FORM S40 AND 540A FORM 541 AND 541A FORM 542 AND 542A ADDITIONAL INFORMATION | A PAGE 1 OF A MATION N | F 7 PAGE(S) 24 PAGE(S) None PAGE(S) None PAGE(S) | 4. MANNEST NUMBER (Use this number on a Pages) - 4032-01-003 | MANNEEST NUMBER (Use this number on all continuation , pages) 4632-01-003 |
| | Т | USER PERMIT NUR NA | ABER | SHIPMENT NUMBER 4032-01-003 | BER X | GENERATOR TYPE (Specify) G | 9, CONSIGNEE - Name and Facility Address | and Facility Address | | CONTACT Shipping and Receiving | iving |
| | - | CONTACT: Mr. Hens Honorlah | nordah | | 19T () | TELEPHONE NUMBER (Include Avez Code) 410-862-8184 | Cive Disposal Site Interstate 80, Exit 49 Cive, UT 84029 | ı | | TELEPHONE NUM: (435)884-0155 | TELEPHONE NUMBER (Include Area Code) (435)884-0155 |
| | Ψ | 6. CARRIER Franklin Envir | 6. CARRIER Name and Address Franklin Environmental Service 185 Inchestral Board | | EPA | EPA LD. NUMBER MAD084814136 | SIGNATURE - Author | SIGNATURE - Authorbed consignee ecknowledging waste receipt | dging waste receipt | DATE | |
| 102 | - | Wrentham, MA 02093 | 02093 | | 器 | SHIPPING DATE | is is to certify that the h | 10. exein-ramed materials ar | . CERTIFICATION | described packaged ma | chaladal box bash |
| | | CONTACT Rob Tess | | <u> </u> | (Inch | TELEPHONE NUMBER CEL (Include Area Code) dis 508-384-6151 | proper condition for tra rities that the materials possal as described in a | sportation according to are classified, package coordance with the requ | the applicable regular 1, marked, and labeled inements of 10 CFR P | in proper condition transportation according to the applicable equalistics of the Department of Tirensportation. This aiso coeffice that the materials are designed, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFP Parts 50 and 61, or equivalent state regulations. | Transportation. This on for transportation ent state regulations |
| | | SIGNATURE - AU | Authorized carrier activodyadqing waste receipt | waste receipt | DATE | , | AUTHORIZED SIGNATURE | RE CONST | 100 Sept. | S. Winds | DATE USA SO |
| 12. DOT LABEL "RADIOACTIVE" | | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | -8 | 15. INDIVIDUAL RADIONUCLIDES | TOTAL | 16. TOTAL PACKAGE ACTIVITY MBq mCI | 17. LSA/SCO CLASS | 18, TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| NA | ¥ | 4 | Solid INA | C-14 | £ | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | 245. LBS; 7.35 FT3 | 290 |
| NA | ≨ | 4 | Solid INA | C-14 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | AA A | 245, LBS; 7.35 FT3 | 070 |
| NA | ≨ | 4 | Solid /NA | 5.74 | £ | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | 245. LBS; 7.35 FT3 | 072 |
| NA NA | ₹ | 4 | Solid INA | C-14 | ¥ | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.36 FT3 | 073 |
| NA | ≨ | 4 | Solid /NA | 2-14 4-14 | H:3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 075 |
| NA | ¥ | æ | Solid /NA | 7-7- | ¥3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.35 FT3 | 7.20 |
| NA NA | ₹ | <i>a</i> | Solid /NA | 7 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.35 FT3 | 679 |
| NA | ≨ | 4 | Solid MA | 2 | H-33 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 080 |
| Record Waste Description Inadequate Contamination or Leakage Detected | scripi | ion Inadequige Detecte | 20. TERMS | TERMS AND CONDITION A. HAZARDOUS MATERIALS: Generator re frazardous waste, this shipment is also acd certification as required by 40 CFR 258.1. | V VTERIALS: Ge this shipment paired by 40 Cf | AND CONDITION AND CONDITION AND CONDITION AND CONDITION (A) is not a hazardous wasts as defined in 40 CFR 261. Where the material is a hazardous wasts as defined in 40 CFR 261. Where the material is a hazardous wasts, this signment is also accompanied by a separate and completed hazardous wasts manifest, along with the appropriate tand-disposal restriction notice and/or exprision as required by 40 CFR 268.1. | is that Waste Material parate and completed | is (or) is no ezardous waste manifer | A 8 hazardous waste 2 4, along with the appro | as defined in 40 CFR 261. opriate tand-disposal rest | Where the mate |
| Unexpected Exposure Rates Detected | ans de | Rates Detect | 6 0 | TITLE: Upon aco representations fx | aptance at the erein shall then | TITE. Upon acceptance at the disposal sile by Environe of Utah, Inc., and all appropriate regulatory authorities, title to the Waste Majerial which conforms to Generator's representations herein shall tearupon transfer from Generator and be vested in Environate of Utah, Inc. | X Utah, Inc., and all ap or and be vested in En | ropriate regulatory auth rirocare of Utah, Inc. | orities, title to the Was | ste Malerial which conform | is to Generator's |
| Container Integrity Inadequate | y Inad | equate | S ta | ASTE MATERLINSPECTS and in | AL: Generator | WASTE MATERIAL. Generator represents and warrants that all data set forth in this (INIFORM LOW-LEVEL RADIOACTIVE MASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, nates, regulations and Envirocase of Utlan, inc.'s facility license. | t all data set forth in this tal laws, rules, regulati | (UN)FORM LOW-LEVE As and Envirocare of UI | il. RADIOACTIVE WA ah, Inc.'s facility licens | \STE MANIFEST) are true se, | and correct in |
| Other No Violations Detected on this Shioment. | hected | on this Shir | ci | DEMNIFICATIC bility results from | N: Generator in the failure of this objument. | NOEANIFICATION. Generator agrees to indemnity Envincars of Utils, inc., its officers, employees and agents against all tosses and fabrilly whatsoever if such losses or liability unlated when the results from the agustient of the results from the agustient of the results from the agustient of the results from the agustient when the results are agreed to a confirm the agreement of the agreement o | are of Utah, Inc., its offi m in all material respen | zers, employees and age as to the data supplied o | outs against all losses on the (UNIFORM LOV | end liability whatsoever if | such losses or WASTE |

٠,

| Form 540A | | ٠ | | | | | - | Envi | Envirocare of Utah, Inc. | 80 | MANIFEST NUMBER |
|---|-----------------------------------|---------------------------|--------------------------------------|-----------------|--------------|------------------------------------|------------|--------------------------------------|--------------------------|---|---------------------------------|
| | | NE NE | ORM LOW-LEVEL RADIOACTIVE | DIOACT | ΝĒ | | | | | pages) 4032-01-003 | -003 |
| | | SHIP | Ž | NUATIO | 2 | | | | | PAGE 2 OF | 7 PAGES |
| 11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information | 12. BOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYBICAL AND CHEMICAL FORM | <u> </u> | PADIC RADIC | 15. INDIVIDUAL RADIONUCLIDES | TOTAL PAC | 18. TOTAL PACKAGE ACTIVITY MBA | 17. LSAISCO | 18. TOTAL WEIGHT OR VOLUME | 19. IDENTIFICATION NUMBER OF |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Soli | 6.14 | £ | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | (Use appropriate units) 645, LBS; 7.35 | PACKAGE 081 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΑΝ | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | FT3 645. LBS; 7.35 | 280 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | A. | Solid /NA | C-14 | ¥ | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | FT3 645, LBS; 7.35 | 083 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≸ | Solid /NA | C-14 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | ĄN | FT3 245. LBS; 7.35 | 084 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 2. 4 | £ | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | F13 645. LBS; 7.35 | 085 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | AN. | Solid /NA | 7 4 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | .FT3 645. LBS; 7.35 | 980 |
| | NA | ¥ | Solid /NA | 25 | H3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.35 | 087 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid INA | 24 | ¥ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | F13 245. LBS; 7.35 | 260 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid /NA | 75 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | FT3 245. LBS; 7.35 | 860 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | | Solid /NA | C-14 | £3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | FT3 245. LBS; 7.35 | 660 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid /NA | <u>₹</u> | ¥3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | FT3 245, LBS; 7.35 | 100 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid INA | 4 | £3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | . NA | FT3 245, LBS; 7.35 | 101 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ş | Solid INA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 8.3540E-03 | NA | F13 245, LBS; 7.35 | 104 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≸ | Solid /NA | 2 | H-3 | Sr-90 | 2.3510E-01 | B.3640E-03 | NA | F13 246. LBS; 7.35 | 105 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid INA | 24 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | | 106 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | AM | ¥ | Solid /NA | 4.7 | £3 | Sr-90 | 2.3510E-01 | 5.3540E-03 | NA | _ | 107 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ¥ | Solid /NA | C-14 | £3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | | 109 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥χ | Solid /NA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | _ | 141 |

| GODM EADA | | | | | | | | Enviro | Envirocare of Utah, Inc. | <u></u> | MANIFEST NUMBER (Use this rumber on all continuation |
|---|-----------------------------------|---------------------------|---------------------------------------|---------------|----------|----------------------------------|--------------|--|--------------------------|--|---|
| | | UNIFO | Ş | IOACTIN | Æ | • | | | | pages) 4032-01- | 5003 |
| | | | WASTE MANIFEST | - | | | | | | | |
| | ٠ | SH | SHIPPING PAPER (CONTINUATION) | UATION | € | | | | | PAGE 3 OF | 7 PAGES |
| U.S. DEPARTMENT OF TRANSPORYATION 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 | | RADIO | 15. INDMDUAL RADIONUCLIDES | TOTAL PACK | 18. TOTAL PACKAGE ACTIVITY MBq mCi | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ā | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 116 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≸ | Solid INA | <u>2</u> | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 112 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ΑΝ | ΑΝ | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 118 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | Y. | Solid INA | C-14 | ĩ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | 345. LBS; 7.35 FT3 | 122 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | 345. LBS; 7.35 FT3 | 130 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΝΑ | Solid /NA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 131 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA A | Solid /NA | 7. | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 132 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 7. | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 133 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | ? 4 | ¥ | Sr-90 | · 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 134 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid INA | 7. | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 141 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid MA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 142 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ψ _N | Solid /NA | C-14 | ? £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥. | 345. LBS; 7.35 FT3 | 144 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | <u>2</u> | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345, LBS; 7.35 FT3 | 151 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | Α <u>ν</u> | Solid /NA | 21.7 | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥. | 345. LBS; 7.35 FT3 | 152 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ₩ | Solid /NA | 4.0 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 153 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΑA | Solid INA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 154 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | er H | Sr-90 | 3.5224E-01 | 9.5200E-03 | AN . | 345. LBS; 7.35 FT3 | 155 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 156 |
| FORM 540A (10-96) | | | | | | | | | | | |

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FORM 540A

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

Envirocare of Utah, Inc.

MANIFEST NUMBER
(Use this number on all continuation pages)
4032-01-003

| | | | TING TALLIT (OUT) | | | | | | | PAGE 4 0 | F 7 PAGES |
|---|-------------------------------------|---------------------------|-------------------|--------|-------------|------------------------------|------------|------------------------------|-------------------------|--|--|
| 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 | CHEMICAL FORM | | INI RADI | 15. DIVIDUAL ONUCLIDES | TOTAL PA | 16. CKAGE ACTIVITY mCl | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19, IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 157 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA . | Solid /NA | · C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 158 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 159 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA. | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 161 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 162 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 173 |
| Radicactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA . | | 176 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 177 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | | 178 |
| Radicactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | | 179 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA . | Solid /NA | C-14 | Н-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | 1 | 184 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA: | | 185 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | | 194 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | Н-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | | 199 |
| Radicactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | | 200 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA - | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | | 204 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA V | | 206 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 FORM 540A (10-95) | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | | 207 |

| FORM \$40A | | UNIFO | FORM LOW-LEVEL RADIOACTIVE | DIOACTI | VE | | | Envir | Envirocare of Utah, Inc. | ಪ | MANIFEST NUMBER (Use this number on all continuation pages) 4032-01-003 |
|--|--------------------------------|---------------------------|---|-------------|--------------|------------------------------------|------------|--|--------------------------|--|--|
| • | | SHIP | WASTE MANIFEST IPPING PAPER (CONTINUATION) | T NUATIO | 2 | | | | | PAGE 5 OF | 7 PAGES |
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN 10 number, and say additional information. | 12 DOT LABEL PADIOACTIVE | 13. TRANSPORT INDEX | PHYSICAL AND CHEMICAL FORM | - | RADIO | 15. INDIVIDUAL RADIONUCLIDES | TOTAL PACE | 16. TOTAL PACKAGE ACTIVITY MBq mCl | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ą. | Solid /NA | 7.7 | Ĩ | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 210 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΨN | Solid /NA | C-14 | . H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 213 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | C-14 | £3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 216 |
| Radioactive material, excepted package-limited quandity of material, 7, UN2910 | ¥¥ | ¥. | Solid /NA | 2 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 217 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ΑN | Solid /NA | C-14 | Ε. Η | Sr-90 | 7.0448E-01 | 1.9040E,02 | NA A | 645. LBS; 7.35 FT3 | 219 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | Ψ _N | Solid /NA | C-14 | £. | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.36 FT3 | 221 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | δN. | Solid INA | 2 | ? | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA NA | 645, LBS; 7.35 FT3 | 224 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | AN. | Solid /NA | 7-7 | ? | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA. | 645. LBS; 7.35 FT3 | 225 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA. | Ą | Solid INA | <u>유</u> | Ŧ | 06-rs | 3.5224E-01 | 9.5200E-03 | NA | 346. LBS; 7.35 FT3 | 228 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | AM. | Solid /NA | 74 | £ | Sr-90 | 7.0448E-01 | 1.9040E-02 | . YA | 645. LBS; 7.35 FT3 | 232 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | MA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 233 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA. | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA A | 645. LBS; 7.35 FT3 | 237 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | A. | Solid /NA | C-14 | ¥ | Sr-90 | 4.6953E-01 | 1.2690E-02 | ¥ | 445. LBS; 7.35 FT3 | 240 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | AN. | ≨ | Solid /NA | C-14 | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | Ā | 345. LBS; 7.35 FT3 | 241 |
| Radioartive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≸ | Solid MA | C-14 | ¥ | Sr-90 | 4.6953E-01 | 1.2690E-02 | AN AN | 445. LBS; 7.35 FT3 | 243 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | AN. | Solid /NA | <u>?</u> | ? | Sr-90 | 4.6953E-01 | 1.2690E-02 | Ā | 445, LBS; 7.35 FT3 | 246 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid INA | 2 4 4 | ? ± | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545: LBS; 7.35 FT3 | 249 |
| Radioactive material, excepted package-limited quantity of | , AN | ₹. | Solid /NA | 24 | £ | Sr-90 | 5.8508E-01 | 1.5840E-02 | ¥ | 645. LBS; 7.36 | 250 |

FORM 540A (10-98)

| *************************************** | | | | | | | | Fred | Environana of Hab Inc. | 89 | BER |
|---|-----------------------------------|---------------------------|---|--------------|--------------|------------------------------------|------------|--|-------------------------|--|--|
| FORM 540A | | | | | | | | | ocale of Otali, in | : | (Use this number on all continuation |
| | | UNIFC | FORM LOW-LEVEL RADIOACTIVE | OACT | NE | <i>:</i> | | | | A032-01-003 | 003 |
| | | SHE | WASTE MANIFEST IPPING PAPER (CONTINUATION) | r IUATIO | Ź | | | | | 30 a | 940Fc |
| | | | | | , | | | | | • | |
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including propor elipping name, hazard class, UN ID number, and any additional information | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | IND RADIC | 15, INDIVIDUAL RADIONUCLIDES | TOTAL PACI | 16. FOTAL PACKAGE ACTIVITY MBq mCi | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | | 2 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 251 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | , NA | NA | Solid INA | 2-14 | £ | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545, LBS; 7.35 FT3 | 252 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | 7 | £ | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 645. LBS; 7.35 FT3 | 253 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | 7 | Ŧ | Sr-90 | 5.8608E-01 | 1.5840E-02 | ΑN | 545. LBS; 7.35 FT3 | 255 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | <u>2</u> | ? * | 06-JS | 4.6953E-01 | 1.2690E-02 | NA NA | 445. LBS; 7.35 FT3 | 257 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | \$ | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 264 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Α. | ¥ | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | AN A | 346, LBS; 7.35 FT3 | 266 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 7. | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | AM | 345, LBS; 7.35 FT3 | 266A |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | AA. | Solid MA | C-14 | £.4 ₩ | Sr-90 | 5.8608E-01 | 1.5840E-02 | ΑN | 546. LBS; 7.35 FT3 | 268 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 271 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ¥ | Solid /NA | <u>5.</u> | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445, LBS; 7.35 FT3 | 27.4 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ≨ | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA N | 445. LBS; 7.35 FT3 | 275 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥. | ≨. | Soild /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | ŊĄ | 345. LBS; 7.35 FT3 | 276 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Ψ. | ≸ | Solid /NA | C-14 | £3 | Sr-90 | 1.1769E-01 | 3.1780E-03 | AN. | 145. LBS; 7.35 FT3 | 283 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ≨ | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545, LBS; 7.35 FT3 | 286 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | S. | ≨ | Solid INA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA NA | 445. LBS; 7.35 FT3 | 287 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | YN | ≨ | Solid /NA | C-14 | Н-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | Ą | 345. LBS; 7.35 FT3 | 288 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA. | Solid INA | <u>2</u> | ¥-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | ΑN | 446. LBS; 7.35 FT3 | 293 |

MANIFEST NUMBER (Use this number on all continuation Envirocare of Utah, Inc. FORM 540A pages) 4032-01-003 UNIFORM LOW-LEVEL RADIOACTIVE **WASTE MANIFEST** SHIPPING PAPER (CONTINUATION) PAGE 7 OF 7 PAGES 12. DOT LABEL "RADIOACTIVE" 13. TRANSPORT INDEX 11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION 14. PHYSICAL AND CHEMICAL FORM 15. INDIVIDUAL RADIONUCLIDES 16. TOTAL PACKAGE ACTIVITY 19. IDENTIFICATION NUMBER OF PACKAGE 17. LSA/SCO CLASS 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) (including proper shipping name, hazard class, UN ID number, and any additional information Radioactive material, excepted package-limited quantity of NA Solid /NA C-14 H-3 Sr-90 .6953E-01 1.2690E-02 NA 445. LBS; 7.35 294 material, 7, UN2910 FT3 Radioactive material, excepted package-limited quantity of NA Solid /NA C-14 H-3 Sr-90 1.1759E-01 3.1780E-03 NA 145. LBS; 7.35 material, 7, UN2910 FT3 Radioactive material, excepted package-limited quantity of Solid /NA C-14 H-3 Sr-90 1.1759E-01 3.1780E-03 NA 145. LBS; 7.35 297 material, 7, UN2910 FT3 Radioactive material, excepted package-limited quantity of Solid /NA 445. LBS; 7.35 303 FT3 C-14 H-3 Sr-90 4.6953E-01 1.2690E-02 NA material, 7, UN2910

FORM 540A (10-96)

FORM 541 1. MANIFEST TOTA Envirocare of Utah, Inc. ECIAL NUCLEAR MATERIAL (grams) 2. MANIFEST NUMBER NET WASTE NET WASTE 4032-01-003 DISPOSAL CONTAINERS VOLUME WEIGHT U-233 , Pu UNIFORM LOW-LEVEL RADIOACTIVE TOTAL 3. PAGE 1 OF 24 PAGE(S) 21.42 kg 17554.32 **WASTE MANIFEST** 102 NP NP NP NP 749.70 ton 19.35 4. SHIPPER NAME CONTAINER AND WASTE DESCRIPTION ACTIVITY U.S. Army Corps Of Engineers ALL NUCLIDES TRITIUM C-14 Tc-99 · I-129 SOURCE Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste 4.5432E+01 6.4917E+00 6.4917E+00 MBq NP NP (kgs) NA SHIPMENT ID NUMBER 1.2279E+00 1.7545E-01 1.7545E-01 mCi 4032-01-003 NP (tons) NA DISPOSAL CONTAINER DESCRIPTION 6.WASTE PHYSICAL DESCRIPTION CLASSIFI-CATION AS-Class A Stable AU-Class A 14. CHEMICAL DESCRIPTION 15. RADIOLOGICAL DESCRIPTION 5 8. WASTE SURFACE 11. 12. APPROXIMATE 13. CONTAINER AND SURFACE CONTAMINATION WASTE WASTE SOLIDIFICATION WEIGHT INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND DENTIFICATION CONTAINER VOLUME CONTAINER RADIATION M8q/100 cm2 dpm/100 cm2 DESCRIPTOR VOLUME(S) IN OR STABILIZATION CHEMICAL FORM %
MEDIA CHELATING AGENT CHELATING CONTAINER TOTAL: OR CONTAINER TOTAL ACTIVITY NUMBER / DESCRIPTION LEVEL (See Note 2 CONTAINER AND RADIONUCLIDE PERCENT GENERATOR ID NUMBER(S) (See Note 1 & Note 1A) Unstable (m3) (F13) & Note 241 (See Note 3) AGENT _mSv/hr BETA-B-Class 8 C-Class C ALPHA IF>0.1% RADIONUCLIDES pCi/gm 1.00000E+01 067/1 39,29-H 9.0700E-04 9.0700E-04 4.5400E-03 NA NONEMP 3.3559E-02 AS 0.21 111.13 <8.0000E-05 3.3400E-06 0.20 H-3 Sr-90 1.00000E+01 5.00000E+01 NP 7.35 0.12 <8.000E-03 2.0000E+02 7.35 Subtotal 2.3510E-01 6.3540E-03 Total 6.3540E-03 2.3510E-01 070/4 39,29-H NONE/NP 1.00000E+01 1.00000E+01 5.00000E+01 9.0700E-04 AS 0.21 111.13 <8.0000E-05 3.3400E-06 H-3 Sr-90 0.20 3.3559E-02 1.6798E-01 9.0700E-04 4.5400E-03 7.35 <8.000E-03 2.0000E+02 7.35 Subtotal 2.3510E-01 6.3540E-03 Total 2.3510E-01 6.3540E-03 072/1 39,29-H C-14 H-3 Sr-90 NONEMP 1.00000E+01 1.00000E+01 5.00000E+01 3.3559E-02 9.0700E-04 9.0700E-04 4.5400E-03 AS 0.21 111.13 <8.0000E-05 3.3400E-08 0.20 3.3559E-02 1.6798E-01 7.35 0.12 <8.000E-03 2.0000E+02 7.35 Subtotal 2.3510E-01 6.3540E-03 Total 2.3510E-01 6.3540E-03 NOTE 1: Container Description Codes. For containers/ Note 1A: Bulk Packaging Description Codes NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.) Note 2A: Specific Waste Description

waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

- 1. Wooden Box or Crate . Metal Box 3. Plastic Drum or Pail
 - 9. Demineralizer
- 11. Bulk, Unpackaged Waste 12. Unpackaged Components . Metal Drum or Pail . Metal Tank or Liner 13. High Integrity Container
- 5. Concrete Tank or Liner 19: Other, Dascribe in Itam 6, or additional page. . Polyethlene Tenk or Liner

B. Fiberglass Tank or Liner

hoose one code as may be applicable.)

- A Gondolat B intermodal C End-dump
- D Roll-off E Seaven

20, Charcoal

Hazardous

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

or additional page

- nose all applicable codes.)
- Solid Combustible
- Air Filtration Filters 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

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

FORM 541 (10-96)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| | | | | CONTAINE | R AND WAS | TE DESCR | ETION (CONTINU | IATION | • | | | | 3 | 3. PAGE 2 OF 24 | PAGE(S) | |
|--|--|----------------------|---------------|-------------------|--------------------------------------|-----------------------------|---|--|---|------------------------------------|-------------|-------------------------------------|----------------------------------|--|--|---|
| | DISPOSAL CON | ITAINER DESC | RIPTION | | | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAS 14. CHEMICAL DE | E TYPE IN C | | t | | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) | WEIGHT | LEVEL | 10. SURI CONTAN MBo/1 dpm/1 | MNATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (fr3) | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT | INDIVIDUAL RADII | ONUCLIDES | AL DESCRIPTION S AND ACTIVITY (MBA NTAINER TOTAL ACT CLIDE PERCENT | q) AND. IVITY | CLASSIFI- CATION AS-Class A Stable AU-Class A Unstable |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | . ALPHA | BETA- GAMMA | | (FT3) | (000 11010 0) | | IF>0.1% | RADIONUCLIDES | pÇi/gm | MBo I | mCl | B-Class B C-Class C |
| 073/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-08 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 1.0 H-3 1.0 | 0000E+0 0000E+0 0000E+0 | 01 1.0064E-01 01 1.0064E-01 01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | . I |
| | | | | | <u> </u> | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 075/1 | 4 | | | | | | 29,39-H | | NA NA | NONE/NP | | C-14 . 1.0 | 0000E+0 | 1 1.0064E-01 | 2.7200E-03 | AS |
| | | 0.21 | | | NP. | 3.3400E-06 | | 0.20 | | | N₽ | H-3 Sr-90 5.00 | 0000E+0 | 1.0064E-01 5.0320E-01 | 2.7200E-03 1.3600E-02 | ~3 |
| - | | 7.35 | 0.32 | <8,000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | |
| | | | - | | | | · | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 077/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-н | 0.20 | NA NA | NONE/NP | | C-14 1,00 H-3 1.00 | 0000E+0 | 1 1.0064E-01 1 1.0064E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Subtotal 5.00 | 0000E+0 | I | 1.3600E-02 1.9040E-02 | |
| | | | | | | | | | · | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | | | | İ |
| 079/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-08 | 29,39-H | 0.26 | NA | NONE/NP | | C-14 1.00 H-3 1.00 Sr-90 5.00 | 0000E+0- 0000E+0- 0000E+0- | 1 1.0064E-01 1 1.0064E-01 1 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | EA. |
| · | | 7,35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | |] | 1.9040E-02 | |
| | | | | | | · | | | | | | Total | · · · · · · | 7.0448E-01 | 1.9040E-02 | |
| 080/1 | 4 | | | | <u> </u> | | 39,29-H | | | | | | | | | |
| | · | 0.21 | 111,13 | <8.0000E-05 | NP | 3.3400E-06 | V4,23-F1 | 0.20 | NA | NONE/NP | NP | C-14 1.00 H-3 1.00 Sr-90 5.00 | 0000E+01 0000E+01 0000E+01 | 3.3559E-02 1 3.3559E-02 1 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| FORM 541A (10-98) | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | i | 6.3540E-03 | l |

FORM 541A (10-98)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

FORM 541A

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| | DISPOSAL COI | THE PERSON | | CONTAINE | R AND WAS | STE DESCR | UPTION (CONTINU | (ATION) | | | | | - 1 | 3. PAGE 3 OF 2 | 4 PAGE(S) | |
|--|--|-------------------------|----------------------------|---|--------------------------|---|---|---|-----------------|----------------------------------|-------------|-------------------------------|-------------------------------------|---|--|--|
| | DISPOSAL COI | NIAINER DESC | RIPTION | | | * | | | WASTE DESCRIPTI | ON FOR EACH WAS | E TYPE IN (| ONTAINER | | | | 16 WASTE |
| 5. | 6. | 7. | 8. WASTE | 9. | . 10. SUR | FACE | 11. | PHYSICAL DESCR | | 14. CHEMICAL DE | SCRIPTION | 15. | RADIOLOGIC | AL DESCRIPTION | | 16,WASTI CLASSIF CATION |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | VOLUME (m3) (ft3) | AND CONTAINER WEIGHT | SURFACE RADIATION LEVEL mSv/hr | CONTAI _MBg/ dpm/1 | MINATION 100 cm2 100 cm2 BETA- | WASTE DESCRIPTOR (See Note 2 & Note 2A) | WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | SOLIDIFICATION | CHEMICAL FORM CHELATING AGENT | AGENT | CONTAINER TO | OTAL; OR CO | ES AND ACTIVITY (MI INTAINER TOTAL AC CLIDE PERCENT | Bq) AND TIVITY | AS-Class Stable AU-Class Unstab |
| | | (110) | (kg) (ton) | mrem/hr | ALPHA | GAMMA_ | ļ <u></u> | (F13) | | | IF>0.1% | RADIONUCLIDES | pCVqm | MBq | mCi | B-Class C-Class |
| | | | | | | İ | | | | | | Total | | 2.3510E-01 | | |
| | | | | | | | - | | 1 | | | | | 2.00102-01 | 0.00-02-00 | |
| 081/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-05 | 29,39-H | 0,20 | NA | NONE/NP | | C-14 1 H-3 1 | 1.00000E+0 | 01 1.0064E-01 01 1.0064E-01 01 5.0320E-01 | 2.7200E-03 2.7200E-03 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | - | | NP | Sr-90 Subtotal | 5.00000E+ | 5.0320E-01 7.0448E-01 | 1.3600E-02 1.9040E-02 | |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1,9040E-02 | |
| | | | | | | | | | | | | | | | | |
| 082/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-05 | 29,39-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 | .00000E+0 | 1.0064E-01 1.0064E-01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | . 0.32 | <8.000E-03 | ЦP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | .VU000E+(| 7.0448E-01 | 1.3600E-02 1.9040E-02 | .i |
| | | | | | | | | - | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 083/1 | | | | | | | | | | | | | | · | | |
| VO.07 | 4 | 0,21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-Н | 0.20 | NA | NONE/NP | | C-14 1. H-3 1. Sr-90 5. | .00000E+0 .00000E+0 | 1.0064E-01 1.0064E-01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.36 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | .00000 | 7.0448E-01 | 1.9040E-02 | |
| , | | • | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 084/1 | . 4 | | | | | | 39,29-H | | | | | | | | | |
| | | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | vo _s eorii | 0.20 | NA . | NONE/NP | NP | C-14 1. H-3 1. Sr-90 5. | .00000E+0 .00000E+0 .00000E+0 | 1 3.3559E-02 1 3.3559E-02 1 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | İ |
| ; | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | } | | i . | | | | | | - 1 | í | 1 | | 1 1 | | i |

| | | | | | | | | | |) | | | | | | |
|-----------------------------------|--------------------------------|--------------------------------|--|-------------------------------------|---|----------------|--|---|-----------------|--------------------------|------------------|-----------------------------|---|---|--------------------------|--|
| FORM 541A | | | | UNIFORM LOW-LEVI | LOW-LEVI | EVEL R | EL RADIOACTIVE | VE | | | | Envirocare of Utah, Inc. | 2. | MANIFEST NUMBER 4032-01-003 | MBER 3 | |
| | | | | | | | | | | | | | eri : | PAGE 4 OF 24 PAGE(S) | PAGE(S) | |
| | DISPOSAL CON | DISPOSAL CONTAINER DESCRIPTION | | CONTAINER | AND WAST | LDESCR | COMPANIER AND WASTE DESCRIPTION (CONTINUATION) | ATION) | WASTE DESCRIPTO | N EAR BACH WASTE | TYPE IN CO. | TAINER | | | | 200 |
| | | | | | | | | PHYSICAL DESCRIP | PTION | 14, CHEMICAL DESCRIPTION | RIPTION | | 15. RADIOLOGICAL DESCRIPTION | DESCRIPTION | | LASSIFF |
| CONTAINER IDENTIFICATION NUMBER / | 6. CONTAINER DESCRIPTION | VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURFACE CONTAMINATION MBq100.cm2 dpm/100.cm2 | OF WITON | 11. WASTE DESCRIPTOR (See Note 2 | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (ms) | 51 00 E | CHEMICAL FORW | WEIGHT % | INDIVIDUAL R CONTAINER 1 | ADIONUCLIDES A TOTAL: OR CONTAIND RADIONUCLI | INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBQ) AND CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | | CATION AS-Class A Stable AU-Class A Unstable |
| ID NUMBER(S) | Note 1A) | (tra) | (kg) | mSvitr | ALPHA | BETA- GAMMA | (AZ BION & | (FT3) | (See Note 3) | | AGENT IF>0.1% | RADIONIICI IDES | mo/iJu | Yara | Ç | B-Class B C-Class C |
| . 086/1 | 7 | 1270 | 292.57 | <8,0000E-05 | ď | 3,3400E-08 | 29,39-H | 0.20 | NA | NONEINP | 9 | | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 7.36 | 0.32 | <8.000E-03 | ·\$ | 2.0000E+02 | | 7.35 | | | | | 100000 | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | 10.7= | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | - | | | - | | |
| 1/380/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | ď | 3.3400E-06 | 29,39-H | 0.20 | NA NA | NONE/NP | 91.0 | C-14 H-3 S-50 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | 2 | 2.0000E+02 | | 7.35 | | | | īī | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | | | | |
| HZ80 | 4 | 0.21 | 292.57 | <8,0000E-05 | d. | 3.3400E-06 | 29,39-H | 0.20 | -NA | NONE/NP | 9 | C-14 H-3 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 2.7200E-03 | AS |
| | | 7.36 | 0.32 | <8.000E-03 | ₩. | 2.0000E+02 | | 7.36 | | | | 76 | 5.00000E+01 | 7.0448E-01 | 1.3600E-02 | |
| | | | | | | | | | | | # | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | | | | |
| H160 | • | 6.27 | 111.13 | <8.0000E-05 | dN | 3.3400E-06 | 39,29-Н | 0.20 | KA K | NONENP | | 1.44 1.44 1.93 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 9.0700E-04 | AS |
| | | 7.36 | 0.12 | <8.000E-03 | ďΝ | 2.0000E+02 | | 7.36 | | | <u> 100</u> | (E) | 2,000,000 | | 6.3540E-03 | |
| | | | | | | | | | | | 13 | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | , | | | | | | | | |
| 1984 1 | • | 0.21 | 111.13 | <8.0000E-05 | ďN | 3.3400E-06 | 38,29-н | 0.20 | NA | NONE/NP | O TO | C-14 H-3 Sr-90 | 1.00000E+01 | 3.3559E-02 3.3559E-02 | 9.0700E-04 | AS |
| | | 7.38 | a.12 | <8.000E-03 | AN. | 2.0000E+02 | | 7.35 | | | | Ē | | | 6.3540E-03 | |
| FORM 541A (10-88) | | | | | | | | | | | | | | | | |

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| | DISPOSAL COI | NTAINER DESC | RIPTION | CONTAINE | R AND WAS | TE DESCR | PTION (CONTINI | JATION) | WASTE DESCRIPTION | ON FOR EACH WAST | ETYPEIN C | ONTAINER | | 3: PAGE 5 OF 2 | | IteM |
|--|--|--------------|--|-------------------------------------|-----------|------------------------------|---|--|---|------------------|-----------|----------------------|--|---|--|------------------|
| | | ŀ | | Γ | <u> </u> | | T | PHYSICAL DESCR | PTION | 14. CHEMICAL DE | SCRIPTION | | PADIOLOGIC | AL DESCRIPTION | | 16.W |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9, SURFACE RADIATION LEVEL | _MBo/1 | MINATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT | INDIVIDUAL RA | ADIONUCLIDE | S AND ACTIVITY (MI NTAINER TOTAL AC CLIDE PERCENT | aq) AND TIVITY | AS- St AU- |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/nr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | (OCC NOIS C) | | IF>0.1% | RADIONUCLIDES . | pCi/qm | MBq | mCi . | . 55 |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| • | | | | | | | ŀ | - | | | • | | | | | |
| 099/1 | 4 | 0.21 | 111.13 | <8.00002-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | NP | IH-3 11 | 1.00000E+0 1.00000E+0 5.00000E+0 |)1 3.3559E-02 | 9.0700E-04 | 11 |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Subtotal | 5.00000E+(| 2.3510E-01 | 4.5400E-03 6.3540E-03 | -1 |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | 1 |
| 100/1 | 4 | | | | | | | | | | | | | | | L |
| 1041 | • | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-08 | 39,29-Н | 0.20 | NA. | NONE/NP | | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 3.3559E-02 3.3559E-02 1 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | L I |
| ···· | | 7.35 | 0.12 | <8.000E-03 | , NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | -1 |
| | | | | | | | | ļ | | | | Total | | 2.3510E-01 | 6.3540E-03 | 1 |
| 101/1 | 4 | | | | | | 70 00 W | | | | | | | | | |
| 10111 | • | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 3.3559E-02 11 3.3559E-02 11 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | , NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | ·I |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| 104/1 | 4 | | | | **** | | | | | | | | | | | |
| ion i | • | 0.21 | 111,13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA. | NONE/NP | i | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 3.3559E-02 1 3.3559E-02 1 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | .1 |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | $\lceil \rceil$ |
| | | 1 1 | | | | | | ł | | 1 | | 1 | | , , | • ; | 1 |

FORM 541A

WASTE MANIFEST

UNIFORM LOW-LEVEL RADIOACTIVE

2. MANIFEST NUMBER 4032-01-003 Envirocare of Utah, Inc.

| | •• | | | CONTAINE | R AND WAS | TE DESCR | PTION (CONTINI | IATION) | | | | | 3: | PAGE 6 OF 2 | 4 PAGE(S) | |
|--|-------------------------------------|--------------------|--|-------------------------------------|-----------|-----------------------------|---|---|---------------------------------------|----------------------------------|--------------------|----------------------|--|---|--|---|
| | DISPOSAL CO | NTAINER DESC | RIPTION | | | | | | WASTE DESCRIPTION | | | | | | | 16.WAS |
| | | } | | | | | | PHYSICAL DESCRI | | 14. CHEMICAL DE | SCRIPTION | 15 | RADIOLOGICAL | DESCRIPTION | | CLAS |
| 5, CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME(m3)(ft3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | _MBa/1 | UNATION 00 cm2 00 cm2 | WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | SOLIDIFICATION OR STABILIZATION | CHEMICAL FORM CHELATING AGENT | CHELATING AGENT | CONTAINER | | AND ACTIVITY (ME AINER TOTAL ACT DE PERCENT | | CAT AS-CI Stal AU-C Uns B-CI C-Ci |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | ł | (F13) | | | IF>0.1% | RADIONUCLIDES I | pCi/qm | MBq | mCi | 100 |
| 105/1 | 4 | 0.21 | | <8.0000E-05 | NP | 3,3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | 41 |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | - | | | Subtotal , | <u>, </u> | 2.3510E-01 | 6.3540E-03 | 4 |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | 1 |
| 106/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0,20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E+01 1.00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 | 41 |
| | | 7,36 | | - | NP | 2.0000E+02 | 1 | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E+01 | 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | 3 |
| | | | | | | | | | · · · · · · · · · · · · · · · · · · · | | - | Total | • | 2,3510E-01 | 6.3540E-03 | |
| | | | | | | | i | | | | | 10001 | | 2,00102-01 | 0.55402-00 | |
| 107/1 | 4 . | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONEMP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | 4 AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | -1 |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | ļ | | | | | | | | | | | | | | |
| 109/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA NA | NONE/NP | N.P | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | ál (|
| | | 7.35 | 0.12 | <8.000E-03 | · NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | 1 | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| 111/1 | 4 | <u> </u> | | | | | 39,29,L-HL | | NA NA | NONE/NP | | C-14 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | 3 AS |
| | | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | | 0.20 | | | NP | | 1.00000E+01 5.00000E+01 | 5.0320E-02 2.5160E-01 | 1.3600E-03 6.8000E-03 | |
| | i | 7.35 | 0.17 | <8.000E-03 | NP. | 2.0000E+02 | 1 | 7,35 | 1 | 1 | ł | Subtotal | | 3.5224E-01 | 9.5200E-03 | .1 |

FORM 541A (10-96)

FORM 541A

| The column The | EDDN: 544.4 | | | | | | | | | | | | | | | | |
|--|--------------------------------------|-------------------------------------|---------------|--------|-------------|---|---------------------|---------------------------------------|--|---|-----------------|------------------|-----------------|--|---|-------------|--|
| Company Comp | ≰ | | | ⊃ | NIFORM | LOW-L | EVEL R | ADIOACTI | VE | | | | Envirocare of U | | MANIFEST NI 4032-01-00 | JMBER 33 | |
| Communication Communicatio | | OSPOSAL CON | TAINER DESCRI | 1 | CONTAINER | AND WAST | E DESCRIP | TION (CONTINU | IATION | | | | | က် | PAGE 7 OF 2 | _ | |
| Communication Communicatio | | | | | | | | | PHYSICAL DESCRI | WASTE DESCRIPTI | 14 CHEMICAL DES | CRIPTION | | PADIOI OGICAL | NO LOCAL | | 16.WASTE |
| Man No. Fig. Color Fig. Color Fig. Fi | TAINER FICATION BER / RATOR | CONTAINER DESCRIPTION (See Note 1 & | VOLUME | | | 10. SURFA CONTAMIN MBar100 dpm/100 | CE MATION Cm2 | VASTE DESCRIPTOR (See Note 2 6 Note 2 | 12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | SOLIDIFICATION OR STABILIZATION MEDIA | CHEMICAL FORM | WEIGHT % | | RADIONUCLIDES / TOTAL: OR CONT. AND RADIONUCLI | AND ACTIVITY (MB AINER TOTAL ACT DE PERCENT | | CATION AS-Class A Stable AU-Class A Unstable |
| Carl | ABER(S) | Note 1A) | (£3) | (Bd) | mSvfhr | - | BETA- GAMMA | Ara arani a | (FT3) | (See NON asc) | | AGENT IF>0.1% | | oCitam | WBW | | B-Class B C-Class C |
| 12.00 16.00 10.0 | | | | | | | | | | | | | otal | | 3.5224E-01 | | |
| 1.5 | | | | | | | | | | · | , | | | | | | |
| 1.25 0.17 0.0000000000 1.25 0.15 0.0000000000 1.25 0.0000000000 1.25 0.0000000000 1.25 0.0000000000 1.25 0.00000000000 1.25 0.0000000000 1.25 0.00000000000 1.25 0.000000000000 1.25 0.0000000000 1.25 0.000000000000 1.25 0.000000000000 1.25 0.0000000000 1.25 0.000000000000 1.25 0.0000000000000000000000000000000000 | | 4 | 120 | 156.49 | <8.0000E-05 | 1 | + | 39,29-H | 0.20 | NA | NONENP | | | 1,00000E+01 | | | AS |
| Total Tota | | | 7.36 | 0.17 | <8.000E-03 | | 2.0000E+02 | | 7,33 | 1 | | | | 5.00000E+07 | | | |
| 14.4 14.4 14.00 14.4 14.00 14.4 14.4 14.00 14.00 14.4 14.00 14.4 14.00 14.4 14.00 14.4 14.00 14.4 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.4 14.00 14.00 14.00 14.4 14.00 | | | | | | | | | | | | 1111 | otal | | 3.5224E-01 | 9 5200E-03 | |
| 1584 1584 1584 1584 1584 1584 1584 1584 1580 1584 1584 1580 1584 1580 1584 | | | | | | | | | | | | | | | | | |
| 7.35 0.17 4.000E-03 NP 2.000E-02 7.35 NP NONEMP | | 4 | ۳. د | 156.49 | <8.0000E-05 | • | 80-36 | 39,29-H | 0,20 | NA | NONEWP | | | 1,00000E+01 | | 1.3600E-03 | AS: |
| 1544 1544 1540 | | | 7.36 | 0.17 | <8.000E-03 | | 2.0000E+02 | | 7.35 | | | | <u> </u> | 5,00000E+01 | | 6.8000E-03 | |
| 154.4 154.4 4.000E-43 NP 3.340E-62 35.29H Q.20 NP 3.340E-62 35.00E-63 NP 3.340E-62 35.29H Q.20 NP 3.340E-62 MA NONENP NP S.340E-63 NP 3.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP NP S.340E-63 MA NONENP MA NONENP MA S.340E-63 MA S.324E-63 MA S.324E- | | | | | | | | | | | | | otal | | 3.5224E-01 | 9.5200E-03 | |
| 154.4 154.4 100000E+01 154.4 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 10000E+01 1000000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 100000E+01 10000 | | | | | | | | | | · · · · · | | · <u> </u> | | | | | |
| 135 0.17 44.00E-03 NP 2.000E+02 T.35 PA NONENP C-14 Subtotal C-15 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-17 C-18 C-1 | | * | E. | | <8.0000E-05 | 1 | 8 | ж,23-н | 0.20 | Ā | NONE/NP | | | 1.00000E+01 | | 1.3600E-03 | AS |
| A 21 156.46 CATOM CONTROL OF THE STATE OF TH | | | 7.35 | 0.17 | <8.000E-03 | | 2,0000E+02 | | 7.35 | | | | Ē | 9.00000=+01 | | 9.5200E-03 | ; 4.1 |
| Q21 158.46 4 monetal NP 3.3400E-03 39,29-H 0.20 NA NONEMP C-14 1,00000E+01 5,0300E-02 1,3500E-02 1,3500E-03 < | | | | | | | | | | | | F | otal | | 3.5224E-01 | 9.5200E-03 | |
| 156.46 156.46 4.0000E-05 | | | ; | • | | | | | | | | | | | | | |
| 2.17 4.000E-13 NP 2.000E-12 7.35 Subtobla 3.5224E_01 3. | | * | 87 | | <8.0000E-05 | 11 | 88 | 38,29-H | 0.20 | ¥ | NONE/NP | | | 1.00000E+01 | | 1.3600E-03 | AS |
| Total 3.5224E-01 | | | 7.35 | 0.17 | <8.000E-03 | | L0000E+02 | | 7.35 | | | | | 5.000005+01 | | 6.8000E-03 | |
| | | | | | | | | , | | | | III P | tal (| | | 9.5200E-03 | |
| | | | | | | | | | | | | | | | | | |

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UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| • | | •• | | CONTAINE | R AND WAS | TE DESCR | IETION (CONTINI | IATION\ | | | | |] 3 | PAGE 8 OF 2 | 4 PAGE(S) | . •• |
|--|---|---------------|--|-------------------------------------|-----------|--------------------------------------|---|--|---|--|---------|------------------------------|---|---|--|---|
| | DISPOSAL CO | NTAINER DESC | RIPTION | | | | | | WASTE DESCRIPTION | | | | | | | 16.WAS |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9, SURFACE RADIATION LEVEL | M8a/1 | FACE IINATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCR 12 APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL RA CONTAINER Y | ADIONUCLIDES | AND ACTIVITY (MI FAINER TOTAL ACTIVITY (DE PERCENT | Bq) AND TIVITY | CLASS CATION AS-CIA Stab AU-CIA Unst |
| ID NUMBER(S) | Note 1A) | (m3) (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | 1 ",,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | (m3) (FT3) | (Gaartala G) | } | IF>0.1% | RADIONUCLIDES | pCl/gm | MBq | mCi | B-Cla C-Cla |
| 139/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-05 | 39,29-11 | 0.20 | NA | NONE/NP | NP | C-14 1 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 | 1.3600E-03 | 3 AS |
| | • | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | , | | Subtotal | | 3.5224E-01 | 9.5200E-03 | -1 |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | , | | | |
| 131/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA. | NONE/NP | NP | C-14 1 H-3 1 Sr-90 5 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 5.0320E-02 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | 31 |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | i |
| | | | | | | | | | | • | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | | | | |
| 132/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA . | NONE/NP | NP | iH-3 1 | I.00000E+01 | 5.0320E-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| ** | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | | i |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | | | | |
| 133/4 | 4 . | 0.21 | 156,49 | <8,0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA | NONEMP | | lH-3 1 | .00000E+01 .00000E+01 5.00000E+01 | 5.0320E-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | 31 |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | .1 |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | |]. | | | | | | | | | |
| 134/1 | 4 | 0.21 | 156.49 | <8,00002-05 | NΡ | 3,3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | NP | H-3 1 | .00000E+01 | 5.0320E-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7,35 | 0.17 | <8,000E-03 | NP | 2.0000E+02 | • | 7.35 | 1 | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | . 1 |

| | | 16.WASTE | CATION AS-Class A Stable AU-Class A | C-Class C | 11.00 | 4 | | 1 | 10.55 | SA. | <u></u> | | | SA. | | | · | 88 | | | | |
|---|--|--|---|------------------|------------|-------------|----------------------------|------------|------------|--------------------------|--------------|------------|---------|-------------|--|------------|------------|-------------|-------------|------------|-----------|-------------------|
| UMBER 03 | 4 PAGE(S) | | Bq) AND TIVITY | ij | 9.5200E-03 | | 1.3600E-03 6.8000E-03 | 9.5200E-03 | 9.5200E-03 | 1.3600E-03 | | 0 52005.03 | | 1.3600E-03 | | 0 50005.03 | 20-3003000 | 1.3600E-03 | | 0 50005 02 | 20.700700 | |
| | PAGE 9 OF 24 PAGE(S | DESCEIPTION | WD ACTIVITY (MI | OR N | 3.5224E-01 | | 5.0320E-02 2.5160E-01 | 3.5224E-01 | 3.5224E-01 | 5.0320E-02 5.0320E-02 | | 3 5224E-01 | | 5.0320E-02 | | 1 5224E 04 | | 5.0320E-02 | 2.5160E-01 | 3 5224E.04 | | |
| | | BADIOLOGICAL DESCRIPTION | | oClom | | 1.00000E+01 | 1.00000E+01 5.00000E+01 | | | 1.00000E+01 | 5.000000E+01 | | | 1.00000E+01 | 5.00000E+01 | | | 1.00000E+01 | 5.00000E+01 | | | |
| Envirocare of Utan, Inc. | | ONTAINER 15 | | RADIONUCLIDES | Total | | H-3 Sr-90 | Subtotal | Total | 0.14 | ī | Total | | F.74 H.3 | Ē | Total | | C-14 H-3 | Į | Total | | 7 |
| | | STE TYPE IN C | WEIGHT % NICHELATING | AGENT IF>0.1% | | | ŧ | | | | ž | | | | ē. | | | | ê | | | |
| | | 14. CHEMICAL | CHEMICAL FORM | | | NONE/NP | - | | | NONENP | | | | NONENP | | | | NONEMP | | | | |
| | | WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER PRION PRION 1 | 13. SOLIDIFICATION OR STABILIZATION (| (See Note 3) | | NA | | | | NA | | | | NA | | | | AN A | | , | | Î |
| ш | | PHYSICAL DESCRIP | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER | (FT3) | | | 020 | 7.35 | | 0.20 | 7.35 | | | 0.20 | 7.35 | | | 0.20 | \$5.7 | | | |
| ONITORINI LOW-LEVEL RADIOACTIVE WASTE MANIFEST | CONTAINER AND WASTE DESCRIPTION (CONTINUATION) | | WASTE DESCRIPTOR (See Note 2 | & Note 2A) | J | 39,28-H | | | | 39,29-H | <u></u> | | <u></u> | 39,29-H | <u> </u> | | <u> </u> | 39,29-H | <u></u> | | 1 | |
| E MANIE | IE DESCRI | | ACE INATION 80.cm2 0 cm2 | BETA- GAMMA | | | 3.3400E-48 | 2,0000E+02 | | 3.3400E-06 | 2,0000E+02 | | | 3.3400E-06 | 2.0000E+02 | | | 3.3400E-08 | 2.0000E+02 | | | |
| WASTE MA | AND WAS | 1 | 10. SURFACE CONTAMINATIONMBq100.cm2 cpm/100.cm2 | ALPHA | | 1 | ž | ď. | | ΝP | NP. | | | 호 | ğ | , | | ž | ₩. | | | |
| | CONTAINE | | 9. Surface Padiation Level | mSvfr | | 20000 | -0.000E-03 | <8.000E-03 | | <8.00006-05 | <8.000E-03 | | | <8.D000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | |
| • | Ì | | 8. WASTE AND CONTAINER WEIGHT | (ton) | | 4 9 9 | 2000 | 0.17 | | 156.49 | 0.17 | | | 156.49 | 0.17 | | | 156.49 | 0.17 | - | | |
| | DISPOSAL CONTAINER DESCRIPTION | , | w | Ê | | 2.5 | | 7.35 | | 12.0 | 7.38 | | | 당 | 7.35 | | | 0.24 | 7.38 | | į | |
| | DISPOSAL COM | | CONTAINER DESCRIPTION (See Note 1 & | Note 1A) | | 4 | | | | 4 | | | | 4 | | | | 7 | | | | |
| | | 10 | CONTAINER IDENTIFICATION NUMBER / GENERATOR | ID NUMBER(S) | | 1411 | | | | 142H | | | | 1447 | | | | 151# | • | | | FORM 541A (10-96) |

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| FORM 541A | | | ח | NIFORM | UNIFORM LOW-LEV | 급 | EL RADIOACTIVE | VE | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER 4032-01-003 | UMBER 03 | |
|--|---|--------------|--------|-------------------------------------|---|-------------------------|--|---|--|---|--------------------------|---|---|---|--|---|
| | | | Ç | CONTAINER | CONTAINER AND WASTE DE | E DESCRI | ENOS | MITION | | | | | 3 | PAGE 10 OF 24 PAGE(S) | 24 PAGE(S) | |
| | DISPOSAL CONTAINER | 3 | ľ | | | Ī | | PHYSICAL DESCR | WASTE DESCRIPT | 14. CHEMICAL DES | CRIPTION | AINER | RADIOLOGICA | 15. RADIOLOGICAL DESCRIPTION | | 출충 |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | R. | 9. SURFACE RADIATION LEVEL | 10. SURFACE CONTAMINATION MB0/100 cm2, dpm/100 cm2 | ACE NATION 0.cm2, | 11. WASTE DESCRIPTOR (See Note 2 & Note 24) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | 12. APPROXMATE 13. WASTE SOLIDIFICATION CHEMICAL FORM % VOLVMEIS) IN OR STABILIZATION CHEMICAL FORM % CONTAINER MEDA CHEMICAL FORM % CONTAINER NEDA CHEMICAL FORM % CONTAINER (See Note 3) | WEIGHT % CHELATING AGENT | | ADIONUCLIDES FOTAL; OR-CON ND RADIONUCI | RIDIVIDUAL RADIONUCLIDES AND ACTIVITY (MB4) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | Bq) AND TIVITY | CATION AS-Class A Stable AU-Class A Unstable B-Class B |
| ID NUMBER(S) | Note 1A) | (813) | (Rg) | mSvfhr | ALPHA | BETA- GAMMA | | (FT3) | | | IF>0.1% | RADIONUCLIDES | pCi/gm | | | 3 |
| 162H | 4 | 6.24 | 156.49 | <8,0000E-05 | ďN | 3.3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | ̱ø | | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 1 5.0320E-02 1 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | & & |
| | | 7.35 | 0.17 | <8.000E-03 | ğ. | 20000E+02 | | 7,35 | | | | · <u>1</u> | | | | 1 |
| | | | | | | | | | | | "- | Total | | 3.5224E-01 | 9.5200E-03 | 11.00 |
| | | | | | | | | | · | | | | | | | |
| 153/1 | 4 | 0.27 | 156.49 | <8.0000E-05 | dN. | 3.3400E-06 | 39,29-H | 0.20 | NA | NONEINP | OIO. | 7.4.6 6.6 6.6 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 1.3600E-03 | 8 |
| | | 7.36 | 0.17 | -8.000E-03 | ě | 2.0000E+02 | | 7.35 | | | | ž | | | | . 1 |
| | | | | | | | | | | | - | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | · · · · · · · · · · · · · · · · · · · | | | , <u> </u> | | | | |
| 154/1 | 4 | ᅜᄱ | 156.49 | <8.0000E-05 | dN. | 3.3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | 9 | 0.44 6.69 6.69 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 | 1.3600E-03 | র |
| | | 7.36 | 0.17 | <8.000E-03 | 2 | 2.0000E+02 | | 7.35 | | | | ī | | | | |
| | | | | | | | | | | | ı, 1= | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | 7 | | | • | | | | |
| 165/I | 4 | 0.21 | 158.49 | <8,0000E-05 | 2 | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONEMP | 9 | F-7-7-8-8-8-8-8-8-8-8-8-8-8-8-8-8-8-8-8- | 1,00000E+01 1,00000E+01 | 5.0320E-02 5.0320E-02 | 1.3600E-03 1.3600E-03 | \$ |
| , | | 7.35 | 0.17 | <8.000E-03 | N. | 2.0000E+02 | | 7.35 | | | | Ē | | | | 12 |
| | | · | | | | | | | | | II ⊢ | Total | | 3.5224E-01 | 9.5200E-03 | |
| • | | | | | | | | | | | | | | , | | |
| 156/1 | 4 | Ŋ | 156.49 | <8.0000E-05 | ş | 3,34005-06 | 39,29-H | 0.20 | , ¥ | NONEINP | OI0 | 7-14 13-14 13-18-18-18-18-18-18-18-18-18-18-18-18-18- | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 | 1.3600E-03 1.3600E-03 | S. |
| | | 7.36 | 0.17 | <8.000E-03 | g _Z | 2,0000E+02 | | 7.35 | | | | | | | | |

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| • | | | • | CONTAINE | | TE DECCE | IPTION (CONTINU | 1ATIONI) | | | | • | 1 | 3. PAGE 11 OF | 24 PAGE(S) | |
|--|---|---------------|--|-------------------------------------|----------|--------------------------------------|---|---|---|--|--------------|----------------------|-----------------------------------|--|--|--|
| | DISPOSAL CO | NTAINER DESC | RIPTION | CALVIA LANGE | AND WAS | IE DESUR | PHONICONTINE | | WASTE DESCRIPTION | ON FOR EACH WAS | TE TYPE IN C | ONTAINER | | | | 16.WAS |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | _MBo/1 | FACE IINATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCR 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIMIDI CONTAI | UAL RADIONUCLI NER TOTAL: OR I | EIGAL DESCRIPTION DES AND ACTIVITY (MI CONTAINER TOTAL AC JUCLIDE PERCENT | Bq) AND TIVITY | CLASS CATION AS-CIA Stab AU-CIA Unite |
| ID NUMBER(S) | Note 1A) | (m3) (ft3) | (kg) (tan) | mSv/hr mrenvhr | ALPHA | BETA- GAMMA | | (m3) (FT3) | (000 (4000 0) | | IF>0.1% | RADIONUCLIDES | pCl/gm | MBq | mCi | B-Cla C-Cla |
| | | | - | | | | | | | | | Total . | | 3.5224E-01 | 9.5200E-03 | |
| 167/H | 4 | 0.21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | | C-14 H-3 | 1.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 | 3 AS |
| | | 7.35 | 0.17 | <8,000E-03 | NP | 2.0000E+02 | | 7,35 | • | | NP | Sr-90 Subtotal | 1.00000E 5.00000E | +01 2.5160E-01 3.5224E-01 | 1.3600E-03 6.8000E-03 9.5200E-03 | -1 |
| | • | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 158/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 6.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8,000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 0.00000 | 3.5224E-01 | 9.5200E-03 | -1 |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | , |
| 159/1 | 4 . | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E | +01 2.5160E-01 3.5224E-01 | 6.8000E-03 9.5200E-03 | 4 |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | 1 |
| 161/1 | 4 | - | | | | | 39,29-H | | NA NA | NONE/NP | | C-14 | 1.00000 | +04 5 03205-02 | 1 3600E 03 | l AS |
| | | 0.21 7.35 | 0.17 | <8.000E-03 | NP NP | 3.3400E-06 2.0000E+02 | | 0.20 | | | NP | H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | i | | -ł |
| | | | •••• | | | | | 7.35 | | | | Subtotal | _ | 3.5224E-01 | 9.5200E-03 9.5200E-03 | |
| | | | | | | | | | | | | | | 0.022.72-01 | J.0200L-03 | |

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FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| | | | | CONTAINE | D AND MAG | TE DESCO | IPTION (CONTINE | (ATION) | | | | | 3. | PAGE 12 OF | 24 PAGE(S) | |
|--|--|-------------|--|-------------------------------------|-----------|------------------------------|---|--|---|--|-----------------------------------|----------------------------------|--|--|--|---|
| | DISPOSAL COM | TAINER DESC | RIPTION | CUNTAINE | R AND WAS | HE DESCR | LION ICONTINI | | WASTE DESCRIPTION | | | | | | | 16.WAST |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | | NINATION 00.cm2 00.cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION | 14. CHEMICAL DE CHEMICAL FORW CHELATING AGEN | WEIGHT % CHELATING AGENT | INDIVIDUAL CONTAINER | RADIOLOGICAL RADIONUCLIDES TOTAL: OR CONT AND RADIONUCLI | AND ACTIVITY (ME | | CLASSI CATTO AS-Clas Stable AU-Clas Unstal B-Clas |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | | | IF>0.1% | RADIONUCLIDES | pCl/gm | MBq | mCi | C-Class |
| 162/1 | 4 | 0.21 | 158.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | 3 |
| | | 7.35 | 0.17 | <8.000E-03 | , NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | | <u> </u> | | | | | - | | | | | Total | | 3.5224E-01 | 9.5200E-03 | 1 |
| 173/1 | 4 | | | | | - | 39,29-H | | NA NA | NONE/NP | | Ç-14 | 1.00000E+01 | 5.0320E-02 | 1.3600E-03 | AS |
| | | 7.35 | 156.49 | | NP NP | 3.3400E-06 2.0000E+02 | | 7.35 | - | | NP | IH-3 Sr-90 Subtotal | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 2.5160E-01 3.5224E-01 | 1.3600E-03 8.8000E-03 9.5200E-03 | 3 |
| | - | | · · · · · · · · · · · · · · · · · · · | - | | | | | | | | Total | | 3.5224E-01 | | |
| | | | | | - | | | | 1 | | | | | | | |
| 176/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-11 | 0,20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 5.0320E-02 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | • | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+0Z | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | - | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 17771 | 4 | 0.21 | 158,49 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0,20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E+01 1.00000E+01 | 5.0320E-02 5.0320E-02 | 1.3600E-03 | AS |
| | | 7.35 | | | NP NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E+01 | 2.5160E-01 3.5224E-01 | 1.3600E-03 6.8000E-03 9.5200E-03 | .1 |
| · · · | | | | | | | | | <u> </u> | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | 1 | | 1 | | | | | | | |
| 178/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONEMP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 5.0320E-02 2,5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | ef i i |
| | | 7,35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | .1 |

FORM 541A (10-96)

200

FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| | | | | • | ***** | r: mwiai | · LO: | | | | | • | - 1 | | | |
|--|--|----------------------|--|-------------------------------------|-----------|------------------------------|--|---|-----------------------|------------------|-------------|------------------------|----------------------------------|---|--|--|
| | DISPOSAL CO | NTAINER DESC | RIPTION | CONTAINE | R AND WAS | TE DESCR | PTION (CONTIN | JATION) | | | | | | 3. PAGE 13 OF | 24 PAGE(S) | |
| | 1 | 1 | 1 | T | | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAST | E TYPE IN C | ONTAINER | 45 04010100 | | | 16.WAS |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | _MBo/1 | MINATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | 13, SOLIDIFICATION | | WEIGHT | INDIVIDUAL CONTAINE | L RADIONUCLI R TOTAL; OR O | GICAL DESCRIPTION IDES AND ACTIVITY (ME CONTAINER TOTAL ACTIVITY NUCLIDE PERCENT | | CLASS CATIC AS-Cla Stabl AU-Cla Unsta |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | (000 11.000 0) | l | IF>0.1% | RADIONUCLIDES | pCl/qm | MBq | mCi | B-Clas C-Clas |
| | | | | | | • | | | | | | Total | Position | 3.5224E-01 | 9.5200E-03 | |
| 179/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0,20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | 3 I |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 3.00000E | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | ` | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 184/1 | 4 | 0,21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,2 9 -H | 0,20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | <u> </u> | 7,35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 0.000002 | 3.5224E-01 | 9.5200E-03 | -1 |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 185/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-11 | 0,20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E | +01 8.3990E-02 +01 8.3990E-02 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | _ | NP | Sr-90 Subtotal | 5.00000E | +01 4.1810E-01 5.8608E-01 | 1.1300E-02 1.5840E-02 | . D. |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| | <u> </u> | | | | | | | , | | | | | | | | |
| 194/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-08 | 29,39-H | 0.20 | . NA | NONEMP | | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 1.0064E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | 1 |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | |
| | | <u> </u> | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | , | , | | | | | | |

FORM 541A (10-9)

| | | 240000 | CLASSIFI- | CATION AS-Class A Stable AU-class A Unstable B-Class B | AS | | | - 1 | Sŧ. | | | | Ş. | | | AS | | | | As | | |
|-------|-----------------------------------|--|------------------------------|---|---------------------|------------|------------|-----|--|------------|------------|---|---|------------|------------|----------------------------|-------------|------------|---|--|------------|-------------------|
| 0 | IMBER 3 | _ [| | | 2.7200E-03 | 1.9040E-02 | 1.9040E-02 | | 2.7200E-03 2.7200E-03 1.3600E-02 | 1.9040E-02 | 1.9040E-02 | | 2.7200E-03 2.7200E-03 1.3600E-02 | 1.9040E-02 | 1.9040E-02 | 2.7200E-03 2.7200E-03 | 1.9040E-02 | 1.9040E-02 | | 2.7200E-03 2.7200E-03 1.3600E-03 | 1.9040E-02 | |
| | 2. MANIFEST NUMBER 4032-01-003 | 3. PAGE 14 OF 24 PAGE(S) | ESCRIPTION | INDVIDUAL RADIONUCLIDES AND ACTIVITY (MBQ) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | 1.0064E-01 | 7.0448E-01 | 7.0448E-01 | | 1.0064E-01 1.0064E-01 5.0320E-01 | 7.0448E-01 | 7.0448E-01 | | 1.0064E-01 1.0064E-01 5.0320E-01 | 7.0448E-01 | 7.0448E-01 | 1.0064E-01 | 7.0448E-01 | 7.0448E-01 | | 1.0064E-01 | 7.0448E-01 | |
| | | 3. | 15, RADIOLOGICAL DESCRIPTION | DIONUCLIDES AI OTAL: OR CONTA ID RADIONUCLID | 1.00000E+01 | | | | 1.00000E+01 5.00000E+01 | | ! | | 1.00000E+01 1.00000E+01 5.00000E+01 | | | 1.00000E+01 1.00000E+01 | | | | 1.00000E+01 5.00000E+01 | | |
| | Envirocare of Utah, Inc. | | 15, | INDIVIDUAL RA CONTAINER TO AN | | | | | <u> ← ← n)</u> | | | | 4-4-K | J-1. | | 4-4-10 | • | | | 1 | | |
| | Env | Control | AINEK | | C-14 H-3 S-20 | Subtotal | Total | | 7.7.7.8 2.2.8 2.0.9 | Subtotal | Total | | 84.044 89.34 | Subtotal | Total | 0∓% 45. 89 | Subtotal | Total | | C-14 H-3 Sr-90 | Subtotal | |
| | | | SCRIPTION | WEIGHT % ICHELATING AGENT IF>0.1% | <u>0</u> ±0 | | 112 | | <u>O</u> ±Ø | | 1 | | ٱÖ È | | 12 | <u> </u> | | 12 | | <u>0±∞</u> | | |
| | | TOY O | 14. CHEMICAL DESCRIPTION | CHEMICAL FORW CHELATING AGENT | NONE/NP | | | | NONEINP | | | | NONEINP | | | NONENP | | | | NONENP | | |
| | | | E DESCRIPTIO | LIDIFICATION TABILIZATION MEDIA See Note 3) | d | | | | ⋖ | | | | æ | | | ď | | | | 4 | | |
| | | | SI≅ | 12. APPROXIMATE 13. WASTE SCOUTABLES) IN OR CONTAINER (m3) (F13) | 0,20 NA | 7.35 | | | 0.20 | 7.35 | | | 0.20 NA | 7,35 | | 0.20 - | 7.35 | | | 0.20 NA | 7.35 | · |
| | EL RADIOACTIVE ANIFEST | SCRIPTION (CONTINUATION) | PHYSI | 12. API UMASTE DESCRIPTOR (See Note 2 & Note 2A) | | <u> </u> | | | | | - | | | | | | | | | | | |
| · | EL RADIO | DIONOL | | 11. WA. DESCR (See No. | 29,39-H | · · · · · | | | 표 8 8 | | | · | 29,39-H | | | H-82'82 | | | · | 29,39-H | | |
| | EVEL E MANI | | | ACE INATION Span2 O an2 BETA- | 3.3400E-06 | 2.0000E+02 | | | , 3.3400E-06 | 2.0000E+02 | | | 3.3400E-06 | 2.0000E+02 | | 3.3400E-06 | 2,00000E+02 | | | 3.3400E-08 | 2.0000E+02 | |
| | I LOW-LEV WASTE M | CONTAINER AND WASTE DE | | 10. SURFACE CONTAMINATION MBQ100.cm2 dpm/100.cm2 AI PHA BETA- | ₽. | ž | | | dN | ΝP | | | dN | ₩. | | NP | ďN | | | ďΝ | NP | , |
| | UNIFORM LOW-LEV | CONTAINE | | SURFACE SURFACE RADIATION LEVEL | 1 4 | <8,000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | |
| | ر | | | 8. WASTE AND CONTAINER WEIGHT | (190) | 0.32 | | | 292.67 | 0.32 | | | 292.57 | 0.32 | | 292.67 | 0,32 | | | 192.57 | 0.32 | |
| | | NOT DIOLOGICA DE LA COMPANIA DEL COMPANIA DEL COMPANIA DE LA COMPA | A I AINER DESCRIPTION | 7. VOLUME · (m3) | 12.0 | 7.35 | | | . 02 | 7.36 | | | 0.24 | 7.35 | | 12.0 | 7.35 | | | 120 | 7,36 | |
| | | | DISPOSE CO | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7 | | | | • | | | | 4 | | | + | • | | | 4 | | |
| | FORM 541A | | | 5. CONTAINER DENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 188/1 | | | | 200/1 | | | | 204/1 | | | 206/1 | : | | | 20711 | : | FORM 541A (10-36) |

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UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| | DISPOSAL CO | NTAINER DESC | DIDTION | CONTAINE | R AND WAS | TE DESCR | IPTION (CONTINI | JATION | | | | | 3 | . PAGE 15 OF | 24 PAGE(S) | |
|--|--|------------------------|--|-------------------------------------|-----------|-------------------------------|---|--|--|--|-------------|-------------------------------|--|--|--|--|
| | 1 | 1 | | r | | | | DIRECTOR OFFI | WASTE DESCRIPTION | ON FOR EACH WAST | E TYPE IN C | | | | | 16.WAS1 |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | _MBp/1 | MINATION 100 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCR 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL RA CONTAINER TO | ADIONUCLIDES | L DESCRIPTION S AND ACTIVITY (MI TAINER TOTAL AC LIDE PERCENT | Bq) AND TIVITY | CLASS CATIC AS-Clas Stable AU-Cla Unsta |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | (08811083) | | IF>0.1% | RADIONUCLIDES | oCVqm | MBq | mCi | B-Clas C-Clas |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | • | | | |
| 210/1 | 4 | 0.21 | 247,21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-Н | 0.20 | NA | NONEJNP | NP | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 1 8.3990E-02 1 8.3990E-02 1 4.1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 5.8608E-01 | 1.5840E-02 | .1 |
| • | | | | | | | · | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | | | | | · | |
| 213/1 | | 0.21 | 292.57 | <8.9000E-05 | NP | 3.3400E-06 | 29,39-Н | 6.26 | NA . | NONEMP | NP | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 1.0064E-01 1.0064E-01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal , | | 7.0448E-01 | 1.9040E-02 | .1 |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | | | | |
| 216/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-Н | 0,20 | NA | NONE/NP | | C-14 1 H-3 1 Sr-90 5 | 1.00000E+0 | 8.3990E-02 8.3990E-02 4.1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7.36 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | , | 5.8608E-01 | 1.58401:-02 | r. |
| | | | | | | | | | . | | | Total | | 5.8608E-01 | 1.58401:-02 | |
| | | | | | | | | | | | | | | . | | |
| 217/1 | 4 | 0.21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA. | NONE/NP | NP | C-14 1 H-3 1 Sr-90 5 | .00000E+01 .00000E+01 | 5.0320E-02 5.0320E-02 2.5160E-01 | 1,3600E-03 1,3600E-03 6,8000E-03 | AS |
| · · · · · · · · · · · · · · · · · · · | | 7.35 | 0.17 | <8.000E-03 | NP | 2,0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | 1 | | | | | | | | • | | | | i i | 1 | 1 |

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

3. PAGE 16 OF 24 PAGE(S)

| | | | | CONTAINE | | ar broom | PTION (CONTINU | 14TIOND " | | | | | 3. F | PAGE 16 OF 2 | 24 PAGE(S) | |
|--|---|--------------|--|-------------------------------------|-----------------|--------------------------------------|---|-------------------|-----------------------|--|--------------|--------------------------|--|--|--|--|
| | DISPOSAL CO | NTAINER DESC | RIPTION | CONTAINE | R AND WAS | HE DESCR | L | IATION | WASTE DESCRIPTI | ON FOR EACH WAST | | | | | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | MBo/1 | FACE IINATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | CONTAINER (m3) | 13. SOLIDIFICATION | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIOUAL RAI | | ND ACTIVITY (ME | | CLASSIF CATION AS-Class Stable AU-Class Unstab B-Class |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | 1 3.00.27 | (FT3) | (000 11010 0) | | IF>0.1% | RADIONUCLIDES | pCl/gm | MBq | mCl . | B-Class C-Class |
| 219/1 | 4 | 0.21 | | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0,20 | NA | NONE/NP | NP | H-3 | .00000E+01 .00000E+01 .00000E+01 | 1.0064E-01 1.0064E-01 5.0320E-01 | 2.7200E-03 | A\$ |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | L. |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | ļ | | | <u> </u> | | | <u> </u> | NA NA | NONE/NP | | C-14 1. | .00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| 221/1 | | 0.21 | 292.57 | <1.2000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA NA | NOREMP | NP | H-3 1. | .00000E+01 .00000E+01 | 1.0064E-01 5.0320E-01 | 2.7200E+03 | \$ 1 |
| | | 7.35 | 0,32 | <1,200E-02 | NP | 2.0000E+02 | | 7,35 | | <u> </u> | | Subtotal | | 7.0448E-01 | 1.9040E-02 | |
| | | <u> </u> | | | - | - | | | - | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 22411 | 4 | <u> </u> | · | | - | | 29,39-H | | NA | NONE/NP | | | .00000E+01 | 1.0064E-01 | 2.7200E-03 | ·AS |
| | | 7.35 | | - | NP NP | 3,3400E-06 2,0000E+02 | ł | 7.35 | - | | NP | H-3 Sr-90 Subtotal | .00000E+01 .00000E+01 | 1.0064E-01 5.0320E-01 7.0448E-01 | 2.7200E-03 1.3600E-02 1.9040E-02 | ·i |
| | | 1 | | 40.000 | "" | | | 1.50 | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | 1 | | | | | | | |
| 225/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,38-H | 0.20 | NA | NONE/NP | NP | IH-3 11. | .00000E+01 .00000E+01 .00000E+01 | 1.0064E-01 1.0064E-01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS · |
| | | 7.36 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | ·ì |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | 22227 | 6.0000 - 5 | | |
| 228/1 | 4 | 0.21 | 156.49 | <1,3000E-04 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | H-3 1. | .00000E+01 .00000E+01 .00000E+01 | 5.0320E-02 5.0320E-02 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | 1 | 7.35 | 0,17 | <1.300E-02 | NP | 2.0000E+02 | 1 . | 7.35 | Ì | ļ | 1 | Subtotal | I | 3.5224E-01 | 9.5200E-03 | |

FORM 541A (10-96)

UNIFORM LOW-LEVEL RADIOACTIVE **WASTE MANIFEST**

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME(ft3) | 8. WASTE AND CONTAINER WEIGHT (kg) (ltd) | 9. SURFACE RADIATION LEVEL mSvhr | 10. SUR | FACE AINATION 100 cm2 | 11. WASTE | PHYSICAL DESCRI 12. APPROXIMATE | | ON FOR EACH WAST | E TYPE IN C | | 5. RADIOLOGICA | L DESCRIPTION | 24 PAGE(S) | 16.WASTI |
|---|---|----------------|---|--|-----------------|-----------------------------|---------------------------|------------------------------------|---|-------------------------------------|------------------|----------------------|--|--|--|---|
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | SURFACE RADIATION LEVEL | CONTAI MBo/f | MINATION 100 cm2 | | PHYSICAL DESCRI 12. APPROXIMATE | PTION | ON FOR EACH WAST 14. CHEMICAL DE | E TYPE IN C | | 5. RADIOLOGICA | L DESCRIPTION | | T CLASSIF |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | VOLUME | AND CONTAINER WEIGHT | SURFACE RADIATION LEVEL | CONTAI MBo/f | MINATION 100 cm2 | | 12. APPROXIMATE | | 14. CHEMICAL DE | SCRIPTION | | 5. RADIOLOGICA | L DESCRIPTION | | T CLASSIF |
| | | ((3) | (kg) (ton) | mSv/hr | | 00 cm2 | DESCRIPTOR (See Note 2 | CONTAINER | SOLIDIFICATION OR STABILIZATION MEDIA | CHEMICAL FORM CHELATING AGENT | CHELATING | CONTAINER | RADIONUCLIDES TOTAL; OR CON AND RADIONUC | S AND ACTIVITY (MI ITAINER TOTAL AC LIDE PERCENT | Bq) AND TIVITY | CATION AS-Class Stable AU-Class Unstabl |
| | | | | mrem/hr | ALPHA | BETA- GAMMA | & Note 2A) | (m3) (F13) | (See Note 3) | | AGENT IF>0,1% | 04000000000 | r 20. | | | B-Class C-Class |
| | | | | | | | | | | | | RADIONUCLIDES Total | pCi/gm | 3.5224E-01 | mCi 9.5200E-03 | |
| | | | | | | | · | - |] | | | | | | |]. |
| 232/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 1 1.0064E-01 1 1.0064E-01 1 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NР | 2.0000E+02 | | 7.35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | . 1 |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 233/1 | 4 | | | | | | | | | | | | | | | |
| | ` | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0,20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 1 1.0064F-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| <u> </u> | | 7.35 | 0.32 | <8.000E-03 | N.P | 2.0000E+02 | | 7.36 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 237/1 | <u> </u> | | | | | | | | | | | | | | | |
| 23/11 | 4 | 0.21 | 292.57 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 1 1.0064E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | 1 |
| | | 7.35 | 0.32 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | · | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 240H | 4 | | | | | | | | | | <u>,</u> | | | | | |
| 2401 | • | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA. | NONE/NP | | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 6.6970E-02 6.6970E-02 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | ŧ . |
| | | 7.35 | 0.22 | <1.000E-02 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | | | | Total | | 4.6953E-01 | 1.2690E-02 | |
| FORM 541A (10-96) | | | | | | | | | | | [| | | | | İ |

FORM 541A

| | | | WASTE | CATION AS-Class A Stable AU-Class A Unstable | 3-Class B | AS | | | AS | | | | AS | | | | AS | | | As | | |
|----|-----------------------------------|-----------------------|--------------------------------|--|---------------------------|--|------------|--------------|----------------------------------|------------|------------|--------------|---------------------------------------|-------------|------------|---|--------------------------|------------|------------|--|------------|-------------------|
| 0 | 18ER | _ | 116 | | 10 | 1.3600E-03 1.3600E-03 6.8000E-03 | 9.5200E-03 | 9.5200E-03 | 1.8100E-03 | 1.2690E-02 | 1.2690E-02 | | 1.8100E-03 1.8100E-03 0.700E-03 | 1.2690E-02 | 1.2690E-02 | · | 2.2700E-03 / | 1.5840E-02 | 1.5840E-02 | 2.2700E-03 / | 1.5840E-02 | |
| | 2. MANIFEST NUMBER 4032-01-003 | PAGE 18 OF 24 PAGE(S) | пошанов | IS TOUR OWNER DESANDED ON THE REPORT OF THE SAND ON TH | MBO | 5.0320E-02 1 5.0320E-02 1 2.5160E-01 6 | | 3.5224E-01 9 | 6.6970E-02 1 6.6970E-02 1 | 4.6953E-01 | 4.6953E-01 | | 6.6970E-02 1 6.6970E-02 1 | | 4.6953E-01 | | 8.3990E-02 8.3990E-02 | | 5.8608E-01 | 8.3990E-02 8.3990E-02 4.1810E-01 | | |
| | | ь. 9 | HOLIGICASSO WOLOO MIGNO | DIONUCLIDES ANI TAL: OR CONTAIN D RADIONUCLIDE | | 1.00000E+01 5.00000E+01 | | | 1.00000E+01 | | | : | 1.00000E+01 | | | | 1.00000E+01 | | | 1.00000E+01 | | |
| • | Envirocare of Utah, Inc. | | ONTAINER | | PADIONICIDES | | 1 | Total | 2.5.4. 2.6.6. 4.4.0.0 | Į s | Total | | 7 4 5 6 6 7 7 7 | EI. | Total | | 7.7.9. 2.6.6. | <u> </u> | Total | 24.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4. | | |
| | | | ASTE TYPE IN | WEIGHT | AGENT IF>0.1% | 2 | · • | | 2 | <u> </u> | | | 2 | ! | | | . 2 | ! | | 2 | : | |
| | | | N FOR EACH WASTE TYPE IN CO | CHEMICAL FORW | | NONEINP | | | NONEMP | | | | NONEWP | | | | NONENP | | | NONEMP | | |
| | | • | WASTE DESCRIPTION | 12. APROXILEGATION 12. APROXIMATE 13. VASTE SOLIDIFICATION VOCUME(S) IN OR STABILIZATION CHE CONTAINER MEDIA CHE | (See Note 3) | NA | | | NA | | | | NA | | | | NA | | | NA | | |
| | ш | (NOIL | 10000 | 2. APPROXIMATE WASTE VOLUME(S) IN CONTAINER | (ET-) | 0.20 | 7.36 | | 0.20 | 7.35 | | | 0.20 | 7.35 | | | 0.20 | 7.35 | | 0.20 | 7.36 | |
| | UNIFORM LOW-LEVEL RADIOACTIVE | ACTIVO 2) | | MASTE DESCRIPTOR (See Note 2 | & Note 2A) | 39,29-H | · · | | 28,38-H | L | | | 29,39-11 | | | | 29,39-H | | | 29,38-Н | | |
| | EVEL RADI | INFAINIT | | CE AATION Com2 | BETA- | 3.3400E-06 | 2,0000E+02 | | 3.3400E-06 | 2.0000E+02 | | | 3.3400E-06 | 2,0000E+02 | | | 3.3400E-08 | 2.0000E+02 | | 3.3400E-06 | 2.0000E+02 | ! ! |
| | LOW-LEV | AND WAST | | 10. SURFACE CONTAMINATION MBa1100 cm2 cpm/100 cm2 | ALPHA | | ď | | dN | 2 | | | ď. | ₽ | | | AN A | en . | | d _E | B | |
| | NIFORM | SONTAINER | | 9, SURFACE RADIATION LEVEL | mSv/hr | <1.0000E-04 | <1.000E-02 | | <1,0000E-04 | <1,000E-02 | | | <1.0000E-04 | <1.0005-02 | | | <1.0000E-04 | <1.000E-02 | | <1.0000E-04 | <1.000E-02 | |
| · |) | | ŀ | 9. WASTE AND CONTAINER WEIGHT | (kg) | 156.49 | 71.0 | | 201.86 | 0.22 | | | 201.85 | 22,0 | | | 247.21 | 0.27 | | 247.21 | 0.27 | |
| | | | DISPOSAL CONTAINER DESCRIPTION | w w | (E) | 0.23 | 7.36 | | 0.24 | 7.35 | | | 0.21 | 7.35 | | | 0.24 | 7,36 | | 0.21 | 7.35 | |
| ٠. | | | DISPOSAL CON | GONTAINER DESCRIPTION | (See Note 1 & Note 1A) | 4 | | | 4 | | | ••••• | - | | | | 4 | | | ! | | |
| | FORM 541A | | | CONTAINER DENTIFICATION NUMBER / | GENERATOR ID NUMBER(S) | 241/1 | | | 243/1 | | | • | 246/1 | | | | 249/1 | | | 250/1 | | FORM 541A (10-96) |

| FORM 541A | | | ί | JNIFORI | | LEVEL E MANI | RADIOACTI FEST | VE | | | | Envirocare of t | Jtah, Inc. 2 | . MANIFEST N 4032-01-0 | | |
|--|-------------------------------------|----------------------|--|--|-----------------|--|--|---|-----------------------|-----------------|--|------------------------|---|--|--|--|
| <u> </u> | | | | CONTAINE | R AND WAS | STE DESCR | IETION (CONTINI | UATION) | | •• | | | 3 | . PAGE 19 OF | 24 PAGE(S) | |
| | DISPOSAL CO | NTAINER DESC | RIPTION | 1 | | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAS | TE TYPE IN C | | | | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT | 9. · SURFACE RADIATION LEVEL | CONTAI _MBa/ | FACE MINATION 100 cm2 100 cm2 | 11. WASTE DESCRIPTOR (See Note 2 '& Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | 13. SOLIDIFICATION | | WEIGHT % | INDIVIDUAL CONTAINE | 15. RADIOLOGICA - RADIONUCLIDES R TOTAL: OR CON AND RADIONUC | AND ACTIVITY (MI | Bq) ANO TIVITY | CATION AS-Class Stable AU-Class Unstable |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mæm/hr | ALPHA | BETA- GAMMA | [| (F13) | (000 11012 0) | İ | IF>0.1% | RADIONUCLIDES | -01 | 1 | | B-Class B C-Class C |
| | | 1 | | | | | | | | | | | pCi/gm | MBq | mCl | |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| 251/1 | 4 | 0.21 | 247.21 | <1,0000E-04 | NP | 3,3400E-06 | 29,39-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+0 1.00000E+0 5.00000E+0 | 1 8.3990E-02 1 8.3990E-02 1 4.1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7,35 | 0.27 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 3.00000E+0 | 5.8608E-01 | 1.5840E-02 | |
| | | | · · · | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| 252/1 | 4 | 0.21 | 247.21 | <1.0000E-04 | · NP | 3.3400E-06 | 29,38-H | 0.20 | NA NA | NONEMP | NP | C-14 H-3 Sr-90 | 1.00000E+01 | 8.3990E-02 | 2.2700E-03 2.2700E-03 | AS |
| | | 7.35 | 0.27 | <1.000E-02 | NP | 2,0000E+02 | | 7.35 | | | NP | Subtotal | 5.00000E+01 | 4.1810E-01 5.8608E-01 | 1.1300E-02 1.5840E-02 | |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| 253/1 | 4 | 0.21 | 247.21 | <1.0000E-04 | ΝP | 3.3400E-08 | 29,39-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E+01 1.00000E+01 5.00000E+01 | 8.3990E-02 8.3990E-02 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7.35 | 0.27 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E+01 | 4.1810E-01 5.8608E-01 | 1.1300E-02 1.5840E-02 | 1 |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| 255/1 | 4 | | | | | | 29,39-H | | NA . | NONE/NP | | C-14 | 4 00000=104 | 9 20005 00 | A 6700 55 | |
| | | 7,35 | 247.21 | <1.000E-04 | NP | 3.3400E-06 2.0000E+02 | | 7.35 | | | NP | H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 1 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | | | | | | | /.35 | | | | Subtotal Total | <u>.</u> | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | | | | 5.8608E-01 | 1.5840E-02 | |
| FORM 541A (10-96) | | | | | | | | · | | | | | L | 1 1 | | |

| Controller Con | | | | | 1 | | 1 | | | | | | _ | 4035-01-003 | | |
|---|----------|-----------------------|--------|------------|------------------------------------|------------|-------------------------|--------------------------------------|---|------------------|-----------------|--------------|---|---|--|--|
| COUNTRET COUNTRE COUNTRE COUNTRE COUN | | | • | 1 | WASTE | MANIF | EST | | | | <i>:</i> . | ٠ | က် | PAGE 20 OF 24 PAGE(S) | _ | |
| CONTABLE | id | SPOSAL CONTAINER DESC | | TIME AINER | AND WAS I | HE STATE | HON INCOMENT | INCOME. | WASTE DESCRIPTION | V FOR EACH WASTE | YPE IN COL | | 45 BADIOI OGICAL DESCRIPTION | CERCOLOTION | | GWASTE CLASSIFI- |
| Marketon Control Con | - | К. | | | 10. SURFAC CONTAMIN. MBQ/100 | A ATION | 11. WASTE DESCRIPTOR | 12. APPROXIMATE WASTE VOLUME(S) IN | 13. SOLIDIFICATION OR STABILIZATION | CHEMICAL FORM | VEIGHT % | | ADIONUCLIDES TOTAL: OR CON | INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND PSECENT AND PSECENT | | CATION AS-Class A Stable AU-Class A |
| 4 0.21 201.26 (-1,000E-04 NP 3.3400E-05 NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NONENPP NP NP NONENPP NP NP NONENPP NP NP NONENPP NP NP NP NONENPP NP NP NP NP NP NP NP NP NP NP NP NP | | | WEIGH! | | ALPHA | SETA. | & Note 2A) | (FT3) | (See Note 3) | | AGENT F>0.1% | RADIONICIDES | morrow on | MBo | į | Onstable B-Class B C-Class C |
| 4 0.21 0.22 0.100E-02 NP 2.000E-02 0.29 0.20 0.20 0.20 0.20 0.20 0.20 0. | | 0.21 | | | _ | 8 | 29,39-H | 0.20 | NA | NONE/NP | | | 1.00000E+01 1.00000E+01 5.00000E+01 | က်ထဲက | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| 4 0.21 65.77 (1,0000E-04 NP 3,3400E-05 AP 1,25000E-04 NP 2,0000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,0000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,0000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,0000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,0000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,0000E-07 T,335 4 0.21 166.49 (1,000E-04 NP 2,000E-07 T,335 4 0.21 | | 7.35 | | | | 2,0000E+02 | | 7,35. | - | · | | ä | | | 1.2690E-02 | • |
| 4 0.21 65.77 (1,000)E-04 NP 3.340)E-05 B-H 0.20 B-M NONENP NP 2,000)E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-02 NP 2,000,E-04 | | | | | | | | | | | <u> </u> | Total | | 4.6953E-01 | 1.2690E-02 | |
| 4 0.21 65.77 (1,000E-04 NP 3,340E-08 T,135 NA NONENP NP 3,340E-08 T,135 NA NONENP NP 2,000E-02 T,135 NA NONENP NP 1,340E-08 T,135 NA NONENP NP 2,000E-02 NA NONENP NP 3,340E-08 NP 2,000E-02 NA NONENP NP 3,340E-08 T,135 NA NONENP NP 3,340E-08 NP 2,000E-02 NA NONENP NP NP NP NP NP NP NP NP NP NP NP NP N | | | | | | | | | | | | | | | | |
| 4 G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 A G.21 166.49 | | | | | | | | | | | | | | | | |

| | WASTE MA | WASTE MI | - <u>-</u> .u | ONITORINI LOW-LEVEL WASTE MAN | | ᄄᄔᅳᆝ | EL RADIOACTIVE ANIFEST | m i | | | | Envirocare of Utah, Inc | | 2. MANIFEST NUMBER 4032-01-003 3. PAGE 21 OF 24 PAGE(S) | JMBER 13 24 PAGE(S) | |
|---|---|------------------------------|--|-------------------------------------|--|--|--|--------|--|--------------------------|---|-----------------------------|--|---|--|--|
| | DISPOSAL CONTAINER DESCRIPTION | TAINER DESCRI | | | The street | | THE PROPERTY OF | DESCRI | WASTE DESCRIPTION | N FOR EACH WASTE TYPE IN | 181- | NTAINER | MOLEGICAS RESCRIPTION OF THE PROPERTY OF THE P | MOLEGICA | 11 | 6.WASTE |
| CONTAINER 6. DENTIFICATION CO. NUMBER / DEC. GENERATOR (5 | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (#3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL | 10. SURFACE CONTAMINATION MBG100 cm2 dpm/100 cm2 An PHA BETA | NATION Danz Cenz Serz BETA | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | 를 충봇 | WEIGHT % ** ** ** ** ** ** ** ** ** ** ** ** ** | INDIVIDUAL R CONTAINER 1 | ADIONUCLIDES / | IS, POUR LOS AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | | CATION A8-Class A Stable AU-Class A Unstable B-Class B |
| | | | (log) | живаши | | GAMMA | | | | | 10 P | RADIONUCLIDES | pCi/gm | MBq 5.8608E-01 | 1.5840E-02 | |
| 4 | | 0.21 | 156.48 | <8.0000E-05 | £ | 3.3400E-06 | 38,25-H | .0.20 | . NA | NONENP | 2 | C-14 72.30 72.90 | 1.00000E+01 5.00000E+01 | 5.0320E-02 5.0320E-02 | 1.3600E-03 | S. S. |
| | | 35.7 | 0.17 | <8.000E-03 | ė, | 2.0000E+02 | | 7.35 | | | | | | | | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 4 | | 12.0 | 201,85 | <8.0000E-05 | Ŗ | 3,3400E-06 | · 구성 | 0.20 | ¥ | NONEMP | SIG S | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 6.6970E-02 6.6970E-02 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| | | 7.35 | 0.22 | <8.000E-03 | £ | 2,0000E+02 | | 7.35 | | | ΙØ | Subtotal | | | | |
| | ! | | | | | | | | | <u> </u> | <u> </u> | Total | | 4.6953E-01 | 1.2690E-02 | |
| 4 | | 0.21 | 201.85 | <8.0000E-05 | d | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | | C-14 | 1.00000E+01 | 6.6970E-02 | 1.8100E-03 | S. |
| | | 7.36 | 220 | <8.000E-03 | ď | 2.0000E+02 | | 7.35 | | | <u>0 00</u> | 擂 | 9.00000E+01 | | 9.0/00E-03 | |
| | L | | | | | | | | | | H 9= | Total | | 4,6953E-01 | 1,2690E-02 | |
| 4 | | K | 156.49 | <8.0000E-05 | ş | 3.3400E-D6 | | 0.20 | N. | NONENP | | C-14 | 1.00000E+01 | 5.0320E-02 5.0320E-02 | 1.3600E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | ď | 2.0000E+02 | | 7.36 | | | <u>%</u> 10 | <u>ra</u> | 5.00000E+01 | 2.5160E-01 3.5224E-01 | 6.8000E-03 | |
| | , <u>_</u> _, | | . | | | | · · · · · · | | | | H = | Total · | | 3.5224E-01 | 9.5200E-03 | |
| FORM 541A (10-96) | | | | | | | | | | | 1 | | | | | |

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FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

3. PAGE 22 OF 24 PAGE(S)

| ĺ | | | | CONTAINE | AND WAS | TE DESCRI | PTION (CONTINU | IATION | | | | •• | 3. | PAGE 22 OF | 24 PAGE(S) | |
|--|--|---------------|--|-------------------------------------|---------|-----------------------------|---|-----------------|---|---------|-----------------------------------|-------------------------|--|--|--|---|
| | DISPOSAL CO | TAINER DESC | RIPTION | - INTERNAL | | | | | WASTE DESCRIPTION | | | | | occomo: | | 16,WASTE CLASSIFI- |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | _MBo/1 | INATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT % CHELATING AGENT | INDIVIDUAL CONTAINER | 5. RADIOLOGICAL RADIONUCLIDES A TOTAL; OR CONT. AND RADIONUCLI | AND ACTIVITY (ME | | CLASSIFI- CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| ID NUMBER(S) | Note 1A) | (m3) (ft3) | (kg) (ton) | m\$v/hr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | L | | IF>0.1% | RADIONUCLIDES | pCi/gm_ | MBq | mCi | |
| 283/1 | 4 | 0.21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 1.6798E-02 1.6798E-02 8.3990E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | | 7.35 | 0.07 | <8.080E-03 | NP | 2,0000E+02 | · | 7,35 | | | | Subtotal | | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | 1 | Total | | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | | | 4.000005.00 | 2 20005 00 | 0.07005.00 | |
| 286/1 | 4 | 0,21 | 247.21 | . <1.0000E-04 | NP | 3.3400E-06 | 29,39-Н | 0.20 | NA NA | NONE/NP | N₽ | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 8.3990E-02 | 2.2700E-03 | AS |
| | | 7,35 | 0.27 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 5.8608E-01 | 1.5840E-02 | |
| | | | | | ļ | | · | | - | · | | Total | | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | | | | | | |
| 287/1 | 4 | 0,21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 6.6970E-02 6.6970E-02 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| | | 7.35 | 0,22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | | · | | Total | | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | | | | | | | | |
| 288/1 | 4 | 0.21 | 158.49 | <1.0000E-04 | NР | 3.3400E-08 | 39,29-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5 0320F-02 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <1,000E-02 | , NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | -1 |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | | | | |
| 293/1 | 4 | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 6.6970E-02 | 1.8100E-03 1.8100E-03 9.0700E-03 | A\$ |
| | | 7.35 | 0.22 | <1.000E-02 | NΡ | 2.0000E+02 | | 7.35 | | | | Subtotal . | | 4.6953E-01 | - | .i |

FORM 541A (10-96)

| UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST CONTAINER AND WASTE DESCRIPTION (CONTINUATION) |
|---|
| CONTAMINATION MB0100 cm2 dpm/100 cm2 ALPHA BETA- |
| 1 1 |
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| |
| NP 3.3400E |
| NP 2.0000E+02 |
| _ |
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| NP 3,3400E |
| NP 2.0000E |
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| NP 3.3400E |
| NP 2.000E |
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UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-003

- 3. PAGE 24 OF 24 PAGE(S)

| | | | • | CONTABIL | O ANTO 18/40 | TE NECCE | PTION (CONTINU | IATION! | | | | | ·- 3. | PAGE 24 OF | 7.5 | |
|---|---|----------------------|--|---|--------------|--------------|---|---|------------------|--|--------------|---------------|---|------------------|-------------------|--|
| | DISPOSAL CO | TAINER DESC | RIPTION | LUNIAINE | AND WAS | TE DESCR | THUN GON LING | • | WASTĘ DESCRIPTIO | ON FOR EACH WAS | E TYPE IN C | ONTAINER | | n-conjugate. | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (tt3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL mSv/hr | MBo/1 | IINATION | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL | 5. RADIOLOGICA RADIONUCLIDES TOTAL; OR CON AND RADIONUCL | AND ACTIVITY (MI | Bq) ANO TIVITY | CATION AS-Class Stable AU-Class Unstable B-Class C-Class |
| ID NUMBER(S) | Note 1A) | (103) | (kg) (ton) | mrem/hr | ALPHA | GAMMA | | (, | | | 11-0.170 | RADIONUCLIDES | pCi/gm | MBq | mCi 1.2279E+00 | |
| Shipment Totals | | 21.42 | 19636.14 | 1 | | |] | | | | | | | 4,5452E701 | 1.22752+00 | |
| • | | 749.70 | 21.39 | | | | | • | | | | | - | | | <u> </u> |
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FORM 541A (10-95)

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|---|----------------------------------|---|--|---|--|--|---|---|---|---|--|--|
| FORM 540 ENVI | Envirocare of Utah, Inc. | - | 6. SHIPPER NA U.S. Anny Corps Of | FACILITY | | E | SHPMENT LD, NUMBER 4032-01-001 | 7. FORM 540 AND 54 | DA PAGE 1 OF | | 8. MANFEST NU | MANFEST NUMBER |
| WASTE MANIFEST | 1 | | CENAC-EN-HI 10 South Roward Street Balkinom, MD 24204-4748 | d Street | | | COLLECTOR | | | 24 PAGE(S): Nome PAGE(S): | pages) 4032-01-001 | 1-001 |
| SHIPPING PAPER | | | USER PERMIT NUMBER | UMBER | SHIDMENT M | 050% | PROCESSOR | ADDITIONAL INFORMATION | RMATION | None PAGE(S) | | |
| 1. ENERGENCY TELEPHONE NUMBER (Include Area Code) | | | NA | | 4032-01-001 | | (Specify) G | 9. CONSEGNEE - Name Environare of Itals for | 9. CONSIGNEE - Name and Facility Address Environment of Illah, Inc. | | CONTACT Shipping and Receiving | iving |
| Cos, Inc. | | | CONTACT Mr. Hans Honerlah | ortah | | E 269 | TELEPHONE NUMBER (Include Area Code) 410-862-9184 | Give Disposal Site Interstate 80, Exit 49 Clive, UT 84029 | i | | TELEPHONE NUMB | TELEPHONE NUMBER (include Area Code) |
| IS THIS AN "EXCLUSIVE USE" SHEMENT? 3. TOTAL NUMBER OF PACKAGE DEMITIED | | | 6. CARRIER – N Dart Trucking Co, 61 Railroad Street | 6. CARRIER – Name and Address Dart Trucking Co, Inc. 61 Raliroad Street | | EPA OHE | EPA LD. NUMBER OHDD09865625 | SIGNATURE - Author | SIGNATURE - Authorized consignee acknowledging waste receipt | edging waste receipt | DATE | |
| | | | Canffeld, OH 44406 | 406 | | 풄 | SHIPPING DATE | | ı | 10. CERTIFICATION | | |
| DOES EPA REGULATED WASTE REQUIRING A WASTE REQUIRING A THIS CHIMATEST ADOMPANY X NO | Y. | | CONTACT Bill Stoddard | | | ET. | TELEPHONE NUMBER (Include Area Code) 608-679-3471 | Institute that the first in proper condition for the condition for the condition that the material disposal as described in | herein-named materials ansportation according t is are classified, peckaga accordance with the req | are property classifier of the applicable regula of marked, and tabele ulrements of 10 CFR is | Institute conduly that the international conductions to engage described, possigned, market, and belong and ear in proper condition for transportables, according to the applicable regulators of the Department of Transportables. This above confide that the medical sear desarified, proceding of medicable regulators of the Department of Transportables. This above forting as the experiment are desarified, proceding and market and are in proper condition for transportables and forting as the experiment of the proceding and the pr | rked, and labeled and Transportation. This e on for transportation a |
| H Yes, "provide Marafest Number =====> | | - | Signaturing - | ydhoffad carrier acknownedging waste raceipt M. 211 | ging waste raceipt | DATE Q | 10-he- | AMTHORIZED SKONATURE | MIRE SOCIAL | TITLE 22 | | DATE |
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazzar class, UN ID number, and any additional information | 12 DOT LABEL "RADIOACTIVE" | | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | _ | - 8ª | 15. INDIVIDUAL RADIOMICLIDES | TOTAL | 18 TOTAL PACKAGE ACTIVITY | 17. 17. LSA/SCO | 18. TOTAL WEIGHT OR VOLUME | 19. IDENTIFICATION NUMBER OF |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | - | ¥. | | Solid MA | C-14 | Ŧ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA CLASS | (Use appropriate units) | PACKAGE 009 |
| Radioacdive material, excepted package-limited quantity of material, 7, UN2810 | y of NA | A. | | Solid INA | C-14 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | ¥ | 245. LBS; 7.35 | 010 |
| Redloactive riaterial, excepted package-limited quantity of material, 7, UN2910 | r of NA | ¥ | | Solid INA | C-14 | ¥3 | Sr-90 | 2.3510E-01 | 5.3540E-03 | ₩ | FT3 245. LBS; 7.35 | 913 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2010 | / of NA | ₹ | | Solid /NA | C-14 | ¥3 | Sr-80 | 2.3510E-01 | 6.3540E-03 | Ā | FT3 245. LBS; 7.35 | 017 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | / of NA | Ā | | Solid INA | <u>C-14</u> | 7 | Sr-90 | 5.8608E-01 | 1.5840E-02 | WA | FT3 645. LBS; 7.35 | 019 |
| Radiosctive material, excepted package-limited quantity of material, 7, UN2910 | / of NA | ¥ | | Solid /NA | C-14 | H2 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | F13 245. LBS; 7.35 | 021 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | | ₹ | | Solid /NA | C-14 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA NA | 245.LBS; 7,35 | 023 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | of NA | ₹ | S | Solid MA | C-14 | ¥ | Sr-30 | 2.3510E-01 | 6.3540E-03 | WA | FT3 245.LBS; 7.35 | 025 |
| FOR CONSIGNEE USE ONLY | Record Was | Record Waste Description Inadequal Confamination or Leakana Detected | Record Waste Description Inadequate Confamination or Leakane Defected | æ | TERAKS AND CONDITION A. HAZARDOÚS MAT PRZENOUS WESTE, I | ATERIALS: Ger fine shipment | neralor represents & warn is also accompanied by a u | rtis that Waste Material. | is (or) is n | प क hazardous waste : न, along with the apon | AND CONDITION HAZARDOUÉS MATERIALS: Generalor represents & warrants that Wasse Makeful is (or) / is not a hazardous waste as defined in 40 CFR 231, Where the material is a material is a second-period by a separate and completed financious waste analysis, along with the appropriate financial consolination and complete in the consolination of t | Where the material is |
| | Unexpected | Exposure R | Unexpected Exposure Rates Detected | ei | TITLE Upon ac | September of the control of the cont | disposal site by Envirocan intro frankler from Cana | of Utsh, inc., and sal ap | iropriate regulatory auth | orities, title to the We | TITE: Upon acceptance at the disposition from the control of the c | s to Generator's |
| | Labels, Mark Container In | Labels, Markings, etc. Inadequate Container Integrity Inadequate | adequate quate | ರ | WASTE MATER | AL: Generator I | represents and wanants the fill of experiments the fill of the proficable governments the fill of the | at all data set forth in this vital laws, nales, regulation | MUCCAR OF LIBRA INC. S (UNIFORM LOW-LEV) YIS AND ENVICARE OF LI | EL RADIOACTIVE WA | WASTE MATERIAL. Generator represents and warrants that as done as from this (UNICORAL DALECEL RADIOACTIVE WASTE MANTEST) are true and correct and respects and in adoptional governmental and, and this mach followed to science the second seco | and correct in |
| | Other No Violation: | s Defected o | Other No Violations Detected on this Shipment | ont. | INDEMNIFICATA Esbliky results for MANIFEST.) or if | ON: Generator: vn the failure of: this shipment fa | egrees to indemnify Eiwir the Waste Material to con ils to meet the standards ; | care of Utah, ho., [ts off orm in all material resper rescribed by the December | Cers, employees and ag 1s to the data supplied of Bent of Transcontains | ents against all losses on the (UNIFORM LOY | INDEANIFICATION: Generator agrees in Indemnity Envirocare of Ulbah, Inc., its officers, employees and agents against all losses and fability vitatioover if such losses or famility results from the falkers of the Weste Material to conform in all material respects to the data supplied to the Ulbah, LOW-LEMEL RAJDIOACTIVE WASTE. MANIFEST) or if this stripment falk to meat the standards prescribed by the Department of Transcription. In commonweal and adventised to the Commonweal and the | such losses or VASTE |

WASTE SHIPMENT RECORD

| | 1. Work site (Generator): | - Diat | Owner's | Name | | Owner ephone | |
|-------------|--|--------------|--------------------|-----------------|-------------|-------------------|---------------|
| . · . | Name US Army Corps of Engineers - Baltimor Mailing Address CENAE-EN-HI. 10 South Howard S | treet | St. Alban' | s VAECC | ' | | |
| | City/State/Zip Baltimore, MD 21201-1715 | | | | | | |
| 13 per 61 | 2. Remover's name and address: | | | | | emove | |
| | Franklin Environmental Services, Inc. | | | | (508) | • | |
| | 185 Industrial Road Wrentham, MA 02093 | | ···· | | (000) | | |
| | 3. Waste Disposal Site (WDS) Name Envirocare of Utah, Clive Disposa | 1 (1+6 | WDS telephone r | (435 |) 884- | 0155 | |
| | Mailing Address Interstate 80, Exit 49 | 3 3100 | Additional | | n: | | |
| | City/State/Zip Clive, UT 84029 | | | | | | , |
| | Physical Interstate 80, Exit 49 | | Pi | rofile No. | 4 0 | 3 2 | |
| GENERATOR | Clive, UT 84029 | · | <u> </u> | | | | |
| 3A. | 4. Name and address of responsible agency | | | | | | |
| Ę | · | | | | | | 1 |
| 9 | | | | | | | |
| | 5. Description of materials | | 6. Contain | ners Type | 7. To | otal qu m³ (yd | antity 3) |
| | RO, ASBESTOS, 9, NA2212, III | | 2 5 | S-gal | O. | ४ 2、 | .13 |
| | RQ = 1 LB (ONE POUND) | |) | grun | <u> </u> | | 40 |
| | 8. Special handling instructions and additional infor | mation (pro | vided by ger | erator.) | | | |
| | Limited Quantity Radioachie Mosteri | 4) · | | ia annoia | amont : | aro ful | ly and |
| | OPERATOR'S CERTIFICATION: I hereby declare accurately described above by proper shipping na | that the co | ontents of the | cked, mark | ed and | liabele | d, and |
| , | are in all respects in proper condition for transpor | t by highwa | y according | to applical | ole inte | nation | al and |
| ار ز | government regulations. NOTE: Generator must r | etain a copy | of this form |) . | | | |
| | Printed/typed name & title | N/ 8 | gnature | | Month | Day | Year |
| | Robert Tays - Project Manager | Hare | 4 | | 01 2 | } フ | 01 |
| | 10. Transporter 1 (Acknowledgment of receipt of mat | | · | | مالات ما | Day | Year |
| | Printed/typed name & title | Calc | ghature | | Month Ol | Day 24 | 01 |
| | , | Carc | 1WW | | | • | |
| re- | Dart Trucking Co. Tre. Address and telephone no. | | | | • | | |
| TE | 61 Prailroad Street | | | | | | |
| OR. | Can Field, OH 44406 5085793471 | | | ļ | | | į |
| TRANSPORTER | 11. Transporter 2 (Acknowledgment of receipt of met | erials) | | | | | |
| 3AN | Printed/typed name & title | | gnature | | Month | Day | Year |
| 7.6 | . , , | | | | | | j |
| | | | • | | | | |
| | Address and telephone no. | | | | • | | ļ |
| | | | | | | | ļ |
| | | | | | | | |
| SITE | 12. Discrepancy Indication space | | Rej | ected: Yes 🔲 | No | | |
| (A) | 13. Waste disposal site owner or operator: Certification | of receipt | of ashestos | TES L | NU | <u> </u> | |
| `~ | materials covered by this manifest except as noted | | o, aspestos | | | | ŀ |
| DISPO | Printed/typed name & title | 9 | ignature | 1 1 | Month | Day | Year |
| Ö | r introdity pod tidnie ot title | 3 | ignatul 6 | ' | | , | |

ORIGINAL RETURN TO GENERATOR

OP-001-02 Radiological Survey Sheet ST. ALBANS VA. Holling TRANSPORTATION SURVEY RWP# 2001-01 LOND 5. of 6206.90 Survey# Survey Type: OUTGON/6" Smear Results D-LARGE ALSA SNESAN ALL <100 Of 1000002 DPM/100cm^2 TRACTOR # 6091 No. α β No. α NO DETECTABLE ALPUA. 1/20/200 26 LIC. # AE-YOTZY. DAKT TRAILER # 1077 PA. 31 33 4 10/20 /20 35 11 36 12 37 13 13 38 (9) 14 39 BOTTUM SI DE 15 40 16 41 17 /42 BSIDE Survey FACTS 18 43 19 44 · 0.005 mr Hu. Course 20 45 a TRACTOR & TRAILOR 21 46 47 . 6.006 CONTACT UNDERSIDE 48 0.005 GOVERAL ARION UF TRAILER. 24 49 - 1' Above Durans · 6.005 @ / METER FROM Thoroson Kulor Comments NOTE NO RADIOLA MARTOR. & TRAILER INCONSISTED CIES LIGTED DULING · 6.005 mc/m. Thoughour THIS SUNCY, Surveyed By: Los of-/100 an 2 B Date: Instrument | Serial # | α Eff. Epinon M. Yawa X 1-724 162420 NA β Eff. | α Bkg. | β Bkg | Cal. Due 190 8-11-01 1-23-201 6-2929 163827 NA AL PHA - Boundary 79.75 8-30-01 Reviewed By: Dose Rate mr/hr A/S Location Dale: 87/32 NA Direct Reading DPM/100 cm^2 Grab Sample

Llore: Names Branchesano - 0.005 mm

CABRERA SERVICES, INC.

| ابع ا ، ر FORM 540 | Envir | Envirocare of Utah, Inc. | 5. SHIPP U.S. Army C | 5. SHIPPER - NAME AND FACULTY U.S. Army Corps of Englaners | | | SHIPMENT LD. NUMBER 4032-01-001 | , NUMBER 7. | | A PAGE 1 OF | | 8. MANIFEST NU (Use this manb | MANIFEST NUMBER (Use this number on all continuation |
|---|-----------|--|--|---|--|--|---|---|---|---|---|--|--|
| UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST | ACTIVE | | CENAE-EN- 10 South He Baltimore, A | CENAE-EN-HI 10 South Howard Street Battimore, MD 21201-1715 | | | COLLECTOR | | FORM 541 AND 541A FORM 542 AND 542A ADDITIONAL INFORMATION | IA thation | 24 PAGE(S) None PAGE(S) None PAGE(S) | 4032-01-001 | 1-00-1 |
| SHIPPING FAPER EMERGENCY TELEPHONE NUMBER (Include Area Code) 1,500-428-5878 | 1. | | USER PERMI NA CONTACT | USER PERMIT NUMBER NA CONTACT | SHIPMENT NUMBER 4032-01-001 | NUMBER | X (Specify) G TELEPHONE NUMBER | ER R | 9. CONSIGNEE - Name as Envirocare of Utak, Inc. Citye Disposal Site | CONSIGNEE - Name and recitivy Address Wirecare of Utal, Inc. Ne Disposal Site | · | Shipping and Receiving TELEPHONE NUMBER (| CONTRACT Shipping and Receiving TELEPHONE NUMBER (Include Area Code) |
| ORGANIZATION Franklin Environmental Services, inc. Franklin Environmental Services, inc. 1 Total Minner | 30 00 | | 6. CARRIER – Name | ER - Name and Address | | | 410-962-9184 EPA LD. NUMBER CHEMINGS 4525 | | CINA, UT 84029 SIGNATURE - Author | 3 Authorized consignee acknowledging waste receipt | rlecting waste receipt | (435)884-0156 DATE | |
| | DENTIFIED | tat | 61 Railroad | Street | | | SHIPPING DATE | | | | 10. CERTIFICATION | | |
| | UMBER | | CONTACT Bitl St | Stoddard | | | TELEPHONE NUMBER (Include Area Code) 608-579-3471 | BER) | s is to certify that the roper condition for traities that the materials ocal as described in a | harein-named materia visportation according s are classified, packa accordance with the re | s are properly classifies to the applicable regul, ped, marked, and label quirements of 10 CFR. | This is to certify that the heach-named materials are properly classified, described, packaged, marked, and tabeled and are impropreduced in proper condition for transportation. This salso impropreduced for transportation. This salso proper conditions the Department of Transportation. This salso certifies that the materials are described, marked, and backed and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 50 and 61, or equivalent state regulations. | rked, and labeled and a Transportation. This als on for transportation are ent state regulations. |
| If "Yes," provide Manifest Number | | | SIGNATURE | SIGNATURE Authorized cenner acknowledging waste receipt | ging waste rece | iot | DATE | 7/10 | ON WELVELD SIGNATURE | PURE POSOPOL PUSSIFEE | TITLE TOTAL | V | DATE 24 SAN CI |
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID rumber, and any additional information | | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | | 15. INDIVIDUAL RADIONUCLIDES | | . TOTAL | 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, excepted package-limited quantity of material, 7, UN2910 | utity of | NA | NA NA | Solid /NA | 2 | | H-3 Sr-90 | 06 | 2.3510E-01 | 6.3540E-03 | Ϋ́ | 245, LBS; 7.35 FT3 | 600 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | tity of | NA | Α <u>γ</u> | Solid INA | 74 | | | 06 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 010 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | tity of | . AM | ΑM | Solid INA | C-14 | | H-3 Sr-90 | 06 | 2.3510E-01 | 6.3540E-03 | ¥ | 245. LBS; 7.35 FT3 | 013 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | rtity of | NA | ₹ | Solid INA | ပဲ | C-14 H | H-3 Sr-90 | 8 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 017 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | tity of | NA | Ą | Solid /NA | ડે_ | C-14 H | H-3 Sr-90 | 06 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 019 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | itity of | NA | ≨ | Solid /NA | ა | C-14 # | H-3 Sr-90 | 06 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 021 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | of the | NA | ¥. | Solid /NA | <u>ن</u> | C-14 | H-3 Sr-90 | 06 | 2.3510E-01 | 6.3540E-03 | NA NA | 245. LBS; 7.35 FT3 | 023 |
| Radloactive material, excepted package-limited quantity of material, 7, UN2910 | tity of | . NA | NA | Solid /NA | ა | C-14 H | H-3 Sr-90 | 06 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 025 |
| FOR CONSIGNEE USE ONLY | 11 | Record Waste Description Inadequate Contamination or Leakage Detected | iption Inade akage Dete | ÿ, | TERMS AND CONDITION A. HAZARDOUS MA' hazardous waste, cartification as req | KTION JS MATERIA Vaste, this st as required | AND CONDITION HAZARDOUS MATERIALS. Generator re hazardous waste, this stripment is also ac certification as required by 40 GFR 268.1. | spresents & warran companied by a se | ts that Waste Materia perate and completed | hazardous waste ma | is not a hazardous was itest, along with the aç | AND CONDITION HAZARODUS WANTERNLS, Generator represents & warrans that Waste Material is forj — is not a hazardous waste as defined in 40 CFR 291. Where the material is a hazardous waste, this stepreptiate is and comparied by a separate and compileded hazardous waste marifest, along with the appropriate land-disposal restriction notice and/or centification as required by 40 CFR 293.1. | Where the material intition notice and/or |
| | 1 | Unexpected Exposure Rates Detected | e Rates De | itected 8. | TITLE: Upo representatè | n acceptano ons herein s | e at the disposal hall thereupon to | ske by Envinceare ansfer from Genera | of Utah, knc., and all a lor and be vested in E | spropriate regulatory invirocare of Utah, Inc | authorities, title to the \ | TITLE. Upon acceptance at the disposal site by Envirocare of Utah, knc., and all appropriate regulatory authorities, title to the Waste Malanial which conforms to Generator's representations herein shall bereaupon trensfer from Generator and be vested in Envirocare of Utah, Inc. | ms to Generator's |
| | | Labers, mannings, etc. inadequate Container Integrity Inadequate | . inauequa adequate | o o | WASTE MA | TERIAL: Ge and in accor | merator represei dence with all ap | ifs and warrants the plicable governmen | t all data set forth in t ital laws, rules, regule | his (UNIFORM LOW- | EVEL RADIOACTIVE ' of Utah, Inc.'s facility lic | WASTE MATERIAL. Generator represents and warrants that all data set from in this (UNIFORM LOW-EVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, regulations and Envirocase of Utan, Inc.'s facility fromse. | is and correct in |
| | Other | Other | | á | INDEMNIFIC | CATIONE G | nerator agrees to | o indemnify Enviror te Material in confe | are of Utah, Inc., its c rm in all material resc | ficers, employees an | 1 agents against all loss | INDEMNIFICATION: Generator agrees to indemnity Envirocare of Utah, Inc., its officers, employees and agents against all losses and liability whatsoever if such losses or liability whatsoever if such losses or liability manuals from the feature of the Mean Maderial to environment in the date envolved not the it INDEMNI TOTEL RABILITATION WASTE | if such losses or |

| | | | | | | | | | | I | |
|--|-----------------------------------|---------------------------|---|--------------|--------|------------------------------------|------------|--|--------------------------|--|---|
| FORM 640A | • | | | | | | | Envi | Envirocare of Utah, Inc. | တ် | MANIFEST NUMBER (Use this number on all continuation pages) |
| | | | ORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST | DIOACT | ME | | | | | 4032-0 | -004 |
| | | SHIS | PPING PAPER (CONTINUATION) | NUATIC | S | | | | | PAGE 2 OF | F 7 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 | <u> </u> | RADII | 15, INDIVIDUAL RADIONUCLIDES | TOTAL PAC | 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, excepted package-limited quantity of material, 7, UN2910 | ¥ | ¥ | Solid MA | 24.7 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA A | 245. LBS; 7.35 FT3 | 027 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 27.4 | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA A | 246. LBS; 7.35 FT3 | 028 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ¥ | Solid /NA | 2-14 4-14 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245, LBS; 7.35 FT3 | 029 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 24 | £3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA NA | 245. LBS; 7.35 FT3 | 035 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΑN | Solid /NA | <u>?</u> | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | A A | 245. LBS; 7.35 | 036 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | W | ΨN | Solid /NA | 5.7 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545, LBS; 7.35 FT3 | 039 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | A. | ¥ | Solid /NA | 2-7- 4-7- | H-3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 040 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | Ā | Solid /NA | <u>2</u> | ₹ ¥ | Sr-90 | 1.1759E-01 | 3.1780E-03 | AN A | 145. LBS; 7.35 FT3 | 041 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | WA | ≨ | Solid MA | 5.7 | H3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | AN A | 245. LBS; 7.35 FT3 | 042 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΑĀ | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA A | 145. LBS; 7.35 FT3 | 046 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | <u>2</u> | £ | Sr-90 | 1.1759E-01 | 3.1780E-03 | AN AN | 145. LBS; 7.35 FT3 | 047 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 7. | £ | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA A | 145. LBS; 7.35 FT3 | 048 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ¥ | Solid MA | 74 | ? ¥ | Sr-90 | 1.1759E-01 | 3.1780E-03 | AN A | 145. LBS; 7.35 FT3 | 049 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | δ. | Solid MA | C-14 | £3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 050 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ą | Solid INA | 2 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | 345. LBS; 7.35 | 051 |
| Radioactive material, excepted package-limited quantity of meterial, 7, UN2910 | NA | ≨ | Solid /NA | 7.7 | H-3 | Sr-90 | 2.3510E-01 | 8.3540E-03 | NA | 245. LBS; 7.35 | 057 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | C-14 | H.3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 | 090 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | MA | ¥ | Solid /NA | 45 | £ | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS: 7.35 | 680 |

| FORM 540A | | | | | | | | Enviro | Envirocare of Utah, Inc. | 8 | MANIFEST NUMBER (Use this number on all continuation |
|--|-----------------------------------|---------------------------|--|-----------------|-----------------|-------------------------------------|------------|--|--------------------------|--|---|
| | | . UNIF | ORM | IOACTI | m | | | | | 4032-01-001 | 100 |
| | | HS | WASTE MANIFEST PPING PAPER (CONTINUATION) | IUATION | ~ | | | | | PAGE 3 OF | 7 PAGES |
| 11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN D number, and any additional information | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | INDIV RADION | 15. Individual Radioniyclides | TOTAL PACH | 16. FOTAL PACKAGE ACTIVITY MBq mCl | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid INA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | ¥ | 646, LBS; 7.35 FT3 | 060 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA A | Solid /NA | 0-14 4-1 | H3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 091 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid MA | 5.7 4 | £3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | ¥ | 645. LBS; 7.35 FT3 | 092 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 4 | ¥ | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA. | 645. LBS; 7.35 FT3 | 095 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | C-14 | £3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 960 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | AN A | ¥ | Solid /NA | <u>2</u> | £ | Sr-90 | 3,5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 114 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥. | ≨ | Solid /NA | <u>2</u> | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 115 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ≨ | Solid /NA | 7.7 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7,35 FT3 | 120 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | ¥ | Solid /NA | 4.2 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA A | 345. LBS; 7.35 FT3 | 121 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | \$ | Solid /NA | <u>2</u> | r X | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥ | 345. LBS; 7.35 FT3 | 127 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ₹ | Solid /NA | <u>7</u> | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 135 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | Ā | ₹ | Solid /NA | 4.7 | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | Ψ _N | 345. LBS; 7.35 FT3 | 136 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid /NA | 7- 4- | ? X | Sr-90 | 3.5224E-01 | 9.5200E-03 | ¥ | 345. LBS; 7.35 FT3 | 137 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid /NA | 4 | ? ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA NA | 345. LBS; 7.35 FT3 | 138 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | A. | ≨ | Solid /NA | C-14 | ž | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 146 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ¥ | Solid /NA | 24 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 147 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | N. | Solid /NA | 1 -7 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 148 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ν | Solid /NA | C-14 | ကူ ± | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 149 |
| FORM 540A (10-96) | | | | | | | | | | | |

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| FORM \$40A | | | | | | | | Envir | Envirocare of Utah, Inc. | 8 | BER on all motivisation |
|--|-----------------------------------|---------------------------|--------------------------------------|------------|--------------------------|------------------------------------|------------|--|--------------------------|--|---|
| | | UNIF | UNIFORM LOW-LEVEL RADIOACTIVE | DACTIVI | Ш | | | | | (Use this number pages) 4032-01- | (Use this number on an expursation pages) 4032-01-001 |
| | | | WASTE MANIFEST | | Ì | | | ٠. | | | |
| | | SE SE | Ž | JATION | _ | | | | | PAGE 4 OF | 7 PAGES |
| 11. U.S. DEPARTAENT OF TRANSPORTATION DESCRIPTION (Including proper thipping name, hezard cless UN ID number, and any additional information | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | 1! INDIVIE RADIONU | 15. Individual Radionuglides | TOTAL PAC | 18. TOTAL PACKAGE ACTIVITY MBq mCi | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid MA | 2-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 160 |
| | NA V | ≸ | Solid MA | 41-0 | £3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | , VA | 345. LBS; 7.35 FT3 | 164 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid MA | C-14 | H3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 165 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ą | Solid /NA | 24.7 | £3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 166 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid MA | 2- 2- | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA A | 345, LBS; 7.35 FT3 | 169 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ą | Solid MA | 7. | ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 346. LBS; 7.35 FT3 | 175 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | 7. | H.3 | Sr-30 | 1.1759E-01 | 3.1780E-03 | NA | 146. LBS; 7.35 FT3 | 180 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | 24 24 | ÷ | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 186 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | WA | ¥ | Solid MA | <u>?</u> | £ | Sr-90 | 5.8608E-01 | 1.5840E-02 | AN A | 545. LBS; 7.35 FT3 | 187 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | WA | ¥N | Solid /NA | 4 | ? | Sr-90 | 3.5224E-01 | 9.5200E-03 | AM | 345, LBS; 7.35 FT3 | 188 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥. | NA | Solid /NA | C-14 | £ | Sr-90 | 3.5224E-01 | 9.5200E-03 | AM | 345. LBS; 7.35 FT3 | 190 |
| Radioactive material, excepted package-limited quamtity of material, 7, UN2910 | NA NA | NA | Solid /NA | 7- 4- | ? | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 191 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid INA | C-14 | ? | Sr-90 | 7.0448E-01 | 1.9040E-02 | ΑN | 645. LBS; 7.35 FT3 | 193 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | AA | ≸ | Solid INA | 7- 4- | ĩ | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.35 FT3 | 196 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | WA | NA | Solid /NA | 24 44 | £ | Sr-90 | 7.0448E-01 | 1.9040E-02 | AN | 645. LBS; 7.35 FT3 | 197 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2810 | NA | AM. | Solid INA | 2 <u>7</u> | £ | Sr-90 | 7.0448E-01 | 1.9040E-02 | AN | 645. LBS; 7.35 FT3 | 201 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-33 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 202 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA NA | Solid /NA | C-14 | £ | Sr-90 | 7.0448E-01 | 1.9040E-02 | WA | 646. LBS; 7.35 FT3 | 203 |
| FORM 540A (10-96) | | | | | | | | | | | |

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UNIFORM LOW-LEVEL RADIOACTIVE

WASTE MANIFEST SHIPPING PAPER (CONTINUATION) Envirocare of Utah, Inc.

MANIFEST NUMBER
(Use this number on all continuation pages)
4032-01-001

5 OF 7 PAGE

| | | SHIF | PPING PAPER (CONT | NUATION | l) | | | | | PAGE 5 0 | F 7 PAGES |
|--|-----------------------------------|---------------------------|--------------------------------------|---------|-------------|-------------------------------|------------------|------------------------------|-------------------------|--|--|
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any editional information | 12. DOT LABEL "RADIOACTIVE" | 13, TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | INI RADI | 15. DIVIDUAL KONUCLIDES | TOTAL PAG MBq | 16. CKAGE ACTIVITY MCI | 17. LSA/SCO CLASS | 18, TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA · | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 209 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | Н-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 211 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7,0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 212 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA · | 645. LBS; 7.35 FT3 | 214 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA . | 345. LBS; 7.35 FT3 | 218 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 220 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.35 FT3 | 222 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 223 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | Н-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 226 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 227 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 229 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 230 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645. LBS; 7.35 FT3 | 231 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 234 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 7.0448E-01 | 1.9040E-02 | NA | 645, LBS; 7.35 FT3 | 235 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 239 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | н-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 242 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | н-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 245 |

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FORM 540A

| TOKE SADA | | | | | ٠. | | | Envi | Envirocare of Utah, Inc. | ಹ | MANIFEST NUMBER (Use this number on all continuation |
|--|-----------------------------------|---------------------------|---|-----------|----------------|------------------------------------|------------|--------------------------------------|--------------------------|-------------------------------|---|
| | | | UNIFORM LOW-LEVEL RADIOACTIVE | MOACTIN | Щ آ | | | | | 4032-01 | -001 |
| | | SHIR | WAS I E MANIFES I PPING PAPER (CONTINUATION) | IUATION | ~ | | | | | PAGE 6 OF | 7 PAGES |
| 11. U.S. DEPARTMENT OF TRANSPORTATION OESCRIPTION (Including proper shipping name, hezard dass, UN ID number, and any additional information | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | INDIV | 15, INDIVIDIAL RADIONUCLIDES | TOTAL PA | 18. TOTAL PACKAGE ACTIVITY MBo | 17. LSA/SCO | 18, TOTAL WEIGHT OR VOLUME | 19. IDENTIFICATION NUMBER OF PACKAGE |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | AN AN | Solid INA | C-14 | 7 | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 | 247 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | Ą | Solid /NA | 574 | £ | Sr-90 | 1.1759E-01 | 3.1780E-03 | . NA: | 145. LBS; 7.35 - | 254 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | A. | Solid /NA | 47-7 | ¥3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445, LBS; 7.35 FT3 | 259 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | £ | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 260 |
| radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≸ | Solid /NA | 7 | Ŧ | Sr-90 | 5.8608E-01 | 1.5840E-02 | NA | 545. LBS; 7.35 FT3 | 261 |
| Kadioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥. | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 262 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | 24 | £ | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 263 |
| Kadioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA | Solid /NA | 2 | £ | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 265 |
| radioacive material, excepted package-limited quantity of material, 7, UN2910 | AN. | ¥ | Solid INA | <u>?</u> | ¥ | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | |
| radioaczive material, excepted package-limited quantity of material, 7, UN2910 | NA A | ≸ | Solid INA | 24 | ₹ ¥ | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 269 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ₹ | Solid /NA | 0-14 4 | £3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 | 270 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ≨ | Solid /NA | ₹ 4 | H3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 272 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ΝΑ | Solid /NA | 7- 4- | £3 | Sr-90 | 2.3510E-01 | 6.3540E-03 | NA | 245. LBS; 7.35 FT3 | 273 |
| Kadioactive material, excepted package-limited quantity of material, 7, UN2910 | ¥ | ¥ | Solid /NA | 2-4 | H.3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 280 |
| kadioactive material, excepted package-limited quantity of material, 7, UN2910 | AA A | ş | Solid INA | 47 | E? | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 285 |
| | ≨. | ≨ | Solid /NA | C-14 | ? | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 299 |
| kadioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | ¥ | Solid INA | C-14 | es H | Sr-90 | 3.5224E-01 | 9.5200E-03 | NA | 345. LBS; 7.35 FT3 | 300 |
| radioacuye material, excepted package-imited quantity of material, 7, UN2910 | A | <u> </u> | Solid /NA | C-14 | K.3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | ¥ | 445. LBS; 7.35 | 301 |

FORM 540A

UNIFORM LOW-LEVEL RADIOACTIVE

WASTE MANIFEST

SHIPPING PAPER (CONTINUATION)

Envirocare of Utah, Inc.

UNIFORM LOW-LEVEL RADIOACTIVE

WASTE MANIFEST

SHIPPING PAPER (CONTINUATION)

Envirocare of Utah, Inc.

WANIFEST NUMBER
(Use plays a)

4032-01-001

PAGE 7 OF 7 PAGES

| U.S. DEPARTMENT OF TRÂNSPORTATION 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 | | IND RADIO | 15. MOUAL NUCLIDES | | 16. KAGE ACTIVITY mCl | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
|---|-----------------------------------|---------------------------|---|-------------|--------------|---------------------------------------|-------------|-----------------------------|-------------------------|--|--|
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA ` | Solid /NA | C-14 | H-3 | Sr-90 | 4.6953E-01 | 1.2690E-02 | NA | 445. LBS; 7.35 FT3 | 302 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA . | Solid /NA | C-14 | H-3 | Sr-90 | 2.3510E-01 | 8.3540E-03 | NA | 245. LBS; 7.35 FT3 | 304 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 305 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 306 |
| Radioactive material, excepted package-limited quantity of material, 7, UN2910 | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.1759E-01 | 3.1780E-03 | NA | 145. LBS; 7.35 FT3 | 309 |
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| EORM 5404 (10.06) | | | · ···································· | | ···· | · · · · · · · · · · · · · · · · · · · | | | | | |

FORM 540A (10-96)

| | | | | of Utah, Inc. | | E I | | 1, MANIFES | | | | | | 1 | MANIFEST N | ISADED | |
|--|---|---|---|--|--|--|---|--|--|---|--|---|--|--|---|--|--|
| | | | | | NUMBER O PACKAGES DISPOSAL | NET WASTE | NET WASTE | | SPECIAL NUCLE | AR MATERIA | L (grams) | T | | - ' | 4032-01-0 | | |
| ORM LOW-LI | | | ΠVE | | CONTAINE | 38 | WEIGHT kg 15467.76 | ·- U-233 | U-235 | | Pu | ļ | TOTAL | 3. | | | |
| | 11 1111 | | | | 103 | ft3 757.05 | | - ND | NP | | NP | 1 | NP | 4. | SHIPPER NA | ME | |
| | | | | | - | ALL MILCLEDGE | T | ACTIVITY | | | | 1 | | 1 1 | U.S. Army Co | rps Of Engin | ieers |
| r Regulatory Commis Disposal o | sion (NRC) f Radioactiv | Requirements ve Waste | for Control, | Transfer and | | | | | | | I-129 | s | SOURCE | | | | |
| • | | | | | | | | | | | | (kgs) | NA | 4 | | MBER | |
| DISPOSAL CON | TAINER DESC | RIPTION | | | mCi | 1.00202-00 | 1.5460E-01 | | | | | (tons) | NA | 4 | 4032-01-001 | | |
| 8. | 7. | R WASTE | | 40 011000 | | | | PTION | | | | | 15. RADIO | LOGICAL | DESCRIPTION | | 16.W |
| CONTAINER DESCRIPTION (See Note 1 & | VOLUME | AND CONTAINER WEIGHT | SURFACE RADIATION LEVEL | CONTAMIN MBo/100 | IATION Cm2 | WASTE DESCRIPTOR (See Note 2 | WASTE VOLUME(S) IN CONTAINER | SOLIDIFICATION OR STABILIZATION MEDIA | CHEMICAL FORM CHELATING AGEN | | | CON | /IDUAL RADIONUS | CLIDES A | IND ACTIVITY (ME | Bq) AND TIVITY | GA AS SI AU- |
| | (RG) | (ton) | msvinr mrem/hr | ALPHA | BETA- GAMMA | , | (FT3) | (000 11000 3) | | IF>0.1% | 040/01/12 | | | | | | B-C |
| 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | | C-14 | CLIDES | 1.0000 | 0E+01 | MBq 3.3559E-02 3.3559E-02 | 9.0700E-04 | AS |
| | 7,36 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Subtotal | | 5.0000 | 0E+01 | 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | ·I |
| | | | | | | | | | | | Total | | | | 2.3510E-01 | 6.3540E-03 | |
| | | , | | | | | | | | | | | | - 1 | | | |
| 4 | 0.21 | 111,13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 | | 1.00000 | 0E+01 | 3.3559E-02 3.3559E-02 | 9.0700E-04 9.0700E-04 | AS |
| | 7.36 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Subtotal | | 5.90000 | DE+01 | 1.6798E-01 2.3510E-01 | 4.5400E-03 6.3540E-03 | |
| | | | | | | | | | | | Total | | | | 2.3510E-01 | 6.3540E-03 | Γ |
| . 1 | | | | | | | | | | | | | | | | | |
| 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-11 | 0.20 | NA NA | NONE/NP | | C-14 H-3 | | 1.00000 | E+01 | 3.3559E-02 | 9.0700E-04 | AS |
| | 7.35 | 0.12 | ≪8.000E-03 | NP : | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | | 5.00000 | E+ŏt | 1.6798E-01 | 4.5400E-03 | |
| | | | | | | | | | | , | Total | | | | 2.3510E-01 | 6.3540E-03 | 一 |
| | | | | | | | | | | | | | | | | | |
| approved structural over- must be followed by "-OP." Demineralizer Description of the Components Hob futbority Container | A Go 8 int C En D Ro E Se | e one code as ma ondola semodal nd-dump olf-off | Description Co y be applicable | 20. 0 21. k 22. S 23. G 24. Q 25. A | harcoal Icinerator Ash oil ias iil queous Liquid | 29. Demoktion Rub 30. Cation Ion-exch 31. Anion Ion-exch 32. Mixed Sed Ion- 33. Contaminated E 34. Organic Llouid | ble 36 nange Media 35 ange Media 35 muchange Media 40 Equipment 41 (except oil) 42 | Evaporator Bottoms. Concentrates Compactible Trash Noncompactible Tra Animal Carcass Biological Material (- | /Siudges/ (Che | Dewatered Solid Combustib Non-comb | cable codes.) la uslible | 1 t t t t t t t t t t t t t t t t t t t | three which predo structural stability by "-S" and the ma in item 13. Code 1 Solidification 30. Cement | minate by requirent edia vend 100=NON | y volume.) For m nents, the numer for and brand nad E REQUIRED | edia meeting dis ical code must bi me must also be | posal e folio |
| | CONTAINER AND T Regulatory Commiss Disposal of DISPOSAL CON 8. CONTAINER DESCRIPTION (See Note 1 & Note 1A) 4 4 4 4 4 4 4 4 4 4 4 4 4 | CONTAINER AND WASTE D r Regulatory Commission (NRC) Disposal of Radioacti Disposal CONTAINER DESC 8. 7. CONTAINER DESCRIPTION (See Note 1 & (m3) (R3) 4 0.21 7.35 tion Codes. For containers/ 1 approved structural overnast be followed by "-OP" Deminaralizer 3. Gas Cylinder 1. Bulk, Unpackaged Weste 1. Bulk, Unpackaged Components 3. High Integrity Consision 1. Other. Describe in Item 6. | DISPOSAL CONTAINER DESCRIPTION G. 7. 8. WASTE AND CONTAINER DESCRIPTION CONTAINER DESCRIPTION (See Note 1 & (m3) (R3) (R3) (R3) (R3) (R3) (R3) 4 0.21 111.13 7.35 0.12 4 0.21 111.13 7.35 0.12 High respect service and overnage to followed by "-OP" Demineralize of followed by "-OP" Demineralize (Chroose one code as many containers) approved structural overnage to followed by "-OP" Demineralize (Chroose one code as many containers) and code (Chroose one code as many code (Chroose one code | CONTAINER AND WASTE DESCRIPTION r Regulatory Commission (NRC) Requirements for Control, Disposal of Radioactive Waste DISPOSAL CONTAINER DESCRIPTION 8. 7. 8. WASTE AND CONTAINER PLESCRIPTION CONTAINER DESCRIPTION GEORGIPTION (See Note 1 8. Note 1A) (R3) (R3) (L9) (L9) (L9) (L9) (L9) (L9) (L9) (L9 | CONTAINER AND WASTE DESCRIPTION r Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste OISPOSAL CONTAINER DESCRIPTION 8. 7. 8. WASTE AND SURFACE RADIATION LEVEL MEGIT LEVEL MEGIT ME | Table Tabl | 103 R3 757.05 | Transfer and Disposal of Radioactive Waste Transfer and Dispos | 103 R3 757.05 NO 17.05 NF ALTIVITY | 103 2757.05 001 17.05 NP NP NP NP NP NP NP NP | 103 13 757,05 100 17.05 NP NP NP NP NP NP NP NP NP NP NP NP NP | 103 33 757.05 9n 17.05 NP NP NP NP NP NP NP N | 103 20 757.05 5m 17.05 7. | 103 27.7.15 100 17.05 NP NP NP NP NP NP NP NP NP NP NP NP NP | 103 17.735 NP NP NP NP NP NP NP NP NP NP NP NP NP | 13 13 15 15 15 15 15 15 | 13.0 2 757.05 10.00 17.05 NP NP NP NP NP NP NP NP NP NP NP NP NP |

93. Vinyl Chlorida

94. Vinyl Ester Styrene 99. Other. Describe in item 13, or additional page 100. None Required.

FORM 541 (10-96)

| | | 16.WASTE CLASSIFI- | CATION AS-Class A Stable AU-Class A Unstable P-Class B | C-Class C | Ą | | | | AS | | | | SA. | | | St. | | | AS | |
|---|--|--------------------------------|--|---------------------------|--|------------|------------|---|--|------------|------------|-----------------------|---|------------|------------|---|------------|------------|---|------------|
| | MBER I PAGE(S) | |) AND VITY | щCi | 9.0700E-04 9.0700E-04 4.5400E-03 | 6.3540E-03 | 6.3540E-03 | | 2.2700E-03 2.2700E-03 1.1300E-02 | 1.5840E-02 | 1.5840E-02 | | 9.0700E-04 9.0700E-04 4.5400E-03 | | 6.3540E-03 | 9.0700E-04 9.0700E-04 4.5400E-03 | 6.3540E-03 | 6.3540E-03 | 9.0700E-04 9.0700E-04 4.5400E-03 | |
| | 2. MANIFEST NUMBER 4032-01-001 3. PAGE 2 OF 24 PAGE(S) | ESCRIPTION | ID ACTIVITY (MB: NER TOTAL ACTI E PERCENT | MBq | 3.3559E-02 3.3559E-02 1.6798E-01 | 2.3510E-01 | 2.3510E-01 | | 8.3990E-02 8.3990E-02 4.1810E-01 | 5.8608E-01 | 5.8608E-01 | , ,,,,,,,, | 3.3559E-02 3.3559E-02 1.6798E-01 | 2.3510E-01 | 2.3510E-01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 2.3510E-01 | 2.3510E-01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 2.3510E-01 |
| | બં છ | 15 PADIOLOGICAL DESCRIPTION | INDVIDUAL RADIONUCLIDES AND ACTIVITY (MBQ) AND CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | | <u> </u> | | | | 1.00000E+01 1.00000E+01 5.00000E+01 | | | | 1.00000E+01 1.00000E+01 5.00000E+01 | | | 1.00000E+01 1.00000E+01 5.00000E+01 | | | 1.00000E+01 1.00000E+01 5.00000E+01 | |
| | Envirocare of Utah, Inc. | ŧ | INDIVIDUAL P | | | • | | | | | | | | | | | | | | |
| | Ū | ONTAINER | | RADIONUCLIDES | C-14 Sr-90 | Subtotal | Total | | <u>유</u> 문 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 | Subtotal | Total | | 7.7.5.2.5.2.4.8.2.5.2.5.2.5.2.5.2.4.4.2.4.4.4.4.4.4.4.4 | Subtotal | Total | 7.7.8 5.24 8.54 | Subtotal | Total | 7.5% 5.5% 8.5% | Subtotal |
| | ٠. | TE TYPE INC | WEIGHT WEIGHT | F>0.1% | c. N | | | | å | | | | Ž | | | - ₹ | ! | | ž | |
| 4 | | N FOR EACH WASTE TYPE IN | CHEMICAL FORM % CHELATING AGENT CHELATING | | NONENP | | | | NONEINP | | | | NONE/NP | | | NONEINP | | | NONE/NP | |
| | , · ! | ASTE DESCRIPTION | 12. APROXIMATE 13. WASTE SOLIDIFICATION VOLUME(S) IN OR STABILIZATION CONTAINER MEDIA (ms) | (c arow age) | NA NA | | | | NA | | | | NA | | | AM A | | | ¥ | |
| | ш | WOLL Describe | 2 APPROXIMATE 1 WASTE VOLUME(S) IN C CONTAINER (m3) | (FT3) | 0.20 | 7.35 | | | 0.20 | 7.35 | | | 0.20 | 7.36 | | 0.20 | 7.35 | | 0.20 | 7.35 |
| | RADIOACTIVE IFEST | CRIPTION (CONTINUATION) | 11. WASTE DESCRIPTOR (See Note 2 | & NOTE CA) | 39,29-H | | | | 29,39,L-HL | | | l | 39,29-Н | <u> </u> | | 38,28-H | | | 78,29-H | |
| | EVEL RADI | N. N. | ATION Particular Sand | BETA- GAMMA | ş | 2.0000E+02 | | | 3.3400E-08 | 2.0000E+02 | | | 3.3400E-06 | 2.0000E+02 | | 3.3400E-08 | Z.0000E+02 | | 3,3400E.06 | 2.0000E+02 |
| · | LOW-LEVE WASTE MA | ANIMASI | 10. SURFACE CONTAMINATION MBd/100 cm2, dpm/100 cm2 | ALPHA | ę. | . X | | | ďN | 2 | | | ďN | ď | | ď | ₽ | | g. | S. |
| | UNIFORM LOW-LEVE WASTE MA | CONTAINER AND WAS IT DES | 9. SURFACE RADIATION LEVEL | mSv/hr | <8,0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 |
| | מׁ ` | | 8. WASTE AND CONTAINER WEIGHT | (kg) | 111.13 | 0.12 | | | 247.21 | 0.27 | | | 111.13 | 0.12 | | 111.13 | 0.12 | | 111.13 | 0.12 |
| | | DISPOSAL CONTAINER DESCRIPTION | ш | (E) | 0.21 | 7.35 | | | 0.21 | 7.36 | | | 12'0 | 7.38 | | 0.21 | 7.35 | | 0.21 | 7.35 |
| | · | DISPOSAL CON | GONTAINER DESCRIPTION | (See Note 1A) | 4 | | | | 4 | | | | 4 | | | 4 | | | | |
| • | FORM 641A | | S. CONTAINER IDENTIFICATION . NUMBER / | GENERATOR ID NUMBER(S) | 1771 | | | - | 018/1 | | | | 021/1 | | | 1,120 | | | 1,520 | |

| | | | | UNIFORM LOW-LEVE | I LOW-LEVE | J 2 | L RADIOAC IIVE Nieest | ม ≥ | | | | Envirocare of Utan, Inc. | | 2. MANIFEST NUMBER 4032-01-001 | IUMBER 01 | |
|--|---|--------------------------------|------------------------------------|--------------------------|------------|--------------------------|--|---|---|--------------------------------------|--------------------------|--------------------------|--|---|--------------------------|--|
| | ; | | | CONTAINED AND WASTE DESC | AND WAS | | TENOS, | · | | : | ٠ | | | 3. PAGE 3 OF 24 PAGE(S) | 24 PAGE(S) | |
| | DISPOSALCO | DISPOSAL CONTAINER DESCRIPTION | | | | | | NO. | WASTE DESCRIP | ION FOR EACH WASTE TYPE IN CONTAINER | E TYPE IN CC | NTAINER | | | | 16.WAST |
| ď | 9 | | a WARTE | , | 44 | | | PHYSICAL DESCR | PTION | | SCRIPTION | | S. RADIOLOGIC | RADIOLOGICAL DESCRIPTION | | CLASSI |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | VOLUME (m3) | AND CONTAINER WEIGHT (kg) | " ທ ∝ | 등록 원호 누 | NATION Ocor2. Jen2 | WASTE DESCRIPTOR (See Note 2 & Note 24) | 12 APPROXIMATE 13 WASTE SOLDIFICATION VOLLME(S) IN OR STABILIZATION (CONTAINER MEDIA CONTAINER MEDIA (See Nois 3) | 13. SOLDIFICATION OR STABILIZATION MEDIA (See Note 3) | N CHEMICAL FORW CHELATING AGENT | WEIGHT % CHELATING AGENT | (INDIVIDIAL CONTAINEF | RADIONUCLIDE 1 TOTAL: OR CO AND RADIONUC | INDIVIDUAL RADIONUCI. IDES AND ACTIVITY (MBG) AND CONTAINER TOTAL. OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | | CA IION AS-Class A Stable AU-Class A Unstable B-Class B |
| | - | | (ton) | momunic | ALPHA | GAMMA | | | | | W. 1.78 | RADIONICLIDES | acilian. | MBG | 500 | 3 |
| | | | | | | | | | | · | | Total | | 2.3510E-01 | 18 | |
| 027H | 4 | 1Z*0 | 111.13 | <8.0000E-05 | ď | 3.3400E-06 | 39,29-H | 0,20 | NA | NONE/NP | | C-14 H-3 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 | AS. |
| | | 7.35 | 0.12 | <8.000E-03 | ğ | 2.0000E+02 | | 7,36 | , | | ₽ | Sr-90 Subtotal | 5.00000E+C | | | |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | - | | | | | | | |
| 028/1 | 4 | 0.21 | 111,13 | <8.0000E-05 | ₽ | 3.3400E-06 | 39,29-H | 0.20 | NA | NONEMP | | FC-14 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 9.0700E-04 | SA . |
| | • | 7.35 | 0.12 | <8.000E-03 | ₽. | 2.0000E+02 | | 7,38 | | | £ | Sr-90 Subtotal | 5.00000E+C | | | |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | · | | | | | | | |
| 029/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | 욮 | 3.3400E-06 | 39,29-H | 0250 | NA NA | NONENP | - | C-14 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | ď | 2,00002+02 | | 7.35 | | | ž | Subtotal | 9-700000E- | | | |
| | | | | | | | | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| | | | | | | | | | | | | , | | | | |
| 1/5t0 | * | 624 | 111.13 | <8.0000E-05 | ş | 3.3400E-06 | 39,29-Н | 0.20 | Ā | MONEMP | | C-14 H-3 | 1.00000E+01 | 3.3559E-02 | 9.0700E-04 9.0700E-04 | S. |
| | | 7.35 | 0.12 | <8.000E-03 | ž | 2.0000E+02 | | 7,36 | | | 2 | Subtotal | 3.00000E=0 | | | |
| | | : | | | | | , | | | | | Total | | 2.3510E-01 | 6.3540E-03 | ! |
| | _ | _ | | | | | | | | | _ | | | | | |

| Company Comp | FORM 541A | | | | NIFORM | LOW-L | EVEL R | UNIFORM LOW-LEVEL RADIOACTIVE | Æ | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER 4032-01-001 | MBER | |
|--|--------------|-------------|--------------|--|-----------|---|-----------------|------------------------------------|---|--|----------------------------------|-------------------------|--------------------------------------|--|--|--|---|
| Company Comp | | | | | | WASTE | MANIF | EST | | | | • | | б | PAGE 4 OF 24 | _ | |
| Company Comp | | DISPOSALCOM | TAINER DESCR | | CONTAINER | AND WAST | H DESCH | TION (CONTINE | | WASTE DESCRIPTION | FOR EACH WASTE | TYPE IN CON | | | | | WASTE |
| Company Comp | | | | | | | | | PHYSICAL DESCRIF | TION | 14. CHEMICAL DESC | RIPTION | , | RADIOLOGICAL I | DESCRIPTION | | - LOSSES |
| Montange | | | | 8. WASTE AND CONTAINER WEIGHT | | 10. SURFA CONTAMIN MB0/100 dpm/100 | LATION Long. | WASTE DESCRIPTOR (See Note 2 | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | CHEMICAL FORM HELATING AGENTO | WEIGHT % HELATING AGENT | ENDIVIDUAL RAI CONTAINER TO AN | DIONUCLIDES A OTAL; OR CONTA 4D RADIONUCLE | NO ACTIVITY (MBOINER TOTAL ACTI | | Stable Stable VI-Class A Unstable B-Class B |
| Time | ID NUMBER(S) | Note 1A) | (£3) | (kg) | mSvftr | - | BETA- | Ŷ. | (FT3) | | | IF>0.1% | DIGNUCLIDES | pCi/pm | MBq | ЩC | C-Class C |
| The column The | 036M | 4 | 0.21 | 111.13 | | | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | | | 1.00000E+01 1.00000E+01 5.00000E+01 | 3.3559E-02 3.3559E-02 1.6798E-01 | 9.0700E-04 9.0700E-04 4.5400E-03 | SA. |
| 1 | | | 20,7 | 0.12 | | | 2.0000E+02 | | 7.35 | | • | | 153 | | 2.3510E-01 | 6.3640E-03 | |
| Columbia | | | | | | | | | | | | <u> </u> | otal | | 2.3510E-01 | 6.3540E-03 | |
| 1.00000E-01 1.0000E-01 1.00000E-01 1.00000E-01 1.00000E-01 1.00000E-01 1.00000E-01 1.0000E-01 1.00000E-01 1.0000E-01 1.0 | | | | | | | | | | | | ··· .~~ | | | | | |
| Total Colored Colore | | 4 | 12.0 | | | <u>₽</u> | 3.3400E-06 | 29,39-H | 0,20 | ¥ | NONENP | | | 1.00000E+01 1.00000E+01 5.00000E+01 | 8.3990E-02 8.3990E-02 4,1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| Color Colo | | | 7.38 | | L | | 2.0000E+02 | | 7.35 | | | | <u>13</u> | | 5.8608E-01 | 1.5840E-02 | |
| 4 0 21 11.11 GLOODE-01 NP 3.300E-04 | | , | | | | | | | | | | <u> </u> | otal | | 5.8608E-01 | 1.5840E-02 | |
| 1,00000E-40 | | | | | | | | | | | | ,,= | • | | | | |
| Total Consistence Total Consistence Total Consistence Total Consistence Consistence Total Consistence Co | 040/1 | 4 | 0.21 | 111.13 | | ₽ | 3.3400E-06 | 38,29-H | 0.20 | ¥ | NONE/NP | | | 1.00000E+01 | 1 | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| 4 0.27 6.6.77 6.000 CE-01 1.77 6.25 CE-03 1.24 0.0 | | | 7.35 | | | | 2.0000E+02 | | 7.36 | | | | | | | 6.3540E-03 | |
| 4 0.21 6.57 4.5400E-04 1.0000E+01 1.6738E-02 4.5400E-04 1.0000E+01 1.6738E-02 4.5400E-04 1.0000E+01 1.6738E-02 4.5400E-04 1.0000E+01 1.6738E-02 4.5400E-04 1.0000E+01 1.6738E-02 4.5400E-04 1.6738E-04 | | | | | | | | | | | | | otal | | 2.3510E-01 | 6.3540E-03 | |
| 4 0.27 64.000E+01 16738E+02 45400E+04 10000E+01 16738E+02 45400E+04 10000E+01 16738E+02 45400E+04 10000E+01 16738E+02 45400E+04 10000E+01 16738E+02 45400E+04 1270E+0 | | | | | | | | | | | | | | | | | |
| 4 6.24 C.44 1.1759E-01 3.1780E-03 | 041/1 | 4 | 12°0 | | | ďN | 3.3400E-06 | +88 | 0.20 | N.A | NONE/NP | | | 1.00000E+01 1.00000E+01 5.00000E+01 | 3 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| 4 0.21 - 111.13 GARDELOS NP 34.2941 0.20 MA NONEMP NP SF-90 5.00000E+01 3.3559E-02 9.0700E-04 1.3759E-01 1.375 | | | 7.35 | • | | | 2.0000E+02 | | 7.36 | | | | E | | | 3.1780E-03 | ! |
| 4 0.21 - 111.13 GADDE-05 NP 33.294 0.20 NA NONEMP C-74 1.00000E+01 3.359E-02 9.0700E-04 1.00000E+01 3.359E-02 9.0700E-04 1.00000E+01 3.359E-02 9.0700E-04 1.00000E+01 1.679E-01 | | | | | | | | | | | | | otal | | 1.1759E-01 | 3.1780E-03 | |
| 4 6.21 - 111.13 GAGODE-06 NP 33,294 0.20 NA NONEMP (C-14 1.00000E+01 3.359E-02 9.0700E-04 1.00000E+01 1.0000E+01 1.0000E+01 1.00000E+01 1.0000E+ | | | · | | | | | | , | | | | | | | | |
| 0.12 <8,000E-03 NP 2,000E+02 7.35 Subtotal 2,3510E-01 | 042/1 | 4 | 0.21 | , | | ğ | 3.3400E-08 | 39,29-H | 0.20 | NA | NONEMP | | | 1.00000E+01 1.00000E+01 5.00000E+01 | | 9.0700E-04 9.0700E-04 4.5400E-03 | AS |
| | | | 7.35 | | | | 2,0000E+02 | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | |

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UNIFORM LOW-LEVEL RADIOACTIVE

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| | | • | | | WAST | E MAN | FEST | | | | | | ļ- | 4032-01-00 | <u> </u> | |
|---|--|----------------|---|---------------|-------------------|---|---|---|---|---|--------|----------------------------------|---|--|--|--|
| | DISTORAL PRO | NTAINER DESC | PIRTIAN | CONTAINE | | | PTION (CONTIN | UATION) | | | | •• | | 3. PAGE 5 OF 2 | 4 PAGE(S) | |
| S. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (h3) | 8. WASTE AND CONTAINER WEIGHT (kg) (ton) | 9. SURFACE | 10. SUR CONTAI | FACE MINATION 100 cm2 00 cm2 BETA- GAMMA | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF THE PHYSICAL DESCRIPTION OF T | 13. SOLIDIFICATION OR STABILIZATION | ON FOR EACH WAS 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL CONTAINER | . RADIONUCLI R TOTAL; OR (AND RADION | GICAL DESCRIPTION IDES AND ACTIVITY (ME CONTAINER TOTAL ACT NUCLIDE PERCENT | IIVITY | 16.W/ CLAS CAT AS-C Sta AU-C Un: B-CI C-CI |
| | | | | | | , | | | | | | Total | pCi/gm | 2.3510E-01 | 6.3540E-03 | - |
| 148/1 | | 0.21 7.35 | 65.77 9.07 | | NP NP | 3.3400E-06 2.0000E+02 | 39-H | 0.20 . 7.35 | NA | NONEINP | NP | C-14 H-3 Sr-90 Subtotal | 1.00000E 1.00000E 5.00000E | +01 1.6798E-02 +01 1.6798E-02 +01 8.3990E-02 1.1759E-01 | 4.5400E-04 4.5400E-04 2.2700E-03 3.1780E-03 | |
| | | : | | | | | | | | | | Total | | 1.1759E-01 | 3.1780E-03 | ╬ |
| | 4 | 0.21 7.36 | 65.77 0.07 | | NP NP | 3,3400E-06 2,0000E+02 | 39-11 | 0.20 7.36 | NA | NONE/NP | 1 1 | C-14 H-3 Sr-90 Subtotal | 1.00000E 1.00000E 5.00000E | +01 1.6798E-02 +01 8.3990E-02 | | -1 |
| | · · · · · · · · · · · · · · · · · · · | | | | | | | | | | | Total | | 1.1759E-01 1.1759E-01 | 3.1780E-03 3.1780E-03 | + |
| 48/1 | 4 | 0.21 | 65.77 | <8,0000E-05 | NP | 3,3400E-06 | 39-H | 0.20 | NA . | NONEMP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 1.6798E-02 +01 1.6798E-02 +01 8.3990E-02 | A SANNE-NA | AS |
| | | 7.35 | 0.07 | <8.000E-03 | NP | 2.000015492 | | 7.35 | | | | Subtotal Total | | 1.1759E-01 | 3.1780E-03 3.1780E-03 | - |
| M9/1 | 4 | 0,21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-H | | NA NA | NONE/NP | | C-14 | 1.00000E | +01 1.6798E-02 | | |
| | | 7.35 | 0.07 | | NP | 2.0000E+02 | | 7.35 | | | | H-3 Sr-90 Subtotal | 1.00000E | · | 4.5400E-04 4.5400E-04 2.2700E-03 3.1780E-03 | -1 |
| | | | | | | | : | | | | | Total | | 1.1759E-01 | 3.1780E-03 | |



UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| | | | | | | e Manii | | | | | | 14 | 3. PAGE | 6 OF 24 P | AGE(S) | |
|--|---|-------------------------------|--|--|---------------------------------------|-----------------------------|---|---|-------------------|-----------------------------------|--|-------------------------------------|--|-------------------------------------|--|--|
| | DISPOSAL COL | NTAINER DESCI | RIPTION | CONTAINE | R AND WAS | TE DESCRI | PTION (CONTINI | IATION) | WASTE DESCRIPTION | ON FOR EACH WAS | E TYPE IN C | ONTAINER | | | · · · · · | 16.WASTE |
| | | | | | | | | PHYSICAL DESCRI | PTION | 14. CHEMICAL DE | SCRIPTION | 15. RAD | NOLOGICAL DESCR | UPTION | | CLASSIFI- CATION |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | G. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL <u>mSv/hr</u> | 10. SURF CONTAN MBo/1 dpm/10 | INATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (F13) | SOLIDIFICATION | CHEMICAL FORM/ CHELATING AGENT | WEIGHT % CHELATING AGENT IF>0.1% | CONTAINER TOTA AND R | NUCLIDES AND AC L; OR CONTAINER T RADIONUCLIDE PER | TOTAL ÁCTIVI ICENT | ſΥ | CATION AS-Class A Stable AU-Class A Unstable 8-Class B C-Class C |
| 050/1 | 4 | - | (100) | mrem/hr | 7 | GAMMA | 39-H | 1 | NA NA | NONE/NP | | C-14 1.00 | 0000E+01 1.67 | 798E-02 4 | mCi .5400E-04 | AS |
| | | 0.21 | 65.77 | <8.0000€-05 | NP | 3.3400E-08 | | 0.20 | | | NP | H-3 1.00 Sr-90 5.00 | 0000E+01 1.67 | 798E-02 4 990E-02 2 | .5400E-04 .2700E-03 | |
| | | 7.35 | 0.07 | <8.000E-03 | NP | 2,0000E+02 | • | 7.35 | | | | Subtotal | ì | | .1780E-03 | |
| | | | | | | | | | | | | Total | | | .1780E-03 | |
| | | | | | | | | | | | | | | | | |
| 051/1 | 4 | 0.21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29,L-HL | 0.20 | NA | NONE/NP | NP | C-14 1.00 H-3 1.00 Sr-90 5.00 | 0000E+01 5.03 0000E+01 5.03 0000E+01 2.51 | 320E-02l 1 | .3600E-03 .3600E-03 .8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | | .5200E-03 | |
| | | | | | | | · | |] | | | Total | | | .5200E-03 | |
| | | | | | | | | | | | | | | | | |
| 057/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-08 | 39,29-H | 0.20 | NA | NONEMP | NP | ÍH-3 1.00 | 0000E+01 3.35 | 559E-02 9 | .0700E-04 .0700E-04 .5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | ΝР | 2.0000E+02 | | 7.35 | | | | Subtotal | | | .3540E-03 | |
| | | | | | | | | |] | | | Total | | | .3540E-03 | |
| | | | | | | | | | | | | | | | | |
| 060/1 | ^ | 0.21 | 111.13 | <8.0000E-05 | NP- | 3.3400E-06 | 39,29-H | 0,20 | NA. | NONEMP | NP | C-14 1.00 H-3 1.00 Sr-90 5.00 | 0000E+01 3.3! 0000E+01 3.3! 0000E+01 1.6 | 559E-02 9 559E-02 9 798E-01 4 | 1.0700E-04 1.0700E-04 1.5400E-03 | AS |
| | | 7,35 | 0.12 | <8.000E-03 | . NP | 2.0000E+02 | | . 7.35 | | | | Subtotal | | | .3540E-03 | |
| | | | | | | | | |] | | | Total | | | 3.3540E-03 | |
| | | | | | | | | | | | | | 2005-04-2-2 | 5505 00 5 | 0700F 01 | |
| 089/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-08 | 39,29-11 | 0.20 | NA . | NONE/NP | NP | H-3 1.00 | 0000E+01 3.35 | 559E-02 9 |).0700E-04).0700E-04 J.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | 2.35 | 510E-01 6 | .3540E-03 | |

FORM 541A (10-96)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| | DISPOSAL CON | | | | | E MANII | | • | | | | | 1 | | | |
|--|--|-------------------------------|---------------------------------------|---|---------------------------------------|--------------------------------------|---|--------------------------|---|------------------|-------------|-------------------------------------|----------------------------------|---|--|---|
| | DISPOSAL CON | | | CONTAINE | R AND WAS | TE DESCRI | PTION (CONTINI | IATION | | | | •• | - 1 | 3. PAGE 7 OF 24 | PAGE(S) | |
| | 0101 001 0011 | TAINER DESCR | RIPTION | | | | | | WASTE DESCRIPTION | ON FOR EACH WAST | E TYPE IN C | ONTAINER | | · · · · · · · · · · · · · · · · · · · | | 16.WAS |
| , | | | | | | | • | PHYSICAL DESCRI | | 14. CHEMICAL DE | SCRIPTION | | RADIOLOGI | ICAL DESCRIPTION | | 1 CLAS |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL <u>MSVAY</u> | 10. SURI CONTAN MBO/1 dpm/10 | INATION 00 cm2 10 cm2 BETA- | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT | INDIVIDUAL RA CONTAINER TI AI | ADIONUCLE OTAL; OR C | DES AND ACTIVITY (MB CONTAINER TOTAL ACT UCLIDE PERCENT | TVITY | CAT AS-CI Stat AU-C Uns B-CI C-CI |
| | | | (ton) | mrem/hr | ALTIN | GAMMA | <u></u> | | <u> </u> | | | RADIONUCLIDES | pCi/gm | MBq | mCi | 1 |
| | | | | | | • | • | | | | | Total | | 2.3510E-01 | 6.3540E-03 | |
| D90/1 | 4 | Q.21 | . 292.57 | <8.0000E-05 | NP | 3,3400E-06 | 29,39-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 1.0064E-01 +01 1.0064E-01 +01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E | +01 5.0320E-01 7.0448E-01 | 1.3600E-02 1.9040E-02 | -1 |
| | | | · · · · · · · · · · · · · · · · · · · | | | | • | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| D91/1 | 4 | 0.21 | 292,57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-11 | . 0.20 | NA NA | NONE/NP | | IH-3 | 1.00000E | +01 1.0084E-01 | 2.7200E-03 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 6.00000E | +01 1.0064E-01 +01 5.0320E-01 7.0448E-01 | 2.7200E-03 1.3600E-02 1.9040E-02 | -1 |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 92/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA NA | NONEMP | | [H-3] 1° | 1.00000E | +01 1.0064E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7,35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7,36 | | | NP | Sr-90 Subtotal | 5.00000E | +01 5.0320E-01 7.0448E-01 | 1.9040E-02 | |
| | , | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 095/1 | 4 | 0,21 | 292.57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA NA | NONE/NP | | C-14 H-3 | 1.00000E | +01 1.0064E-01 +01 1.0064E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | 3 AS |
| | | 7.35 | 0,32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | , | NP | Sr-90 Subtotal | 5.00000E | +01 5.0320E-01 7.0448E-01 | 1.3600E-02 1.9040E-02 | -1 |
| | | | _ | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | T |

- FORM 541A

| | | | 16.WASTE | CATION AS-Class A Stable AU-Class A Unstable | Colsts C | \$ \$25 | 3 8 | 8 | S S S | ३।इ | 93 | - | 93 AS | 3 8 | #B | 93 AS | 3 8 | #8 | | A As | 3 18 |
|---|-----------------------------------|-------------------------|--------------------------------|--|-----------------------|---|------------|------------|--------------------------|------------|------------|------|---|------------|------------|--------------------------|------------|------------|-------------|-------------------------|------------|
| | UMBER | 4 PAGE(S) | | Bq) AND | | 9.0700E-04 | | 6.3540E-03 | 1.3600E-03 | | 9.5200E-03 | | 1.3600E-03 | | 9.5200E-03 | 1.3600E-03 | | 9.5200E-03 | | 1.3600E-03 | |
| | 2. MANIFEST NUMBER 4032-01-001 | 3. PAGE 8 OF 24 PAGE(S) | NOTTORNOS | ND ACTIVITY (M UNER TOTAL AC | MBG | 3.3559E-02 3.3559E-02 | 2.3510E-01 | 2.3510E-01 | 5.0320E-02 5.0320E-02 | 3.5224E-01 | 3.5224E-01 | | 5.0320E-02 5.0320E-02 | 3.5224E-01 | 3.5224E-01 | 5.0320E-02 5.0320E-02 | 3.5224E-01 | 3.5224E-01 | | 5.0320E-02 | |
| İ | Ш | 3. | 15 RADIOLOGICAL DESCRIPTION | INDMIDUAL RADIONUCLIDES AND ACTUTY (MBQ) AND CONTAINER TOTAL, CR CONTAINER TOTAL ACTUTY AND RADIONUCLIDE PERCENT | DCKom | 1.00000E+01 | | | 1.00000E+01 | 0.00000 | | | 1.00000E+01 | | | 1.00000E+01 | | | | 1.00000E+01 | 10.00000.c |
| | Envirocare of Utah, Inc. | | PE IN CONTAINER | | 0.1% RADIONUCLIDES | \$ 5.00 P. 0.00 | - | Total | 4F.7. | | Total | | 4.0.7.9.4.4.2.4.2.4.2.4.2.4.2.4.4.4.4.4.4.4.4 | | Total | 7. T. P. | - | Total | | 45.77. 45.74. 29. | |
| · | | İ | ION FOR EACH WASTE TYPE IN | WEIGHT CHEMICAL FORM % CHELATING AGENTCHELATING | €€ | | | | - | - | | , | | | | | <u> </u> | | | - | |
| | | | TION FOR EA | N CHEMICA CHELATIN | | NONEANP | | | NONE/NP | , | | | NONEWP | | | NONEWP | | | | NONE/ND | |
| • | | | WASTE DESCRIP | 13. SOLIDIFICATION OR STABILIZATION MEDIA (Spe Mode 3) | (c most man) | ¥N | | | AN A | | | | V | | | NA | | | | NA NA | |
| | ш | TION | PHYSICAL DESCRIE | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | (FT3) | 0.20 | 7.35 | | 0.20 | 7.38 | | | 0.20 | 7.35 | | 0.20 | 7.35 | | | 0.20 | 7.35 |
| • | L. RADIOACTIVE | CRIPTION (CONTINUATION) | | 11. WASTE DESCRIPTOR (See Note 2.) | | 39,29-H | | | 39,29-H | I | | L.,, | 19,29-H | <u>.</u> | | 39,23-1 | | | | 39,29-H | L |
| | EVEL R | E DESCRIE | | VCE NATION Com2 | BETA- GAMMA | 3.3400E-06 | 2.0000E+02 | | 3.3400E-06 | Z.0000E+02 | | | 3,3400E-06 | 2,0000£+02 | | 3.3400E-06 | 2.0000E+02 | | | 3,34002.08 | 2.0000E+02 |
| | LOW-LEVE | ANDWASI | | 10. SURFACE CONTAMINATION MBG/100.cm2. dpm/100.cm2. | ALPHA | ž | £ | | 2 | ď | | | Ŗ | ₽ | | 활 | ďN | | | , & | ₫ |
| | UNIFORM LOW-LEVE | CONTAINER AND WASTE DES | | | mSvthr | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 | | • | <8,0000E-05 | <8.000E-03 | | -8.0000E-05 | <3.000E-03 | | | <8,0000E-05 | <8.000E-03 |
| | 5 | | | <u>&</u> , | (kg) | 111.13 | 0.12 | | 156.49 | 0.17 | | | 156.49 | 0.17 | | 156.49 | 0.17 | | | 156.49 | 0.17 |
| | | | DISPUSAL CONTAINER DESCRIPTION | | (fZ) | 6.27 | 7.35 | | 0.21 | 7.36 | | , | 624 | 7.35 | | K.9 | 7.36 | | | 52 | 7,38 |
| | | | DISPOSALCON | 6. CONTAINER DESCRIPTION (See Note 1 & | Note 1A) | 4 | | | 4 | | | | 7 | | ! | 4 | | | | * | |
| | FORM 541A | .; | | 5. CONTAINER IDENTIFICATION. NUMBER / GENERATOR | ID NUMBER(S) | 096/1 | | | 1147 | | | | 115/1 | | | 120/1 | | | | 121/1 | • |

FORM 541A **UNIFORM LOW-LEVEL RADIOACTIVE** Envirocare of Utah, Inc. 2. MANIFEST NUMBER 4032-01-001 **WASTE MANIFEST** 3. PAGE 9 OF 24 PAGE(S) CONTAINER AND WASTE DESCRIPTION (CONTINUATION) WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER
PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 16.WASTE CLASSIFI-CATION AS-Class A 15. RADIOLOGICAL DESCRIPTION 8. WASTE SURFACE 12. APPROXIMATE 13. CONTAINER AND CONTAINER WEIGHT SURFACE CONTAMINATION WASTE WASTE SOLIDIFICATION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MEQ) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT IDENTIFICATION NUMBER / CONTAINER DESCRIPTION Stable AU-Class A VOLUME VOLUME(S) IN CONTAINER (m3) (FT3) RADIATION MBo/100 cm2 dpm/100 cm2 DESCRIPTOR OR STABILIZATION CHEMICAL FORM MEDIA CHELATING AGENT CHELATING GENERATOR ID NUMBER(S) Unstable B-Class B C-Class C (See Note 1 & & Note 2A) (See Note 3) AGENT IF>0.1% mSv/hr ALPHA RADIONUCLIDES Total 3.5224E-01 9.5200E-03 127/1 39,29-H 1.00000E+01 1.00000E+01 5.00000E+01 1.3600E-03 AS 1.3600E-03 6.8000E-03 5.0320E-02 NONE/NP 0.21 156.49 <8.0000E-05 3,3400E-06 0.20 H-3 Sr-90 5.0320E-02 2.5160E-01 NP 7,36 0.17 <8.000E-03 2.0000E+02 Subtotal 3.5224E-01 7.35 9.5200E-03 Total 3.5224E-01 9.5200E-03 135/1 39,29-H C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 1.3600E-03 AS 1.3600E-03 6.8000E-03 NONEMP 5.0320E-02 5.0320E-02 2.5160E-01 0.21 <8.0000E-05 3,3400E-06 0.20 7.35 0.17 <8.000E-03 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 136/1 NONE/NP C-14 H-3 Sr-90 5.0320E-02 5.0320E-02 2.5160E-01 AS 0.21 158.49 <8.0000E-05 3.3400E-08 0.20 7.35 0.17 <8.000E-03 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 137/1 39,29-11 1.00000E+01 1.00000E+01 5.00000E+01 NONE/NP C-14 H-3 Sr-90 0.21 <8.0000E-05 3.3400E-06 0.20 7.35 **Q.17** <8.000E-03 2.0000E+02 Subtotal 7.35 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03

FORM 541A (10-96)

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

3. PAGE 10 OF 24 PAGE(S)

| • | ••. | | | CONTAINS | ANITA INTAG | TE DECOR | PTION (CONTINI | IATIONS. | | | | | 3. PAGE 10 OF | 24 PAGE(S) | |
|---|--|----------------------|--|-------------------------------------|--|------------------------------|--|---|---|--|-----------------------------------|--|---|--|---|
| | DISPOSAL CON | TAINER DESC | RIPTION | CUNTAINE | AND WAS | TE DESCRI | PHON CONTINI | | WASTE DESCRIPTION | | | ONTAINER | | 1 | 16.WASTI CLASSIF |
| 5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURF CONTAM MBg/11 dpm/10 | IINATION 00 cm2 30 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (FT3) | 13. SOLIDIFICATION OR STABILIZATION | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT % CHELATING AGENT | INDIVIDUAL RADION CONTAINER TOTAL: | DLOGICAL DESCRIPTION UCLIDES AND ACTIVITY (M OR CONTAINER TOTAL AC DIONUCLIDE PERCENT | Bq) AND | CLASSI CATIO AS-Class Stable AU-Class Unstar 8-Class C-Class |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (F13) | | | (F>0.1% | RADIONUCLIDES pC | Wgm M8q | mCi . | 1 |
| 138/1 | 4 | 0.21 | 156,49 | <8.0000E-06 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 1.000 H-3 1.000 Sr-90 5.000 | 00E+01 5.0320E-02 00E+01 5.0320E-02 00E+01 2.5160E-01 | 1.3600E-03 2 1.3600E-03 6.8000E-03 | AS |
| | | 7,35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | , | | | Subtotal | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | _ | | | | | | Total | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | | V005-04 F 00005 00 | 1.3600E-03 | AS |
| 146/1 | 14 | 0.21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA . | NONE/NP | NP | C-14 1.000 H-3 1.000 Sr-90 5.000 | 00E+01 5.0320E-02 00E+01 5.0320E-02 00E+01 2.5160E-01 | 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | ,NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 3.5224E-01 | | |
| | | | | | | | | | | | | Total | 3.5224E-01 | | |
| | | | | | | <u> </u> | | <u></u> | | NONE/NP · | | C-14 1.000 | 00E+01 5.0320E-02 | 1.3600E-03 | AS |
| 147/1 | 1 | 0.21 | 156.49 | <8,0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONEMP . | NP | H-3 1.000 Sr-90 5.000 | 000E+01 5.0320E-02 000E+01 2.5160E-01 | 1.3600E-03 6.8000E-03 | ~ |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 3.5224E-01 | 1 | |
| | | | | | | | | | - | | | Total | 3.5224E-01 | 9.5200E-03 | |
| 148/1 | 4 | | | | | | 39,29-H | ļ | NA NA | NONE/NP | | C-14 1.000 | 000E+01 5.0320E-02 | 1.3600E-03 | AS |
| 1407 | | 0.21 | 156.49 | <8.0000E-05 | NP | 3,3400E-06 | | 0.20 | <u> </u> "" | I I I I I I I I I I I I I I I I I I I | NP | H-3 1.000 Sr-90 5.000 | 00E+01 5.0320E-02 00E+01 2.5160E-01 | 1.3600E-03 6.8000E-03 | |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2,0000E+02 | | 7.35 | | | | Subtotal | 3.5224E-01 | <u> </u> | |
| | | | | | | |] | | | | | Total | 3.5224E-01 | 9.5200E-03 | |
| | | | ļ | | | | | | | | | | 2005 to 4 5 02205 01 | 4 30005 03 | |
| 149/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONEMP | NP | C-14 1.000 H-3 1.000 Sr-90 5.000 | 000E+01 5.0320E-02 000E+01 5.0320E-02 000E+01 2.5160E-01 | 2 1.3600E-03 2 1.3600E-03 1 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | 3.5224E-01 | 9.6200E-03 | |

FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE Envirocare of Utah, Inc. 2. MANIFEST NUMBER WASTE MANIFEST 4032-01-001 CONTAINER AND WASTE DESCRIPTION (CONTINUATION) 3. PAGE 11 OF 24 PAGE(S)** WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER
PTION 14 CHEMICAL DESCRIPTION PHYSICAL DESCRIPTION CLASSIFI-CATION AS-Class A Stable AU-Class A 15. RADIOLOGICAL DESCRIPTION 8. WASTE 10. SURFACE CONTAINER 12. APPROXIMATE 13. SURFACE RADIATION AND CONTAMINATION WASTE WASTE SOLIDIFICATION IDENTIFICATION CONTAINER INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT VOLUME WEIGHT CONTAINER MBo/100 cm2 dom/100 cm2 DESCRIPTOR VOLUME(S) IN CONTAINER OR STABILIZATION CHEMICAL FORM/ %
MEDIA CHELATING AGENT CHELATING NUMBER / DESCRIPTION WEIGHT GENERATOR (See Note 2 & Note 2A) (See Note 1 & Note 1A) Unstable (See Note 3) AGENT IF>0.1% mSv/hr ALPHA B-Class B C-Class C RADIONUCLIDES pCl/gm MBg mCi Total 3.5224E-01 9.5200E-03 160/1 4 39,29-11 NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 1.3600E-03 5.0320E-02 1.3600E-03 2.5160E-01 6.8000E-03 0.21 156.49 <8.0000E-05 NP 3.3400E-06 0.20 7.35 0.17 <8.000€-03 NP 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 164/1 39,29-H 1.00000E+01 1.00000E+01 5.00000E+01 0.21 NA NONE/NP C-14 H-3 Sr-90 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 156.49 <8.0000E-05 3.3400E-06 0.20 NP 7.35 0.17 <8.000E-03 2,0000€+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 165/1 39,29 H NA NONE/NP 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 0.21 156,49 <8.0000E-05 NP 3,3400E-06 AS 0.20 H-3 Sr-90 NP 7.35 0.17 <8.000E-03 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 166/1 39,29-41 NA NONE/NP 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 0.21 1.3600E-03 1.3600E-03 6.8000E-03 158.49 <8.0000E-05 3.3400E-06 0.20 H-3 Sr-80 NP 7,35 0.17 <8.000E-03 7.35 Subtotal 3.5224E-01 9.5200E-03 Tota! 3.5224E-01 9.5200E-03

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| | | | | | MAGI | C MWM | reg i | | | | | | i | 3. PAGE 12 OF 2 | 4 PAGE(S) | ٠. |
|--|--|-------------------------------|--|-------------------------------------|---------------------------------------|-----------------------------|---|--|--|----------------------------------|--------------------|-----------------------|-------------------------------------|---|--|--|
| | DISPOSALCON | | RETION | CONTAINE | R AND WAS | TE DESCR | PTION (CONTINU | IATION) | WASTE DESCRIPTION | N EOD EACH WAS | E TVOE IN O | ONTAINED | | J | | 16.WASTE |
| | Diground don | | | | | | | PHYSICAL DESCRI | | 14. CHEMICAL DE | SCRIPTION | 15, | RADIOLOGI | ICAL DESCRIPTION | | CLASSIFI- |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (f(3) | 8. WASTE AND CONTAINER WEIGHT | 9, SURFACE RADIATION LEVEL | 10. SURF CONTAM MRA/1 dpm/10 | INATION 00 cm2 00 cm2 | 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) | CHEMICAL FORW CHELATING AGENT | CHELATING AGENT | CONTAINER T | TOTAL; OR C | DES AND ACTIVITY (MB CONTAINER TOTAL ACT UCLIDE PERCENT | | CATION AS-Class A Stable AU-Class A Unstable 8-Class B C-Class C |
| ID NUMBER(S) | Note 1A) | (tt3) | (kg) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | 1 | | 1F>0.1% | RADIONUCLIDES | pÇi/qm | MBq | mCl | C-Class C |
| 169/1 | 4 | 0.21 | 156,49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29 -H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E 1.00000E 5.00000E | +01 5.0320E-02 +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 175/1 | 4 | | | | | | 39.29-H | | NA NA | NONE/NP | | C-14 · | 1.00000E | +01 5.0320E-02 | 1.3600E-03 | AS . |
| | | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | | 0.20 | | , | NP | C-14 H-3 Sr-90 | 1.00000E | +01 5.0320E-02 +01 2.5160E-01 | 1.3600E-03 6.8000E-03 | |
| | | 7.35 | 0.17 | <8'000E-02 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | _ | | | | | | | | | | | |
| 180/1 | 4 | 0.21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-H | 0.20 | NA | NONE/NP | NP | IH-3 | 1.00000E- 1.00000E- 5.00000E- | +01 1.6798E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | | 7.38 | 0.07 | <8.000E-03 | NP | 2,0000E+02 | | 7.35 | | | | Subtotal | | 1.1759E-01 | 3.1780E-03 | |
| | | | · | | | | | | | | | Total | | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | | | | | | |
| 186/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E- 1.00000E- 5.00000E- | +01 8.3990E-02 +01 8.3990E-02 +01 4.1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal _. | | 5.8608E-01 | 1.5840E-02 | ı |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | | | | | | |
| 187/1 | 4 | 0,21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-11 | 0.20 | NA | NONE/NP | NP | IH-3 1 · | 1.00000E- 1.00000E- 5.00000E- | +01 8.3990E-02 | 2.2700E-03 2.2700E-03 1.1300E-02 | AS |
| | | 7.35 | · 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 5.8608E-01 | 1.5840E-02 | .l |
| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE Envirocare of Utah, Inc. 2. MANIFEST NUMBER 4032-01-001 **WASTE MANIFEST** 3. PAGE 13 OF 24 PAGE(S) CONTAINER AND WASTE DESCRIPTION (CONTINUATION) WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER
PTION 14. CHEMICAL DESCRIPTION 6.WASTE PHYSICAL DESCRIPTION CLASSIFI-CATION AS-Class A Stable AU-Class A 15. RADIOLOGICAL DESCRIPTION SURFACE
CONTAMINATION
MBd/100 cm2
dpm/100 cm2 8. WASTE 9. SURFACE 12. APPROXIMATE 13. CONTAINER WASTE DESCRIPTOR WASTE SOLIDIFICATION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT IDENTIFICATION CONTAINER VOLUME WEIGHT CONTAINER RADIATION VOLUME(S) IN OR STABILIZATION CHEMICAL FORM/ CONTAINER MEDIA CHELATING AGENT NUMBER / LEVEL HELATING AGENT CHELATING GENERATOR (See Note 1 & Unstable B-Class B C-Class C & Note 2A) (See Note 3) AGENT IF>0.1% ID NUMBER(S) Note 1A) (kg) mSv/hr ALPHA RADIONUCLIDES pCl/gm MBq mCi Total 5.8608E-01 1.5840E-02 188/1 39,29-11 C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 AS 1.3600E-03 6.8000E-03 NONE/NP 0.21 156,49 <8.0000E-05 3 3400E-0 0.20 NP 7.35 0.17 <8.000E-03 2,0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 190/1 39,29-11 1.00000E+01 1.00000E+01 5.00000E+01 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 0.21 156.49 <6.0000E-05 3.3400E-08 H-3 Sr-90 0.20 NP 7.35 0.17 <8.000E-03 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 191/1 4 39,29-H C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 NONE/NP 5.0320E-02 5.0320E-02 2.5160E-01 1.3600E-03 1.3600E-03 6.8000E-03 0.21 <8.0000E-05 3.3400E-06 0.20 7.35 0.17 <8.000E-03 2.0000E+02 7.35 Subtotal 3.5224E-01 9.5200E-03 Total 3.5224E-01 9.5200E-03 193/1 29,39-H NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 1.0064E-01 1.0064E-01 5.0320E-01 0.21 AS 292.57 <8.0000E-05 3,3400E-06 0.20 NP 0.32 <8.000E-03 2,000002+02 7.35 Subtotal 7.0448E-01 1.9040E-02 Total 7.0448E-01 1.9040E-02

| | • | | • | NFORM | LOW-LEVE WASTE MA | EVEL F | UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST | ۳ ا | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER 4032-01-001 | MBER | |
|--|-------------------------------------|--------------------------------|--|-------------------------|--|-----------------------|--|---|-------------------|-------------------------------------|--------------|--------------------------|--------------------------------|--|--|---|
| | | | | CONTAINER AND WASTE DES | AND WAST | II ZUSZU Z | CRIPTION (CONTINUESTION) | MOLEN | - | | | | ю. — | 3. PAGE 14 OF 24 PAGE(S) | 4 PAGE(S) | |
| | DISPOSAL CON | DISPOSAL CONTAINER DESCRIPTION | | | | | | DHV9[CA! DESCE | WASTE DESCRIPTION | ON FOR EACH WASTE TYPE IN CONTAINER | E TYPE IN CO | | ACITOTOCIONO S | Sections | | 6.WASTE |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | w op ex | 10. SURFACE CONTAMINATION MBG/100 cm2 dpm/100 cm2 | VATTON Dem2 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | | -1 OM | WEIGHT % | | MONUCLIDES AL TAL; OR CONTA | INDVIOUAL RADIONICLIDES AND ACTUTY (MAG) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTUTY AND RADIONICLIDE PERCENT | | CATION AS-Cless A Stable AU-Class A Unstable P-Cless B |
| NUMBER(S) | Note 1A) | <u>5</u> | (S) | mswhr | ALPHA | BETA- | | (FT3) | | | (F>0.1% | RADIONUCLIDES | oCilom | MBc | 겉 | C-Class C |
| | * | 0.21 | 292.57 | <8.0000E-05 | 햪 | 3.34008-06 | H-80'92 | 0.20 | NA | NONEINP | 2 | | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 7.36 | 0.32 | <8.00dE-03 | Š | 2.0000E+02 | | 7.36 | | | | , 33 | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | · | | | | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |
| | 4 | 0.21 | 292.57 | <8,0000E-05 | Ð | 3.3400E-06 | 29,39-H | 0.20 | NA N | NONEINP | | H-0-14 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | g _ž | 2.0000E+02 | | 7.35 | | | 2 | B | 1010000 | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | Total . | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | - | - | | | |
| | 4 | 0.21 | 292.57 | <8.0000E-05 | - A | 3,3400E-06 | 29,39-Н | 0.20 | NA | NONEMP | | F-14 F-3 F-3 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 22.36 | 2E.0 | <8.000E-03 | 步 | 2.0000E+02 | | 7.35 | ······ | | è | ŢĪ. | 0.430000 | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | r- | | | | | • . | | |
| | 4 | 120 | 292.57 | <8.000ag-05 | d. | 3.3400E-08 | 28,39-H | 02.0 | NA | NONE/NP | 9 | C-14 H-3 1.0 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 7.36 | 0.32 | <8.000E-03 | 2 | 2.0000E+02 | | 7.35 | | | | TE. | | 7.0448E-01 | 1.9040E-02 | ٠ |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| | | | | | | | | | | | | | | • | | |
| | 4 | F. 6 | 292.57 | <8.0000E-05 | ξ | 3.3400E-06 | 29,39-H | 070 | NA NA | NONENP | 9 | C-14 1.0 | 1.00000E+01 | 1.0064E-01 | 2.7200E-03 | AS |
| | | 34,7 | 0.32 | <8.000E-03 | ş | 2.0000E+02 | | 7.36 | | | | <u>s</u> | | 7.0448E-01 | 1.9040E-02 | |

UNIFORM LOW-LEVEL RADIOACTIVE

FORM 541A

Envirocare of Utah, Inc.

2. MANIFEST NUMBER

| | | | | | WAST | E MANI | FEST | | | | | • : • | ļ | 4032-01-0 | 01 | |
|--|--|--------------|----------------|--------------------|-------------------|---------------------------------------|---|--|-----------------------|-----------------|--------|--------------------------|---|---|--|---|
| | DISPOSAL CO | NTAINED NEO | DIDTION | CONTAINE | | | IPTION (CONTINI | JATION) | | | | • | 1 | 3. PAGE 15 OF | 24 PAGE(S) | • |
| 5. CONTAINER DENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME | 8. WASTE | 9, SURFACE | 10. SUR CONTAI | FACE MINATION 100 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCR 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | 13. SOLIDIFICATION | 14, CHEMICAL DE | WEIGHT | INDIVIDUAL CONTAINE | RADIONUCLIE R TOTAL; OR C AND RADIONI | CAL DESCRIPTION DES AND ACTIVITY (MI ONTAINER TOTAL ACTIVITY ACTIVITY (MI ONTAINER TOTAL ACTIVITY (MI ONTAINER TOTAL ACTIVITY (MI | | 16,WASTE CLASSIFI- CATION AS-Class / Stable AU-Class / Unstable B-Class B C-Class O |
| | | | | - | | GAMMA | | | | | | RADIONUCLIDES Total | pCi/gm | 7.0448E-01 | mCi 1.9040E-02 | |
| 209/1 | 4 | 0.21 7.35 | 247,21 0.27 | | NP NP | 3.3400E-06 | 29,38-H | 0.20 | NA NA | NONEMP | NP | C-14 H-3 Sr-90 | 1.00000E- 1.00000E- 5.00000E- | | | |
| | | | | | | | | | | | | Subtotal Total | | 5.8608E-01 5.8608E-01 | 1.5840E-02 1.5840E-02 | |
| 211A | 4 | 0.21 7.35 | 292.57 | | NP | 3.3400 €-06 | 29,39-H | 0.20 | NA NA | NONE/NP | N#P | C-14 H-3 Sr-90 | 1.00000E- 1.00000E- 5.00000E- | 01 1.0064E-01 01 1.0064E-01 01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| • | | 1.00 | V.32 | CA.000.E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal Total | | 7.0448E-01 7.0448E-01 | 1.9040E-02 1.9040E-02 | - |
| 212/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3,3400E-06 | 29,39-Н | 0.20 | NA NA | NONEMP | NР | C-14 H-3 Sr-90 | 1.00000E- 1.00000E- 5.00000E- | 01 1.0064E-01 01 1.0064E-01 01 5.0320E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 | AS |
| | | 7.35 | 0.32 | <8.000E-03 | NР | 2.0000E+02 | | 7.35 | | | | Subtotal Total | | 7.0448E-01 | | .50 |
| 214/1 | 4 | 0.21 | 292.57 | <8.0000E-06 | NP | 3.3400E-08 | 29,39-H | 0.20 | NA NA | NONEMP | | C-14 | 1.00000E+ 1.00000E+ 5.0000E+ | | | |
| | | 7,35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | H-3 Sr-90 Subtotal | 5.00000E+ | 01 1.0084E-01 01 1.0064E-01 01 5.0320E-01 7.0448E-01 | 2.7200E-03 2.7200E-03 1.3600E-02 1.9040E-02 | |
| FORM 541A (10-96) | ٠, | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |

| | | 118.WASTE | CLASSIFI | AS-Class A Stable AU-Class A Unstable | C Class C | S A S | 2 [m | 11 80 | SA Ac | ı lm | 11 60 | | SA F | V 100 | II & | | & Ass | 110 | In ov | | AS AS | 9 100 |
|---|--------------------------|--------------------------------|-------------------------------|--|--|--------------------------|------------|------------|----------------------|------------|------------|---|--|------------|------------|---|---|------------|------------|---|--------------------------|------------|
| JMBER | 24 PAGE(S) | | | q) AND IVITY | j j | 1.3600E-03 | | 9.5200E-03 | 4.5400E-04 | | 3.1780E-03 | | 2.7200E-03 | 1.9040E-02 | 1.9040E-02 | | 2.7200E-03 | 1.9040E-02 | 1.9040E-02 | | 1.3600E-03 | |
| 2. MANIFEST NUMBER 4032-01-001 | 3. PAGE 16 OF 24 PAGE(S) | | XESCRIPTION | ND ACTIVITY (MB JINER TOTAL ACT IE PERCENT | MBo | 5.0320E-02 5.0320E-02 | | 3.5224E-01 | 1.6798E-02 | 1.1759E-01 | 1.1759E-01 | | 1.0064E-01 | 7.0448E-01 | 7.0448E-01 | | 1.0064E-01 | 7.0448E-01 | 7.0448E-01 | | 5.0320E-02 5.0320E-02 | 3.5224E-01 |
| | 67 | - | 15. RADIOLOGICAL DESCRIPTION | NDINIDUAL RADIONUCLIDES AND ACTIVITY (MB9) AND CONTAINER TOTAL: OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT | DCilom | 1.00000E+01 | , | | 1.00000E+01 | 1000000 | | | 1.00000E+01 | 0.000000 | | | 1.00000E+01 1.00000E+01 5.00000E+01 | 2 | | | 1.00000E+01 | 0.000000 |
| Envirocare of Utan, Inc. | | | | | RADIONUCLIDES | | Ī | Total | 7-14 2-14 2-14 | Subtotal | Total | | 14-14-14-14-14-14-14-14-14-14-14-14-14-1 | Subtotal | Total | | 주프 4 ~ 6 | 33 | Total | | C-14 H-3 | Ē |
| | | STE TYPE IN | DESCRIPTION | WEIGHT % SINGHT AGENT | F>0.1% | 9 | <u>.</u> | | 1 | ŧ | | | 9 | <u> </u> | | | 2 | : | | | . 9 | <u> </u> |
| | | N FOR EACH W | 14. CHEMICAL | CHEMICAL FORW | | NONEMP | | | NONEWP | | | • | NONEINP | | | | NONEWP | | | | NONEINP | |
| | | WASTE DESCRIPTION | PTION 14 CHEMICAL DESCRIPTION | 13. SOLIDIFICATION OR STABILIZATION MEDIA | Ì | NA | | | NA | | | | ₹2 | | | | NA NA | | | | NA | |
| m | 0.00 | A TUTAL | PHYSICAL DESCRIPTION | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) | (FT3) | 0.20 | 7.35 | | 0.20 | 7.35 | | | 0.20 | 7.35 | | | 0.20 | 7.36 | | | 0.20 | 7.35 |
| UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIEEST | WAS I.E. MANIFES I. | THE WAY THE WAY | | WASTE DESCRIPTOR (See Note 2 | | 39,29-H | | | H-60 | | | | 29,38-H | | | • | 79,39-H | | | • | 38,23-H | |
| EVEL F | HINIMIN : | - | | NATION Demo | BETA- GAMMA | 3.3400E-05 | 2.0000E+02 | | 3.3400E-08 | 2.00m0E+02 | | | 3.3400E-08 | 2.0000E+02 | | | 3.3400E-08 | 2.0000E+02 | | | 3.3400E-06 | 2.0000E+02 |
| LOW-LEVE | AND WAST | THE PARTY | | 10. SURFACE CONTAMINATION MB0/100 cm2 dpm/100 cm2 | ALPHA | S. | , N | | Đ. | \$ | - | | N. | NP | | | ē. | NP | | | Ĉ. | 9± |
| NI CKN | CMTAINGE | | | SURFACE RADIATION LEVEL | ANSWER THE PERSON NAMED IN COLUMN TWO IN COL | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 | | | <1.0000E-04 | <1.000E-02 | | | <8.0000E-05 | <8.000E-03 | | | <8.000uE-05 | <8.000E-03 |
| o | | | | AND CONTAINER WEIGHT | (gu) | 166.49 | 0.17 | | 65.77 | 0,07 | | | 292.67 | 0.32 | | | 292.57 | 0.32 | • | | 158.49 | 0.17 |
| | | DISPOSAL CONTAINER DESCRIPTION | , | YOLUME (m3) | (843) | 12.0 | 7.36 | | 120 | 7.38 | | | K-0 | 7.38 | | | 12.0 | 7.35 | | , | K ₂ | 7.35 |
| | | DISPOSAL CON | | CONTAINER DESCRIPTION (See Note 1 & | Note 1A) | 4 | | | 4 | | | | 7 | | | | 4 | | | | 4 | |
| 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | | CONTAINER IDENTIFICATION NUMBER / GENERATOR | ID NUMBER(S) | 218/1 | | | 22011 | | • | | нгаг | | | | T T T T T T T T T T T T T T T T T T T | | | | 1,922 | |

| Envirocare of Utah, Inc. 2. MANIFEST NUMBER 4032-01-001 | 3. PAGE 17 OF 24 PAGE(S) | | F | AND RADIONUCLIDE SAID ACTIVITY (MEQ AND SIERA) CONTAINER TOTAL, OR CONTAINER TOTAL, CHICAGO AND RADIONUCLIDE PERCENT ACTIVITY AND RADIONUCLIDE PERCENT ACTIVITY AND RADIONUCLIDE PERCENT ACTIVITY ACTIVITY ACTIVITY ACTIVITY | Ser my//De | 3.5224E-01 9-57 | | 1.00000E+01 5.0320E-02 1.3800E-03 As 1.00000E+01 5.0320E-02 1.3800E-03 | 2.5160E-01 | _ | . | | 1.00000E+01 1.0064E-01 2.7200E-03 As | 5.0320E-01 | | | 1.00000E+01 8.3990E-02 2.2700E-03 As | 5,8608E-01 | | 1.00000E+01 1.0084E-01 2.7200E-03 AS | 5.0320E-01 7.0448E-01 | 7 OAASEAN 1 OANGAN | |
|---|--------------------------------|--|-----------------------|--|------------|-----------------|---|---|------------|----------|---------------|-----|--------------------------------------|------------|----------|---|--------------------------------------|--------------|-------|--|--------------------------|--------------------|---|
| En | | PE IN CONTAINER | NO. | CHELATING AGENT | | Total | • | 7.∓ 7.5. | Sr-90 | - Canada | Total | | 7± 4± | Subtotal | Total | | 2.± | | Total | 7.1. 2.1. | | Total | |
| | | WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER | in the second | CHEMICAL FORM HELATING AGENI | X. | | | NONEMP | | | | | NONE/NP | Z . | | | NONEMP | 2 | | NONENP | <u></u> | | |
| | | WASTE DESCRIPTION | 13. SOUIDIEICATION | R STABILIZATION MEDIA (See Note 3) | | | - | Y. | · · · | | | | NA | | | | ₹. | | | NA | | | |
| Z E | HATION | PHYSICAL DESCR | 12. APPROXIMATE | VOLLIME(S) IN C CONTAINER (MS) | (01.1) | | | 6.28 | 2.5 | | | | 0.20 | 7.35 | | | 8 | 7.36 | | 0730 | 7.35 | | |
| RADIOACTIVE FEST | PTION (CONTINUATION) | | 11. WASTE | DESCRIPTOR (See Note 2 & Note 24) | | | | 38,29-H | | | | | H-65'82 | | | | 29,39-H | | | 29,39 H | | | |
| UNITORM LOW-LEVEL RA WASTE MANIFE | CONTAINER AND WASTE DESCRIPT | | IFACE MINATION | dpm/100 cm2 dpm/100 cm2 | GAMMA | • | | 3.3400E-06 | 2.0000E+02 | | | ··· | 3,3400E-06 | 2.0000E+02 | | | 3,3400E-06 | 2.0000E+02 | | 33400E-08 | 2,0000E+02 | | |
| MAST WAST | R AND WAS | L | 유 | | ALPHA | | | ₽ | ě | | | | 함 | ¥ | | | 충 | ₽ | | ž | £ | | |
| Z C | CONTAINE | | 9. SURFACE | | memur | | | <8.0000E-05 | <8.000E-03 | | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | <8.0000E-05 | <8.000E-03 | | |
| , | - | | 8. WASTE AND | CONTAINER WEIGHT (Rg) | (lool) | | | 156.49 | 0.17 | | | | 292.57 | 0.32 | | | 247.21 | 0.27 | | 292.67 | . 0.33 | | |
| | DISPOSAL CONTAINER DESCRIPTION | | | (m3) | | | | 0.21 | 7.35 | | 1 | | ಜಿ | 7.35 | <u> </u> | | 0.21 | 7.35 | | 120 | 7.35 | | |
| | DISPOSAL CON | | o di | CONTAINEN DESCRIPTION (See Note 1 & Note 1A) | | | | 4 | | | | | → . | | • | • | 4 | | | 4 | | | • |
| | | | CONTAINER | NUMBER / GENERATOR ID NUMBER(S) | | | | 1/1ZZ | ٠ | | | | 2294 | | | | 230/1 | | | 231/1 | | | |

1 1 FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| | | | • | CONTRIBUT | | TE DECCE | IPTION (CONTINI | MIN | | | | |] -3 | 3. PAGE 18 OF 2 | 4 PAGE(S) | |
|--|--|--------------|--|-------------------------------------|-----------|-------------------|---|---------------|-------------------|---------|------------------|------------------------------------|----------|---|--|---|
| | DISPOSAL CON | TAINER DESC | RIPTION | CONTAINE | R AND WAS | TE DESCR | PHONICONTINI | | WASTE DESCRIPTION | | | | | | | 16.WASTE |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | | MNATION 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | CONTAINER | | | WEIGHT | INDIVIDUAL RADIC CONTAINER TOTA | NUCLIDES | CAL DESCRIPTION ES AND ACYTVITY (MBO INTAINER TOTAL ACTI CLIDE PERCENT | q) AND IVITY | CLASSIF CATION AS-Class Stable AU-Class Unstab |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA · | BETA- | a nace za) | (m3) (F13) | (269 (100) | | AGENT IF>0.1% | RADIONUCLIDES | pCi/gm | MBq | mCi | B-Class C-Class |
| 23411 . | 4 | 0.21 | | 1 | NP | 3.3400E-06 | 39-H | 0.20 | NA | NONE/NP | NP | C-14 1.00 | 0000E+0 | 01 1.6798E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | , | 7,35 | 0.07 | <8.000E-03 | NP | 2.0000E+02 | · | 7.35 | | | | Subtotal | | 1.1759E-01 | 3.1780E-03 | -1 |
| | | | | <u> </u> | | | | | | | | Total | | 1.1759E-01 | 3.1780E-03 | |
| 235/1 | 4 | 0.21 | 292,57 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0,20 | NA NA | NONE/NP | | C-14 1.00 H-3 1.00 | 0000E+0 | 01 1.0064E-01 | 2.7200E-03 2.7200E-03 | AS |
| , | | 7.35 | 0.32 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | H-3 Sr-90 Subtotal | 0000E+0 | ! | 2.7200E-03 1.3600E-02 1.9040E-02 | -1 |
| | | | | | | | | | | | | Total | | 7.0448E-01 | 1.9040E-02 | |
| 239/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA NA | NONE/NP | | C-14 1.00 H-3 1.00 | 0000E+0 | 01 8.3990E-02 01 8.3990E-02 01 4.1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | 'AS |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7,36 | | | NP | Sr-90 5.00 Subtotal | 0000E+0 | 5.8608E-01 | 1.1300E-02 1.5840E-02 | -1 |
| | | | | | | | | | | | | Total | | 5.8608E-01 | 1.5840E-02 | |
| 24211 | 4 | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA. | NONE/NP | | IH-3 11.00 | 0000E+0 | 01 6.6970E-02 01 6.6970E-02 | 1.8100E-03 1.8100E-03 | 31 |
| | | 7,35 | 0.22 | <1.000E-02 | NP | 2,0000€+02 | | 7.35 | | | NP | Sr-90 5.00 Subtotal | 0000E+0 | 01 6.6970E-02 01 3.3559E-01 4.6953E-01 | 9.0700E-03 1.2690E-02 | -1 |
| | | | | | | | | | | | | Total | | 4.6953E-01 | 1.2690E-02 | |
| 245/1 | 4 | 0,21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-11 | | NA NA | NONE/NP | | C-14 1.00 | 000E+0 | 01 6.6970E-02 | 1.8100E-03 | AS |
| |] | 7.36 | 0.22 | | NP | 2.0000E+02 | | 7.35 | | | NP | H-3 Sr-90 Subtotal | 000E+0 | | 1.8100E-03 9.0700E-03 1.2690E-02 | 3 |

FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE Envirocare of Utah, Inc. 2. MANIFEST NUMBER 4032-01-001 **WASTE MANIFEST** CONTAINER AND WASTE DESCRIPTION (CONTINUATION) 3. PAGE 19 OF 24 PAGE(S) 16.WASTE PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 8. WASTE 15. RADIOLOGICAL DESCRIPTION 9. SURFACE SURFACE CONTAMINATION 12. APPROXIMATE 13. WASTE S APPROXIMATE 13.
WASTE SOLIDIFICATION CHEMICAL FORM %
VOLUME(S) IN OR STABILIZATION CHELATING AGENT CHELATING AGENT AGENT CLASSIFI-CATION AS-Class A Stable AU-Class A CONTAINER WASTE DENTIFICATION CONTAINER DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT VOLUME CONTAINER RADIATION MBa/100 cm2 dpm/100 cm2 DESCRIPTOR NUMBER / LEVEL (See Note 2 CONTAINER (m3) (FT3) GENERATOR (See Note 1 & Note 1A) (m3) (#3) & Note 2A) Unstable AGENT IF>0.1% (kg) mSv/hr BETA-8-Class B C-Class C ALPHA RADIONUCLIDES pCVgm mC1 Total 4.6953E-01 1.2690E-02 247/1 29,39-H NA NONE/NP C-14 H-3 Sr-90 8.3990E-02 2.2700E-03 0.21 247.21 <1.0000E-04 AS NP 3.3400E-06 0.20 8.3990E-02 4.1810E-01 2.2700E-03 1.1300E-02 7,36 0.27 <1.000E-02 2.0000E+02 7.35 Subtotal 5.8608E-01 1.5840E-02 Total 5.8608E-01 1.5840E-02 254/1 38-H NA NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 1.6798E-02 1.6798E-02 8.3990E-02 4.5400E-04 4.5400E-04 2.2700E-03 0.21 65.77 <1.0000E-04 3.3400E-08 0.20 NP 7.35 0.07 <1.000F-02 2.0000E+02 7.35 Subtotal 1.1759E-01 3.1780E-03 Total 1.1759E-01 3.1780E-03 259/1 7 29,39-H NA NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 6.6970E-02 6.6970E-02 3.3559E-01 1.8100E-03 1.8100E-03 9.0700E-03 0.21 201,85 <1.0000E-04 NP 3.3400E-06 AS ----0.20 NP <1.000E-02 NP 2.0000E+02 7.35 Subtotal 4.6953E-01 1.2690E-02 Total 4.6953E-01 1.2690E-02 29,39-H NA NONE/NP C-14 H-3 Sr-90 1.00000E+01 1.00000E+01 5.00000E+01 8.3990E-02 8.3990E-02 4.1810E-01 2.2700E-03 2.2700E-03 1.1300E-02 0.21 247.21 <1.0000E-04 3.3400E-06 AS 0.20 NP 7.35 0.27 <1.000E-02 2.0000E+02 7,35 Subtotal 5.8608E-01 1.5840E-02 Total 5.8608E-01 1.5840E-02

FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| 1 | | | | | | WAST | E MANII | FEST | | | | | | 4032-01-00 | | |
|----------|--|--|----------------------|--|---|-------|--------------------|---|-------------------------|-----------------------|------------------------------------|-------------|---|--|--|--|
| <u> </u> | | | | | CONTAINE | | | PTION (CONTINU | IATION) | ·· · | | | | 3. PAGE 20 OF | 24 PAGE(S) | |
| \vdash | | DISPOSAL CON | TAINER DESC | RIPTION | | | | | PHYSICAL DESCRI | WASTE DESCRIPTION | ON FOR EACH WAS 14. CHEMICAL DE | E TYPE IN C | ONTAINER 15 PADIO | OGICAL DESCRIPTION | | 16,WASTE CLASSIFI- |
| | CONTAINER DENTIFICATION NUMBER / GENERATOR O NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (fi3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL mSv/hr | | IINATION 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12 APPROXIMATE WASTE | 13. SOLIDIFICATION | | WEIGHT | INDIVIDUAL RADIONU CONTAINER TOTAL; C AND RAD | CLIDES AND ACTIVITY (ME IR CONTAINER TOTAL ACT IONUCLIDE PERCENT | nvity . | CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| 261/ | | 4 | , · · · · | (ton) | mrem/hr | ALPNA | GAMMA | 29,39-H | | NA NA | NONE/NP | | RADIONUCLIDES pCi/ C-14 1.0000 | gm M8q 0F+01 8 3990F-02 | mCi 2 2700F-03 | 1 |
| | | | 0.21 | 247.21 | <1.0000E-04 | NP | 3,3400E-06 | 20/00-11 | 0.20 | | | NP · | H-3 1.0000 Sr-90 5.0000 | 0E+01 8.3990E-02 0E+01 8.3990E-02 0E+01 4.1810E-01 | 2.2700E-03 2.2700E-03 1.1300E-02 | ~ |
| <u> </u> | | | 7,35 | 0.27 | <1.000E-02 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | | | Total | 5.8608E-01 | 1.5840E-02 | |
| | | | | | | | | | | | | | | | • | |
| 262/1 | 1 | | 0.21 | 65.77 | <1.0000E-04 | NP | 3,3400E-06 | 39 -1 1 | 0.20 | NA . | NONE/NP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 1.6798E-02 0E+01 1.6798E-02 0E+01 8.3990E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| L | | | 7.35 | 0.07 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 1.1759E-01 | 3.1780E-03 | |
| } | | | | | | | | | | | | | Total | 1.1759E-01 | 3.1780E-03 | |
| | _ | | | | | | | | | | | : | | | | |
| 263/ | 1 | 4 | 0,21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 6.6970E-02 0E+01 6.6970E-02 0E+01 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| | | | 7.35 | 0.22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | | | | | Total | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | | | | | | | | |
| 265/1 | 1 | 4 | 0.21 | 201.85 | <1.0000E-04 | NР | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 6.6970E-02 0E+01 6.6970E-02 0E+01 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | i I |
| | | | 7.35 | 0.22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 4.6953E-01 | 1.2690E-02 | .I |
| | | - | | | | | | | | | | | Total | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | | |] | | | | | | |
| 267/1 | 1 | 4 | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 1.0000 H-3 1.0000 Sr-90 5.0000 | 0E+01 6.6970E-02 0E+01 6.6970E-02 0E+01 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | 3 |
| | | | 7.35 | 0.22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | 4.6953E-01 | 1.2690E-02 | .1 |

FÓRM 541A UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

| | | | • | | WAST | TE MANI | FEST | | | | | | - ⊢ | 4032-01-00 | 7 | |
|--|--|-------------------------------|--|---|-----------|------------------------------|---|--------------------------|-------------------|-----------------|--------------|---------------------------------------|-----------------------|--|--|---|
| <u> </u> | 585555 | | PUR PIR I | CONTAINE | R AND WAS | STE DESCR | IPTION (CONTINE | JATION | •• | | | | Í | 3. PAGE 21 OF 2 | 24 PAGE(S) | |
| | DISPOSAL CON | ſ. | RIPTION | 1 | T | | | PHYSICAL DESCR | WASTE DESCRIPTION | ON FOR EACH WAS | TE TYPE IN C | | 140101 001 | 044 05500000000 | | 16.WAST |
| CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (fi3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL <u>mSv/hr</u> mrem/hr | CONTAI | MINATION 100 cm2 8ETA- | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE | | | WEIGHT | INDIVIDUAL RAI CONTAINER TO ANI | DIONUCLIDE | CAL DESCRIPTION DES AND ACTIVITY (MB ONTAINER TOTAL ACT JCLIDE PERCENT | (q) AND TVITY | CLASSIII CATION AS-Class Stable AU-Class Unstab 8-Class C-Class |
| | | | (ton) | mrem/hr | ~ ~ ~ | GAMMA | | | ļ | - | 0-0,170 | RADIONUCLIDES | pCi/gm | MBq | mCi | - |
| | | | | | | | 1 | | | | | Total | | 4.6953E-01 | 1.2690E-02 | |
| · | , . | | | | | | | | - | | | | | | • | |
| 289/1 | 4 | 0,21 | 158,49 | <1.0000E-64 | NP | 3.3400E-06 | 39,29-11 | 0.20 | NA NA | NONE/NP | <u> </u> | C-14 1. H-3 1. Sr-90 5. | .00000E+ .00000E+ | 01 5.0320E-02 01 5.0320E-02 | 1.3600E-03 1.3600E-03 | AS |
| | | 7.35 | 0.17 | <1.000E-02 | NP | Z.0000E+02 | | 7.35 | 1 | | NP | Subtotal 5. | .0000001:+ | 7.5160E-01 3.5224E-01 | 6.8000E-03 9.5200E-03 | .1 |
| | | | | i | | | | <u> </u> | | | | | | | | . |
| | | | | | | | 1 | | | | | Total | | 3.5224E-01 | 9.5200E-03 | 1 . |
| 270/1 | 4 | | | | ļ | | 29,39-H | | NA. | | | | | | | <u> </u> |
| | | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-06 | 20,0041 | 0.20 | , NA | NONE/NP | NP | C-14 1. H-3 1. Sr-90 5. | +300000E+ .00000E+ | 01 6.6970E-02 01 6.6970E-02 01 3.3559E-01 | 1.8100E-03 1.8100E-03 9.0700E-03 | AS |
| | | 7.35 | 0.22 | <1.000E-02 | NP | 2.0000€+02 | | 7.35 | | | | Subtotal | | 4.6953E-01 | 1.2690E-02 | -1 |
| | | | | | | | | | | | | Total | | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | 1 | | | | | | | | | |
| 272/1 | -4 | 0.21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-11 | 0.20 | NA NA | NONE/NP | | C-14 1.1 | .00000E+ .00000E+ | -01 1.6798E-02 -01 1.6798E-02 -01 8.3990E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | | 7.35 | 0,07 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | .0000001 | 1.1759E-01 | 2.2700E-03 3.1780E-03 | |
| | | | | | | | | | | | | Total | ···· | 1.1759E-01 | 3.1780E-03 | |
| | ' | | | | | | | | | | | | | 1.17052-01 | 3.17002-03 | |
| 273/1 | 4 | 0.21 | 111.13 | <4.0000E-05 | NP | 3.3400E-08 | 39,29-H | 0.20 | NA | NONE/NP | | C-14 1.0 H-3 1.0 | 00000E+ | 01 3.3559E-02 | 9.0700E-04 | AŞ |
| | | 7.35 | 0.12 | | NP | 2,0000E+02 | · | | | | NP | Sr-90 5.0 | 00000E+0 | | | |
| | · | | | | | | | 7.35 | | | | Subtotal | | 2.3510E-01 | 6.3540E-03 | <u> </u> |
| | | | | | | | | | | | | Total | | 2.3510E-01 | -6.3540E-03 | 1 |
| | | | | | | | | | | | | | | | | 1 |

| FORM 541A | | | U | NIFORM | | LEVEL I | RADIOACTI | VE | · | · · · · · · · · · · · · · · · · · · · | | Envirocare of Ut | ah, Inc. 2. | MANIFEST NU 4032-01-00 | | |
|---|--|------------------------|--|---|---------------------------------------|---------------------|---|---|-------------------|--|-------------|------------------------------|--|---|--|--|
| | | | | CONTAINE | | | PTION (CONTINU | IATION) | | •• | | | 3. | PAGE 22 OF 2 | 24 PAGE(S) | |
| | DISPOSAL CON | TAINER DESC | REPTION | | | | | | WASTE DESCRIPTION | N FOR EACH WAST | E TYPE IN C | ONTAINER | | | | 16,WASTE CLASSIFI- |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (f(3) | 8, WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL mSv/hr | 10. SURF CONTAN MBg/1 dpm/10 | IINATION 00 cm2. | 11. WASTE DESCRIPTOR (See Note 2 - & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (F13) | | 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT | INDIVIDUAL S CONTAINER | RADIOLOGICAL RADIONUCLIDES A TOTAL; OR CONT AND RADIONUCLI | AND ACTIVITY (MB | TVITY | CATION AS-Class A Stable AU-Class A Unstable B-Class 8 C-Class C |
| 280/1 | 4 | 0.21 | (ton) 65.77 | mrem/hr <8.0000E-05 | ALFRA NP | 3.3400E-06 | 39-11 | 0.20 | NA NA | NONE/NP | | RADIONUCLIDES C-14 H-3 Sr-90 | pCl/gm 1.00000E+01 | M8q 1,6798E-02 1,6798E-02 8,3990E-02 | 4.5400E-04 | AS |
| | | | | | | | | | _ | | NP | | 1.00000E+01 5.00000E+01 | | | 4 |
| | | 7.35 | 0.07 | <8.000E-03 | NP | 2.0000E+02 | <u> </u> | 7.35 | | | | Subtotal | | 1.1759E-01 | 3.1780E-03 | |
| | | | , | | | | | | | | | Total | | 1.1759E-01 | 3.1780E-03 | |
| 285/1 | 4 | 0,21 | 156.49 | <8.0000E-05 | NP | 3,3400E-08 | 39,29-H | 0,20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 5.0320E-02 2.5160E-01 | 1,3600E-03 1,3600E-03 6,8000E-03 | AS |
| | | 7.35 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| 299/1 | 4 | 0.21 | 201.85 | <1.0000E-04 | NP | 3.3400E-08 | 29,39-H | | NA . | NONE/NP | | C-14 H-3 | 1.00000E+01 | 6.6970E-02 | 1.8100E-03 | AS |
| | | 7,35 | | <1.000E-02 | NP NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 1.00000E+01 5.00000E+01 | 6.6970E-02 3.3559E-01 4.6953E-01 | 1.8100E-03 9.0700E-03 1.2690E-02 | 4 |
| | | | | | | | | | | | | Total | | 4.6953E-01 | 1.2690E-02 | |
| | | | | | | | | - | | | | | | | | |
| 300/1 | 4 | 0.21 | 156.49 | <1.0000E-04 | NР | 3,3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 5.0320E-02 5.0320E-02 2.5160E-01 | 1.3600E-03 1.3600E-03 6.8000E-03 | 1 |
| | | 7.36 | 0.17 | <1,000E-02 | ŅP | 2,6000E+02 | | 7.35 | | | | Subtotal | | 3.5224E-01 | 9.5200E-03 | .i |
| | | | | | | | | | | | | Total | | 3.5224E-01 | 9.5200E-03 | |
| | | | | | | | , | | | | | | | | 4.54449 == | |
| 301/1 | 4 | 0.21 | 201.85 | <1.0000E-04 | NP | 3,3400E-08 | 29,39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 6.6970E-02 6.6970E-02 3.3559E-01 | 1:8100E-03 1.8100E-03 9.0700E-03 | AS |
| FORM 541A (10-96) | | 7.35 | 0.22 | <1.000E-02 | NP | 2.0000E+02 | | 7.35 | | <u> </u> | | Subtotal | | 4.6953E-01 | 1.2690E-02 | |

FORM 541A (10-96)

| 1. | FORM 541A | | | . | NIFORM | LOW-LEVE WASTF MA | EVEL R | UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST | VE | | | | Envirocare of Utah, Inc. | Ш | 2. MANIFEST NUMBER 4032-01-001 | JMBER 11 | |
|--|---|--|--------|------------|--------------|---------------------------------------|-------------------------------|--|---|---|------------------|-------------------------|--------------------------|---|-----------------------------------|--------------------------|---|
| Contraction | | | | | CONTAINER | AND WAST | E DESCRIP | TION (CONTINUE | (NOITAL | | • | | | <i>г</i> і | 3. PAGE 23 OF 24 PAGE(S) | 24 PAGE(S) | |
| Continues Cont | | | | | | | | | PHYSICAL DESCRE | WASTE DESCRIPTION | N FOR EACH WASTE | IYPE IN CON | | DANIOS OCICAS | OFFICE | | 18.WASTE |
| Table Tabl | CONTAINER (DENTIFICATION NUMBER! GENERATOR ID NUMBER(S) | CONTAINER DESCRIPTION (See Nats 1 & Note 14) | | S . | | SURF. CONTAMI MBQ/10 dpm/100 | ACE NATION Come ome? | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (M3) | 13. SOLIDIFICATION OR STABLIZATION MEDIA (See Note 3) | CHEMICAL FORM | WEIGHT % HELATING AGENT | | RADIONUCLIDES. TOTAL: OR CONTAINED RADIONUCLI | AND ACTIVITY (MB | | AS-Class A Stable AU-Class A Unstable B-Class B |
| Companies Comp | | | | (ton) | membr | - | GAMMA | | | | | H-20.1% | RADIONUCLIDES | pCl/pm | MBa | Que | CClass C |
| 1.10 | | | | | | | | | | | | <u> </u> | otal | | 4.6953E-01 | 1.2690E-02 | |
| Table Tabl | 1/200 | 4 | 0.21 | | | ğ | 3.3400E-06 | 29,38-H | 6.20 | NA | NONEMP | | 4.00 | 1.00000E+01 | 6.6970E-02 6.6970E-02 | 1.8100E-03 | S. |
| 4 6.21 (11.13 6.0000E-05 NP 2.000CE-07 7.34 NP NOMENP | | | 7.35 | 0.22 | <1.000E-02 | 2 | 2.0000E+02 | | 7.36 | | | | ubtotal | 5.00000E+01 | | | |
| 1,11 1,12 1,10 | | | | | | | | | | | | #F | otal | | 4.6953E-01 | 1.2690E-02 | |
| 111 | | | | | | | | | | | | | | | | | |
| 1,23 0,12 0,2000E-40 1,235 1,230 1 | 36411 | * | . 0.21 | | <\$.0000E-05 | 2 | | 39,29,1-41, | 0.20 | Z. | NONENP | | | 1,00000E+01 | 3.3559E-02 3.3559E-02 | 9.0700E-04 9.0700E-04 | AS |
| 4 6.21 66.77 64.000E-64 NP 3.3400E-66 SPH 0.20 NA NOMENP NP SPH-64 SPH-6 | | • | 7.35 | 0.12 | <6.000E-03 | ļ | 2.0000E+0.2 | | 7,36 | | | | J | 5.00000E+01 | | | |
| 4 6.21 68.77 64.000E-05 NP 3.340E-05 T.38 NA NONENP R.5.799 5.7000E-07 (1.00000E-07) | | | | | | | · | | | | | 1115 | otal | | 2,3510E-01 | 6.3540E-03 | |
| 1,00000E+01 1,00000E+02 1,000000E+02 1,00000E+02 1,00000E+02 1,00000E+02 1,00000E+02 | | | | | | | | | | | | . | | | | | |
| 4 0.27 64.000E-02 NP 2.000E-02 NA NONEMP NP 57.39 5.0000E-01 (2.0000E-01 1.0000E-01 1.00000E-01 1.00000E-01 1.0000E-01 1.00000E-01 1.00000E-01 1.0000E-01 1 | 1/50E | 4 | 0.21 | | <8.0000E-05 | 2 | | 39-4 | 0.20 | ¥. | NONENP | | | 1.00000E+01 | 1.6798E-02 | 4.5400E-04 | AS. |
| 4 0.21 65.77 62.00005-05 NP 3.34000E-65 T.34 0.20 NA NOMENNP NP 57-90 5.00000E-61 T.000000E-61 T.00000E-61 T.000000E-61 T.000000E-61 T.000 | | | 7.35 | 0.07 | <8.000E-03 | | 2.0000E+02 | • | 96"2 | | | | ŢĘ. | 5.000002+01 | | 3.1780E-03 | : ! |
| 4 0.21 65.77 62.0000E-05 NP 3.3400E-64 0.20 NA NOMENNP C-14 1.00000E+01 1.000000E+01 1.000000E+01 1.000000E+01 1.000000E+01 1. | | | | | | | | | | | | 1015 | otal | | 1.1759E-01 | 3.1780E-03 | |
| 4 0.21 65.77 45.0000E-05 NP 3.3400E-02 NP 3.3400E-02 NP 2.0000E-02 NP 2.000E-02 NP | 7 | | | | | | | | | | | " | , | | • | | • |
| 4.000Ε-03 NP 2.0006Ε-02 · 7.35 Subforbal Subforbal Total | 308/1 | 4 | 6.2 | _ | <8.0000E-06 | | 2 | 39-H | 0.20 | NA | NONE/NP | | | 1.00000E+01 | 1.6798E-02 | 4.5400E-04 | SA S |
| Total | | | 2,36 | 0.07 | <8.000E-03 | | 2.0000E+02 | | | | | | Ē | 9.000005491 | | 3.1780E-03 | |
| | | | | | | | | | | | | 15= | , tal | | 1.1759E-01 | 3.1780E-03 | ' |
| | | | | | | | | -100 | | | | | | | | | |

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| F | 0 | RM | 541A |
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UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER 4032-01-001

3. PAGE 24 OF 24 PAGE(S)

| | | | | CONTAINE | R AND WAS | TE DESCR | PTION (CONTINI | (MOITAL | | | | | \3. | PAGE 24 OF | | |
|--|---|------------------------|--|-------------------------------------|-----------|------------------------------|---|--------------------------|---|-----------------|-----------------------------------|-------------------------|---|--|--|--|
| | DISPOSAL COM | TAINER DESC | RIPTION | | , | | | PHYSICAL DESCRI | WASTE DESCRIPTION | N FOR EACH WAST | CE TYPE IN C | ONTAINER | 5, RADIOLOGICA | DESCRIPTION | | 16.WASTE CLASSIFI- |
| 5. CONTAINER EDENTIFICATION NUMBER / GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (ft3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | _MBd/1 | AINATION 00 cm2 00 cm2 | 11, WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT % CHELATING AGENT | INDIVIDUAL CONTAINER | RADIONUCLIDES | AND ACTIVITY (ME | Bg) AND | CATION AS-Class / Stable AU-Class Unstable 8-Class E C-Class C |
| ID NUMBER(S) | Note 1A) | (ft3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (FT3) | , , , , , , | | IF>0.1% | RADIONUCLIDES | pCi/qm | MBq | mCl | |
| 309/1 | 4 | 0.21 | 65.77 | | NP | 3.3406E-06 | 39-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.00000E+01 1.00000E+01 5.00000E+01 | 1,6798E-02 1,6798E-02 8,3990E-02 | 4.5400E-04 4.5400E-04 2.2700E-03 | AS |
| | | 7.35 | 0.07 | <8.000E-03 | NP | 2.0000E+02 | | 7,35 | | | | Subtotal | | 1.1759E-01 | 3.1780E-03 | .1 |
| | | | | | | |] | | | | | Total | | 1.1759E-01 | 3.1780E-03 | |
| | | | | | | | | | | | | | | | | |
| Shipment Totals | | 21.63 | 17689.99 | | | | | | | | | | | 4.0035E+01 | 1.0820E+00 | |
| | | 767.05 | 19.11 | | | | | | | | | | | | | |
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99% Se 1902 81 极 0 h 0b Of Other Should hehoh - IH (H 1077 (TRaileiz) 1501 OCS/~ PINIT 1609 #

TRUCK NO.2 ARIVED 1810

FRANKLIN ENV. (TROILIN) (JONNA TRUMY. (TRUTA)

TRUCTOR (MA) 39577 TRAIL PRITO TOO FRANKLY MA

Looding: Stentil 1950 Completations

145 | 198 | 150. | 308 | 189 | 69

52 | 3) | 143 | 310 | 407424 | 65

248 | 124 | 174 | 279 | 44 | 66

102 | 24 | 171 | 307 | 290 | 150

15 | 76 | 140 | 5 | 311

61 | 30 | 8 | 2 | 33

61 | 30 | 8 | 2 | 33

TRuck No. 3 Aprived 1810

Teadly Livers # (TN) T160842 Tractor Livers # (MA) 22797

Kanney & Son MA Loading 5 Stepted 2200 12 15 lμ 17 20

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|---|--|--|---------------------------------|---|---|--|---|--|---|---|--|--|
| FORM 540 | Envi | Envirocare of Utah, Inc. | 5. SHIPPER | ER - NAME AND FACILITY | | 3 | SHIPMENT LD. NUMBER | | | | 8. MANIFEST MINI | 1 |
| UNIFORM LOW-LEVEL RADIOACTIVE | RADIOACTIVE | | U.S. Army Cor St. Alban's VA | U.S. Array Corps Of Engineers St. Aban's VAECC | | STA | LBAN-4032-01-001 | 7. FORM 540 AND 540A FORM 541 AND 541A | PAGE 1 OF | 4 PAGE(S) | (Use this number | (Use this number on all continuation |
| WASTE MANIFEST | VIETST. | | 179th Street a | od Linden Blvd | | Ш | COLLECTOR | FORM 542 AND 542A | | | STALEAN-4032-01-001 | 2-01-001 |
| | | | Jemaica, NT 11425 | 1425 | | | PROCESSOR | ADDITIONAL INFORMATION | | None PAGE(S) | - | |
| THE PAPER OF THE PRINCE NAME OF THE PAPER | PAPER | | USER PERMIT NA | AIT NUMBER | SHIPMENT NUMBER STALBANS-4032-01-001 | MBER X | GENERATOR TYPE (Specify) G | 8. CONSIGNEE - Name and Facility Address | id Facility Address | | CONTACT Shipping and Receiving | |
| 1-800-426-8878 | (1000) | | CONTACT | | | 4. | TELEPHONE NUMBER | Envirocere of Utah, Inc. Cilve Disposel Site | | | TELEDITANE NI RECOVER AND AND AND AND AND AND AND AND AND AND | (profinds Area Code) |
| ORGANIZATION Franklin Environmental Services, Inc. | | | Mr. Hans H | Konerieh | | §. | (include Area Code) 410-962-4972 | Interstate 80, Edit 49 Clive, UT 84029 | | | (435)884-0155 | ו ווייניים איניים איניים |
| 6 | TOTAL NUMBER OF | | 6. CARRIER - Name # | ER - Name and Address | | <u>6</u> : | EPA LD, NUMBER | SIGNATURE - Authorized consignee acknowledging waste receipt | consignee acknowledg | ing waste receipt | OATE . | |
| | PACKAGES IDENTIFIED ON THIS MANIEST | ç | 205 Pennbriar | port mc. Avenue | | ≨ | | | | | | |
| | | ٠ | Erle, PA 16509 | | | | SHIPPING DATE | 100 | 10 | 10. CERTIFICATION | | |
| SES EPA REQUIATED YES ASTE REQUIRING A VES ANIFEST ACCOMPANY Y NO | EPA MANIFEST NUMBER | | CONTACT Rob To | Tous | | ES. | WBER 39) | is to boethy that the herein-named materials are popular, described, perkeged, material and lessed and are imported more than the temperature according to the opposition to the popular and according to the applicable regulations of the Department of Transposition. This also described that the temperature according to the applicable regulations of the Department of Transposition. This also described the applicable that the professional and applicable that the professional according to the applicable and are the professional and applicable the applicable that the profession with the requirements of 10 CFR Parts 20 and 51, or extraction and operature and applicable and applicable and according to the profession and applicable and appl | wh-named materials are ortation according to the ortassified, packaged, ordance with the require | . property classified, de e applicable regulation marked, and labeled a vments of 10 CFR Pan | sscribed, packaged, marks is of the Department of Tri ind are in proper condition is 20 and 51, or equivalent | d, and labeled and are ansportation. This also for transportation and state regulations. |
| | N. | | SIGNATURE - | – Authorizsd carrier acknowledging waste receipt | g waste receipt | DARE | | AUTHORIZED SIGNATURE | W | TITLE | | DATE |
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hezzard class, UN ID number, and any additional information | CRIPTION number, | 12. DOT LABEL. "PADIOACTIVE" | 13. TRANSPORT INDEX | 14, PHYSICAL AND CHEMICAL FORM | / | - | 15. INDIVIDUAL PADIONI/CLIDES | TOTAL PAI | 16. TOTAL PACKAGE ACTIVITY MBq mCl | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| US DOT Exempt, Non-Regulated Material | | | ¥ | Solid MA | <u>9</u> | H.3 | 06-JS | 6.4787E-01 | 1.7510E-02 | NA | | 001 |
| US DOT Exempt, Non-Regulated Material | | | ¥ | Solid /NA | <u>수</u> | H3 | 26-JS | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 002 |
| US DOI Exempt, Non-Hegulated Material | | | ΑA | Solid /NA | 다. 구 | £ | 06-JS | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 603 |
| US DOT Exempt, Non-Regulated Material | | | Ą | Solid /NA | C-14 | | Sr-90 | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 004 |
| US DOT Exempt, Norregulated Material | | | ∮ | Solid /NA | C-14 | £3 | Sr-90 | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 905 |
| US DOT Externity, INDIFFUE DESCRIPTION OF THE PROPERTY OF THE | | | ≨ | Solid /NA | <u>당</u> | | Sr-90 | 3.2375E-01 | 8.7500E-03 | NA NA | 145. LBS; 7.35 FT3 | 900 |
| us DOT Exempt, non-regulated Material | | | ≰ | Solid MA | <u>Ş</u> | | Sr-90 | 5.4787E-01 | 1.7510E-02 | AN . | 1 | 007 |
| us DOI Exempt, non-regulated material | | \$ | ¥ | Solid MA | C-14 | ¥ | 06-JS | 6.4787E-01 | 1.7510E-02 | Ψ | 245. LBS; 7.35 FT3 | 800 |
| FOR CONSIGNEE USE ONLY | 11 | Record Waste Description Inadequate Contamination or Leakage Detected | nton Inadequage Detecte | 20. | TERMS AND CONDITION A. HAZARDOUS MATERIALS: Generator is hazardous weaste, this shipment is also accentification as required by 40 CFR 258.1. | N. LATEFIALS: G a, this shipmen equired by 40 | ienerator represents & war it is also accompanied by e CFR 268.1. | AND CONDITION ASABOUSH MINETALES: Generator represents & warrants that Woste Naterial is (or) / Is not a hazardous waste as defined in 40 GFR 281. Where the material is a hazardous waste, this eithorient is also accompanied by a separate and competed hazardous waste menthes, along with the appropriate band-disposal restriction notice and/or certification as required by 40 GFR 2881. | is (or) / Is not | a hazardous waste as along with the approp | defined in 40 CFR 281. V | Where the material is a lion notice and/or |
| | | Unexpected Exposure Rates Detected Labels Marking of Inadomists | Rates Deter | . | TITLE: Upon av representations | ceptance at th | e disposal site by Enviroca sreupon transfer from Gen | TITLE: Upon acceptance at the disposal site by Environare of Utah, Inc., and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in Environe of Utah, Inc. | spriate regulatory autho ocare of Utah, Inc. | riles, tite to the Wast | a Matańal which conforms | to Generator's |
| | | Container Integrity Inadequate | dequate | ರ | WASTE MATE | MAL: Generate in accordance | x represents and warrants with all applicable govern | WASTE MATERIAL. Generator represents and warrants that all data set forth in this (LINFORM LOWLER/EL FADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental tawe, rules, regulations and Environate of Utah, Inc.'s facility license. | UNIFORM LOW-LEVEL s and Envirocare of Uta | . PADIOACTIVE WAS h, Inc.'s facility license | ITE MANIFEST) are true a | nd correct in |
| | | Other | | ģ | INDEMNIFICAT | 10N: Generak om the failure | r agrees to Indemnity Erwi of the Waste Material to co | NOEMNIFCATION: Cenerator agrees to indemnity Environe of Utah, Inc., its officers, employees and against all insses and labelity whatsoever if such bases or labelity results from the fallure of the Waste Material to conform in all material researchs to the date serviced on the IT HILD TALL EVER IS A DURANTED WASTER. | rs, employees and age. | nts against all losses a | and liability whatsoever if s | uch losses or |
| ٠ | - | No Violations Detected on this Shipment. | d on this Shi | - | MANIFEST,) or | If this shipment | falls to meet the standard | prescribed by the Departme | nt of Transportation or | any governmental age | -LEVEL RADKAG11ve w ncy having jurisdiction ove | ASTE ir such matters. |
| FORM 540 (10-88) | | | | | | | | | | | | |

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| FORM 540A | | UNIF | ORM LOW-LEVEL RA | ADIOACTIV | E | | | Envir | ocare of Utah, Ir | NC. 8. MANIFEST NUM (Use this number pages) STALBAN-40 | er on all continuation |
|---|-----------------------------------|---------------------------|--------------------------------------|-----------|--------|---------------------------|------------------|-----------------------------|-------------------------|---|--|
| | | SHII | WASTE MANIFE PING PAPER (CON | |) | | | | | PAGE 2 O | F 4 PAGES |
| 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 | | IND | 15. VIDUAL NUCLIDES | TOTAL PAC MBq | 16. KAGE ACTIVITY mCi | 17. LSA/SCO CLASS | 18. TOTAL WEIGHT OR VOLUME (Use appropriate units) | 19. IDENTIFICATION NUMBER OF PACKAGE |
| US DOT Exempt, Non-Regulated Material | , NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | .NA | 245. LBS; 7.35 FT3 | 009 |
| US DOT Exempt, Non-Regulated Material | NA | NA NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA . | 245. LBS; 7.35 FT3 | 010 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA. | Solid /NA | C-14 | H-3 | Sr-90 | 5.4787E-01 | 1.7510E-02 | NA | 245. LBS; 7.35 FT3 | 011 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6,4787E-01 | 1.7510E-02 | ŅĄ | 245, LBS; 7.35 FT3 | 012 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA | 245. LBS; 7.35 FT3 | 013 |
| US DOT Exempt, Non-Regulated Material | NA | NA | Solid /NA | C-14 | н-з | Sr-90 | 5.4787E-01 | 1.7510E-02 | ŅĄ | 245. LBS; 7.35 FT3 | 014 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | -NA | 245. LBS; 7.35 FT3 | 015 - |
| US DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | ŅA | 245. LBS; 7.35 FT3 | 016 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA | 245. LBS; 7.35 FT3 | 017 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.6206E+00 | 4.3800E-02 | NA . | 545. LBS; 7.35 FT3 | 018 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA. | Solid /NA | C-14 | н-3 | Sr-90 | 1.6206E+00 | 4,3800E-02 | NA | 545. LBS; 7.35 FT3 | 019 |
| US DOT Exempt, Non-Regulated Material | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA | 245. LBS; 7.35 FT3 | 020 |
| US DOT Exempt, Non-Regulated Material | NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA | 245. LBS; 7.35 FT3 | 021 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA NA | Solid /NA | C-14 | H-3 | Sr-90 | 6,4787E-01 | 1.7510E-02 | . NA | 245. LBS; 7.35 FT3 | 022 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA NA | Solid /NA | C-14 | H-3 | Sr-90 | 9.7273E-01 | 2.6290E-02 | NA NA | 345. LBS; 7.35 FT3 | 023 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA NA | Solid /NA | C-14 | H=3 ·· | Sr-90 | 6,4787E-01 | 1.7510E-02 | NA NA | 245. LBS; 7.35 FT3 | 024 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA NA | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA NA | 245, LBS; 7.35 FT3 | 025 |
| US DOT Exempt, Non-Regulated Material | NA · | NA. | Solid /NA | C-14 | H-3 | Sr-90 | 6.4787E-01 | 1.7510E-02 | NA | 245. LBS; 7.35 | 026 |

| UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER (CONTINUATION) GEGUIPTON TO TUBEL TRANSFORT TO TUBEL TRANSFORT TO TUBEL TRANSFORT TO TUBEL TRANSFORT TO TUBEL THA THA TO TUBEL TO TU | | | Enviro | Englanding of Hoth Jin | | MANIFEST NUMBER |
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| NA | | | | | đ | An all administration |
| WASTE MANIFEST | ACTIVE | | ٠. | | v | 2-01-001 |
| Dot Luber | ATION) | | | | PAGE 3 OF | 4 PAGES |
| NA NA SOIID NA C-14 H | 16. RNDV/DUAL RADIONICALIDES | | 16. TOTAL PACKAGE ACTIVITY MBG | 17. LSANSCO | 18. TOTAL WEIGHT OR VOLUME | 19. IDENTIFICATION NUMBER OF |
| NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila C-14 NA NA Solid fila | = | 6.478 | 1.7510E-02 | | | 720 |
| NA NA Solid MA C-14 NA NA SOLID MA C-14 NA NA NA SOLID MA C-14 NA NA NA SOLID MA C-14 NA NA NA SOLID MA C-14 NA NA NA SOLID MA C | H3 | Sr-90 5.4787E-01 | 1.7610E-02 | NA | | 028 |
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| NA NA Solid MA C-14 | ₽ H | | 1.7510E-02 | NA | 1 | 032 |
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| NA NA Solid MA C-14 NA NA Solid MA C-14 NA NA Solid MA C-14 NA NA Solid MA C-14 | ? | Sr-90 5.4787E-01 | 1.7510E-02 | NA | | 037 |
| NA NA SOIId/NA C-14 NA NA SOIId/NA C-14 NA NA SOIId/NA C-14 NA NA SOIId/NA C-14 | ? ¥ | Sr-90 1.6206E+00 | 4.3800E-02 | NA | 1 | 038 |
| NA NA Solid MA C-14 NA NA Solid MA C-14 NA NA SOGIG NA C-14 | Ĩ | Sr-90 1.6206E+00 | 4.3800E-02 | Ā | | 620 |
| NA NA Solid NA C-14 NA NA SOGIG NA C-14 | £ | | 1.7510E-02 | NA NA | 1 | 040 |
| NA NA SOLID NA C-14 | H3 | | 8.7500E-03 | A. | 1 | 041 |
| | £ | 9 | 1.7510E-02 | NA | | 042 |
| NA Solid NA C-14 | НЗ | • | 5.2500E-02 | NA | 1 | 043 |
| COCOL Examply Nutringsulated material DA NA Solid PA H-3 | ? ¥ | Sr-90 1.6206E+00 | 4.3800E-02 | A. | 545. LBS; 7.36 FT3 | 4 |

FORM 540A

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

Envirocare of Utah, Inc.

. MANIFEST NUMBER
(Use this number on all continuation pages).
STALBAN-4032-01-001

AGE 4 OF 4 PAGES

| • | | | | | | • | | | | | |
|---|-----------------------------------|---------------------------|--------------------------------------|------|-------------|--------------------------------|------------|-----------------------------|-------------------------|--------------------------------------|---|
| U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN IO number, and any additional information | 12. DOT LABEL "RADIOACTIVE" | 13. TRANSPORT INDEX | 14. PHYSICAL AND CHEMICAL FORM | | INI RADK | 15. DIVIDUAL ONUCLIDES . | TOTAL PAC | 16. KAGE ACTIVITY mCl | 17. LSA/SCO CLASS | OR VOLUME (Use appropriate units) | 19. IDENTIFICATIO NUMBER OF PACKAGE |
| JS DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | H-3 | Sr-90 | 1.6206E+00 | 4.3800E-02 | NA | FT3 | 045 |
| S DOT Exempt, Non-Regulated Material | NA: | NA . | Solid /NA | C-14 | H-3 | Sr-90 | 3,2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 046 |
| S DOT Exempt, Non-Regulated Material | NA NA | NA NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 047 |
| IS DOT Exempt, Non-Regulated Material | , NA | NA NA | Solid /NA | C-14 | н-3 | Sr-90 | 3,2375E-01 | 8.7500E-03 | NA NA | 145. LBS; 7.35 FT3 | 048 |
| JS DOT Exempt, Non-Regulated Material | NA NA | NA | Solid /NA | C-14 | Н-3 | Sr-90 | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 049 |
| US DOT Exempt, Non-Regulated Material | NA NA | NA NA | Solid /NA | C-14 | H-3 | Sr-90 | 3.2375E-01 | 8.7500E-03 | NA | 145. LBS; 7.35 FT3 | 050 |
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FORM 540A (10-98)

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|---|---|-------------------------------------|----------------|-----------------|---------------------------------|--------------|-------------------------------|---------------------|--|---|---------------------------|--|--------------------------|------------|----------|--|------------|------------|---|--|------------|------------|----------------|--|--|---|--|-----------------------------|
| 1 | | | | | s. | | | | S.WASTE | CATION AS-Class A Stable AU-Class A | P Class B | AS | | | • | AS | | | | AS. | 174 | | | e up to osal site followed | dentified | | | |
| • | ~ | 01-001 E(S) | (2) | | U.S. Army Corps Of Engineers | | | ı | | | | 8.7100E-03 | 4.5400E-03 | 1.7510E-02 | | 2.1300E-03 | 8.7500E-03 | 8.7500E-03 | | 4.3500E-03 2.1300E-03 | 8.7500E-03 | 8.7500E-03 | | Note 3: Schidification and Stabilization Media Codes. (Choose up to hitps which predominate by volume, For media media disposal si structural abability noutivements. The utmerical code must be follow. | by "-S" and the media vender and brand name must also be identified in form 13. Code 100±NONE REQUIRED | | | |
| | NUMBER | N-4032-(| 2012 | AME | Sorps of | | IUMBER | 032-01- | | (MBq) AND | | | | | | | | | | | | | , . | Media Cod or media m merical co | d name mu | Styrene | 90 io 1 | Wined. |
| | 2. MANIFEST NUMBER | STALBAN-4032-01-001 | 20.00 | 4. SHIPPER NAME | S. Army (| | SHIPMENT ID NUMBER | STALBAN-4032-01-001 | | 15. FACKOGICAL DESCREPTION NONIDUAL RADIONICIDES AND ACTIVITY (MBQ) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND BANCON PAINTS IN ESERCENT | | 3.2227E-01 | 1.6798E-01 6.4787E-01 | 6.4787E-01 | | 1.6095E-01 7.8810E-02 8.3990F-02 | 3.2375E-01 | 3.2375E-01 | | 1.6095E-01 7.8810E-02 8.3990E-02 | 3.2375E-01 | 3.2375E-01 | | abilization volume.) F ents. the m | or and bran | . Vinyl Estor | 99. Other, Describe in Rem 13, or additional page | 0. None Rec |
| | 2. MA | o o | ó | \$ \$ | <u></u> | | SHIPM | ST | | CUDES AND | | | | | | | | | | 9.60000E+01 | | | | ation and Si forminate by ty requirem | nedie vend | z | | |
| | | | | | | L. | NA | NA | 9 | L RADIONUS R TOTAL: O | | 9.60000E+01 | 2.000 | | | 9.60000E+01 | | | | 9.600 | | | | 3: Solidifica which pre- | S" and the ra 13. Code | Solidification 90. Cement | 91. Concrete (encapsulation) 92. Bitumen | Inyl Chloride |
| | | TOTAL | 1 | NP | | SOURCE | | (tons) | | NDIVIDUA | | 89 | | | | | | | | | | | | | 2 2 | 8 8 | <u>8</u> | 8 |
| | | _ | - | | T | - | (kgs) | | | | | HADIONUCLIDES | a | 1 | | | ă | | | | Ti. | | | Description los.) | | | | |
| | (manual) | 2 | ! | Z | | - F29 | 2 | Đ. | CONTAINER | S | - 1 | 2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2. | Subtotal | Total | | <u>2</u> ₹% | Subtotal | Total | | 23.5° | Subtota | Total | | Note 2A: Specific Weste Descriptions (Choose all applicable codes.) | 2 | Sono Combustible Non-combustible | tion Filters | |
| | ANATEON O | | - | _ | - | - | | _ | E TYPE IN | WEIGHT | AGENT IF>0.1% | | £ | | | 9 | ! | | | 9 | ! | | | te 2A: Spe cose all ap | Dewatered | | | |
|) | 1, MANIFEST TOTALS COSCIAL ANICH EAD MATERIAL ANICH | U-235 | ! | MP | | To-99 | AN . | c _N | ACHWAST | CHEMICAL FORW | | NP. | | | | AN. | | | | d. | | | | | 0 : | 3 | X -1 | |
| | ST TOTALS | | | | - | - | | L | MON FOR | N CHENE | | NONEMP | | _ | | NONEWP | | | | NONEAN | | | | r volume.) | g. | fal (emospt | Est In 18em 11. | |
| | 1. MANIFE | U-233 | | dN . | ACTIVITY | ž | 1.8051E+01 | 4.8786E-01 | WASTE DESCRIPTION FOR EACH WASTE TYPE IN C | 13. SOLDIFICATION OR STABILIZATION | (See Note 3) | | | | • | | | | | | | | | isale Descriptor Codes. (Choose up to three which predominate by volume.) | Concentrates 38. Compacible Trash | 40. Noncompaction I rash 41. Animal Carcass 42. Biological Maharial (except | animal carcass) 43. Activated Material 59. Other, Describe in Item 11. | or additional page |
| | - | <u> </u> | 5080.32 | 9.60 | ξ. | \dashv | | П | T 13 | | | ₹ | 185 | | | 0.20 NA | 7.35 | | | 0.20 | 7.35 | | | a which pr | 88 | } \$ 4.8, \$ 4.20 | 48 40 | i |
| | | NET WASTE WEIGHT | | | | MULTERIL | 8.8386E+00 | 2.3888E-01 | | 12. APPROXIMATE WASTE VOLUME(S) IN | EL. | | | | | | ,- | | | | | | | ee up to thin | ange Media inge Modia | quipment (except off) | 35. Glassware or Labware 38. Sealed Source/Device 37. Paint or Plating | |
| | | NET WASTE VOLUME | 10.50 kg | 367.50 lon | - | SE I | | 5 | ľ | | \$24) | | | | <u>'</u> | | | | 1 | | | | | des. (Choo noiston Rubi | ion lon-exch on lon-exch | taminated E | SSWERP OF LA | |
| | | | 왍 | £3 | | ALL NUCLIDES | 3.6264E+01 | 9.8065E-01 | | 11. WASTE DESCRIPTOR | & Note 2A) | 39,29-H | | | | Ŧ | | | | # | | | | ascriptor Co | 8 8 8 | មិន្ត ខ្លួន ខ្លួន | 28 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | • |
| | A MARCO AC | PACKAGES/ DISPOSAL CONTAINERS | 1 | 3 | - | 1 | MBq . | ឌ្ឌ | | | BETA- | 3.3400£-08 | 2.0000E+02 | | | 3.3400E-06 | 2.0000E+02 | | | 3.3400E-06 | 2.0000E+02 | | | NOTE 2: Weste D | cinerator Ash oi | 24. Oil 25. Aqueous Liquid | 25. Filter Media 27. Mechanical Filter 28. EPA or State | azardous |
| : | ah, Inc. | | · | | | er and | | | | CONTAMINATION MBQ/100 cm2 | ALPHA B | +- | | | | AN S | 4 | | | ₹ | £ | | · | NOTE SO | <u>2,2,3</u> | 122 | <u> </u> | |
|) | Envirocare of Utah, Inc. | | | | | oi. Trans | | | ŀ | 2 | \perp | <u> </u> | 8 | _ | | 98 | 8 | | | 耠 | ŝ | | | n Codes | | | | |
| | Enviroca | ZE | ! | | | for Confr | | | | 9. SURFACE PADIATION LEVEL | | 1 4 | | | | <8.0000E-05 | <8.000E-03 | | | <8.0000E-05 | <8.000E-03 | | | g Descriptions by the applications of the second se | | | | |
| | | UNIFORM LOW-LEVEL BADIOACTIVE | , | | RIPTION. | uirements | Disposal of Radioactive Waste | | ð | 8. WASTE AND CONTAINER WEIGHT | 2 | 111.13 | 0.12 | | | 66.77 | 20'0 | | | 65.77 | 70.0 | | | Note 1A: Bulk Packaging Description Codes (Choose one code as may be applicable.) | - P |) | | |
| | • | RAD | NIFF | | TE DESC | (RC) Red | oactive W | | DESCRIPT | NOLUME 8. | 鲍 | 120 | 191 | <u> </u> | | 129 | 7.25 | | | 5 | 7.35 | - | | Note 1A: Bu (Choose or | A Gondola B Intermodal | Seave Seave | • | |
| | | LEVE | E MAI | | ND WAS | nission (h | of Radi | | CONTAINER | ĸ | | - | | <u> </u> | | | | | | | | | | ainers/ over- OP: | | este Pants | # # # # # # # # # # # # # # # # # # # | |
| | | -MO1 | WASTE MANIEEST | | CONTAINER AND WASTE DESCRIPTION | ory Comm | Dispose | | DISPOSAL CONTAINER DESCRIPTION | TAINER RIPTION | (See Note 1 & Note 1A) | | | | | | | | | ; ; | | | | For cont structural flowed by " | Mizer | packaged W | grity Contain escribe in Italional page. | |
| | | ORM | | | CONT | * Regulat | • | | | | <u>8</u> * | + | | | · | 4 | | | | • | | | | ption Code in approved must be fo | 9. Deminers | 1. Bulk, Un | 13. High link 19. Othor. C or eddit | |
| | | UNIE | • | | | al Nuclean | | | | UNER CATION ER/ | ATOR JER(S) | | | | | | | | | | | | | niner Descri g disposal 1 verical code | cor Crate | or Pad | or Liner rik or Liner Tenk or Line | ank or Liner |
| | FORM 541 | | | | | Addition | | | | CONTAINER IDENTIFICATION NUMBER! | GENERA | 001/J | | | | 1/200 | | | | 1/200 | | | | NOTE 1: Container Description Codes. For containers waste requiring disposal in approved structural over-pacts the numerical code must be followed by "-Op-" | 1. Wooden Box or Crate 2. Month Box | Plassic Drum Metal Drum | 5. Metal Tank or Liner 13. High knegdity Container 6. Commiss Tank or Liner 19. Other. Describe in Item 6, 7. Polyectriane Tank or Liner or additional page. | 8. Fiberglass Tank or Liner |
| | ď | | | | | | | -1 | | 너 | | 10 | | • | | l | 1 | | | , - | | | | ¥ \$ £ | | 144 | 666 | ed |

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| • | | | |) | | | | | • |) | | | | | | |
|--|-----------------------|--------------------------------|--|-------------------------------------|---|-----------------------|--|--|---|----------------------------------|--------------------------|--|--|--|--|---|
| FORM 541A | | | 5 | NIFORM | UNIFORM LOW-LEVE | 1_ | RADIOACTIVE | Ę. | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER STALBAN-4032-01-001 | ABER 032-01-001 | |
| | | | | | WASTE MA | | NIFEST | | | • | | | 3. 6 | PAGE 2 OF 12 PAGE(S) | PAGE(S) | |
| | | | ŀ | CONTAINER | CONTAINER AND WASTEDES | | HIPTION (CONTINUATION) | | WASTE DESCRIPTION | N FOR EACH WAST | EYPEINCO | TAINER | - | | | WASTE |
| | DISPOSALCOR | DISPOSAL CONTAINER DESCRIPTION | SELECT. | | | | | PHYSICAL DESCRIP | PTION 14. CHEMICAL DESCRIPTION | 14. CHEMICAL DES | CRIPTION | 15. | RADIOLOGICAL DESCRIPTION | ESCRIPTION | | TOTA |
| 6. CONTAINER IDENTIFICATION NUMBER / | CONTAINER DESCRIPTION | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURFACE CONTAMINATION MEGING CITZ. dpm/100 CITZ. | CE WATTON Tame. | 11. WASTE DESCRIPTOR (See Note 2 | 12 APPROXIMATE 1 WASTE VOLUME(S) IN CONTAINER (m3) | 13. SOLIDIFICATION. OR STABILIZATION MEDIA (See Note 3) | CHENICAL FORW CHELATING AGENT | WEIGHT % CHELATING AGENT | • | ADIONUCLIDES AN OTAL; OR CONTAI ND RADIONUCLID | NEDVIDUAL RADIONUCLIDES AND ACTIVITY (WBQ) AND CONTANER TOTAL, CR CONTANER TOTAL ACTIVITY AND FADIONUCLIDE PERCENT | | AS-Cless A Stable AU-Class A Unstable B-Class B |
| D NUMBER(S) | Note 1A) | þ | 9 | WS/W | ALPHA | BETA- | | (FT3) | | | F>0.1% | DIONUCLIDES | pCl/pm | | Ę. | |
| 1,000 | * . | ភូ | | 7 | | 3.3400E-08 | 39-H | 0.20 | NA NA | HONEMP | 2 | C-14 H-3 Sr-80 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.6095E-01 7.8810E-02 8.3990E-02 | 2.1300E-03 2.2700E-03 | S |
| | | 7.35 | 70.0 | <8.000E-03 | £ | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | | | | Total | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | | | | | | | • | |
| 1/500 | | 62 | es.77 | \$0.5000d.6> | Ş | 3.3400E-06 | H-66 | 0.20 | NA NA | NONEMP | ¥ | C-14 H-3 Sr-80 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.6095E-01 7.8810E-02 8.3990E-02 | 4.3500E-03 2.1300E-03 2.2700E-03 | AS |
| | | 7.35 | TOLO | <8.000E-03 | 2 | 2,0000E+02 | | 26.7 | | | | Subtotal | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | J | | | | | Total | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | | | | | | | | |
| 1/900 | 4 | 0.21 | 15.77 | <5.0000É-05 | 9 | 3.3400E-08 | 7-82 | 623 | ¥ | NONEMP | ş | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 7.8810E-02 8.3990E-02 | | 2 |
| | | 7.38 | 6.07 | <8.000€-03 | ď | 2,0000E+02 | | 7.35 | | | | Subtotal | | 3.2375E-01 | - 1 | |
| | | - | | | | | | | | | | Total | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | • | | | | I | | 00 10074 0 | |
| 1/200 | | 0.21 | 111.13 | -8.0000E-05 | NP | 3.3400E-06 | H-62,68 | 6.20 | \$ | NONEMP | 2 | 7 .7. 4 2.4 7.90 | 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.5400E-03 | 2 |
| | | 7.85 | 5 0.12 | 50-2000'S> | ŧ | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1,7510E-02 | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | | 0.50000 | | | 94 |
| 1/900 | * | F7 | 111.13 | \$-30000£-05 | Ş | 3.3400E-06 | 38,28+H | 0.20 | ≨ | NONEMP | £ | ###################################### | 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | | |
| | | 7.35 | 5 0.12 | -8.000E-03 | ğ | 2.0000E+02 | | . 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

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UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER STALBAN-4032-01-001

| Ì | | | • | | WASI | E MANII | res i | | | | | | | 9 040540540 | DACE(C) | 1 |
|---|--|------------------------------|--|---|---------------------------------------|-----------------------------|---|--------------------------|---|-----------------|-------------|-----------------------------------|--|--|--|--|
| | DISPOSAL CON | and the second | HOYP WITH | CONTAINE | RAND WAS | TE DESCRI | PTION (CONTINU | IATION) | | | | | | 3. PAGE 3 OF 12 | PAGE(S) | |
| | Diardadecor | I ANER DESA | HE TRANS | | <u> </u> | · | <u> </u> | PHYSICAL DESCRI | WASTE DESCRIPTION | 14. CHEMICAL DE | E TYPE IN C | ONTAINER 16 | BADKOLOGIC | AL DESCRIPTION | | 16.WASTE CLASSIFI- |
| 5. CONTAINER DENTIFICATION NUMBER/ GENERATOR ID NUMBER(S) | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (H3) | 8. WASTE AND CONTAINER WEIGHT (kg) | 9. SURFACE RADIATION LEVEL mSv/hr | 10, SURF CONTAN MBO/1 dpm/10 | INATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE | 18. SOLIDIFICATION OR STABILIZATION | | WEIGHT | INDIVIDUAL R CONTAINER T A | MADIONUCLIDE FOTAL; OR CO IND RADIONUC | ES AND ACTIVITY (MBI NTAINER TOTAL ACT CLIDE PERCENT | İVITY | CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| | | | (lon) | mrem/hr | - ALCTA | GAMMA | | | | | | RADIONUCLIDES | pCl/gm | MBq | mCi | |
| | <u> </u> | | | | | | : | | | | | Total | | 6.4787E-01 | 1.7510E-02 | e dita |
| 009/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | МP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+ 4.70000E+ 5.00000E+ | 01 3.2227E-01 01 1.5762E-01 01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.25 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | , | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | | | | | |
| 010/1 | 4 | 0.21 | 111.13 | -41.0000€-05 | NP | 3.3400E-06 | 39,29-H | 8.20 | NA | NONEMP | NP NP | C-14 H-3 Sr- 9 0 | 9.60000E+ 4.70000E+ 5.00000E+ | 01 3.2227E-01 01 1.5762E-01 01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | | | | | |
| G11/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.340015-06 | 39,29-H | 0.20 | NA | NONE/NP | NP. | C-14 H-3 Sr-90 | 9.60000E+ 4.70000E+ 5.00000E+ | 01 1.5762E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E+03 | NР | 2.000015+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | <u>.</u> | | | | | | | | | _ |
| 012/1 | 1 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+ 4.70000E+ 5.00000E+ | -01i 1.5762E-01i | 8.7100E-03 4.2600E-03 4.5400E-03 | |
| | | 7.95 | 0.12 | <8.000Æ-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | .l |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| FORM SHA MO OF | | | | | | <u></u> | | | <u> </u> | | | | | | | <u> </u> |
| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

FORM 541A (10-96

FORM 541A

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER STALBAN-4032-01-001

3. PAGE 4 OF 12 PAGE(S)

| | | | | | | | | | | | | | 3.1 | AGE 4 OF 12 | PAGE(5) | |
|---|--|-------------------------------|--|-------------------------------------|--|-----------------------------|---|---|------------------------------------|-----------------------------------|--|-----------------------|---|--|--|--|
| | DISPOSALCON | TO DESCRIPTION OF THE PARTY | SIGTICAL (| CONTAINER | AND WAS | TE DESCRI | SHOW (CONTINU | ATION) | WASTE DESCRIPTION | IN FOR EACH WAST | E TYPE IN C | ONTAINER | | | | 16.WASTE |
| | DISPOSALCON | TAINER DESCRI | HF 17011 | 1 | | | | PHYSICAL DESCRI | PTION | 14. CHEMICAL DES | CRIPTION | 15 | , RADIOLOGICAL D | DESCRIPTION | | CATION |
| 5. CONTAINER IDENTIFICATION NUMBER! GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUMĖ (m3) (fi3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURF CONTAM MB0/10 dpm/10 | INATION 00 cm2 10 cm2 | WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3) | SOLIDIFICATION OR STABILIZATION | CHEMICAL FORM/ CHELATING AGENT | WEIGHT % CHELATING AGENT IF>0.1% | CONTAINER | RADIONUCLIDES A TOTAL; OR CONTA AND RADIONUCLID | NNER TOTAL ACT | ĬVΠY | AS-Class A Stable AU-Class A Unstable B-Class B G-Class C |
| ID NUMBER(S) | Note 1A) | (ft:3) · · | (kg) (ton) | mSv/hr mrenvhr | ALPHA | GAMMA | | (F-10) | | | #30.1 A | RADIONUCLIDES | pCi/gm | MBq | mCi | |
| elau . | 4 | 0.31 | | <8.0000E-05 | NP | 3.3400E-06 | 89,29-H | 0.20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | |
| • | | 7.35 | 0.12 | <8.000E-03 | KP | 2.0000E+02 | ļ | 7.35 | | ļ | l | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| ,,,,, | | | | | - | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | <u> </u> | C-14 | 9.60000E+01 | 3.2227E-01 | 8.7100E-03 | AS |
| 014/1 | • | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-05 | 39,29-11 | 0.20 | NA | NONE/NP | МÞ | H-3 Sr-90 | 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | <u> </u> | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | _ | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | <u> </u> | | | - 000005-04 | 0.00075-01 | 8.7100E-03 | B AS |
| 015/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-03 | |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | <u> </u> | 6.4787E-01 | 1.7510E-02 | 2 |
| | | | | | | | | | | | | Total | | 6.4787E-01 | | 2 |
| | | | | | į | | | | | | | | D 50000F-04 | 2 2007 64 | 8.7190E-0 | 3 AS |
| 016/1 | 1 | 0.21 | 111.3 | <8.0000E-05 | N2P | 3.3400E-06 | 39,29-Н | 0.20 | NA . | NONEMP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | 3 45 |
| | | 7.35 | 6.1: | 2 <8.0005-03 | MP | 2.0000E+0 | | 7.35 | | | | Subtotal | | 6.4787E-01 | ļ | 2 |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-0 | 2 |
| | | | | | | | | | | | | | 0.00000 | 4 9 000XF 0 | 0.7100=0 | 2 10 |
| 017/1 | 4 | 0.2 | 1 111.1 | 3 <8.0000E-05 | , NF | 3.34005-0 | 39,29-H | 0.20 | NA | NONE/NP | qq. | C-14 H-3 Sr-90 | 9.60000E+0 4.70000E+0 5.00000E+0 | 1 1.5762E-01 | 8.7100E-0 4.2600E-0 4.5400E-0 | 3 AS 3 |
| | | 7.3 | 5 0.1 | 2 <8.000E-63 | NF | 2.0000E+0 | 2 | 7,35 | | | | Subtotal | 1 | 6.4787E-0 | 1.7510E-0 | 2 |

Envirocare of Utah, Inc. 2. MANIFEST NUMBER

| FORM 541A | | | U | NIFORM | | EVEL F | RADIOACTI | VE | <u>.</u> | ···· | | Envirocare of U | tah, inc. 2. | MANIFEST NU STALBAN | JMBER 4032-01-001 | |
|---|--|---------------|--|-------------------------------------|---|--------------------------|---|--|---|--|---------------------------|-------------------------|--|--|--|---|
| | · · · | · | • | CONTAINE | | | PDON (CONTINU | (AOITÁ | | | | | 3. | PAGE 5 OF 1 | 2 PAGE(S) | |
| 5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURF CONTAM _MBa/11 dpm/10 | ACE INATION 10 cm2 | 11. WASTE DESCRIPTOR (See Note 2 | PHYSICAL DESCRI 12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER | PTION 13. SOLIDIFICATION OR STABILIZATION MEDIA | IN FOR EACH WAST 14. CHEMICAL DE CHEMICAL FORM/ CHELATING AGENT | WEIGHT WEIGHT CHELATING | INDIVIDUAL CONTAINER | S. RADIOLOGICAL RADIONUCLIDES TOTAL: OR CONT AND RADIONUCLI | AND ACTIVITY (ME | Sq) AND | 16.WASTE CLASSIFI- CATION AS-Class A Stable AU-Class A Unstable |
| ID NUMBER(S) | Note 1A) | (m3) (ft3) | (leg) (lon) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | & Note 2A) | (<u>m9)</u> (F13) | (See Note 3) | | AGENT IF>0.1% | RADIONUCLIDES | pCi/gm | MBq | mCi | B-Class B C-Class C |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 3333 | |
| 018/1 | 4 | . 0.21 | 247.21 | <2.5000E-04 | NP | 3.3400E-06 | 39,29,40-HL | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 8.0660E-01 3.9590E-01 4.1810E-01 | 2.1800E-02 1.0700E-02 1.1300E-02 | AS |
| | | 7.35 | 0.27 | <2.500E-02 | NP | 2.0000E+02 | | 7.95 | | | | Subtotal | | 1.6206E+00 | | |
| | | | | | | | | | | | | Total | | 1.6206E+00 | 4.3800E-02 | |
| 019/1 | 4 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | \$9,29,40-HL | 0.20 | NA | NONEMP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+0 | 8.0660E-01 3.9590E-01 4.1810E-01 | 2.1800E-02 1.0700E-02 1.1300E-02 | AS |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 1.6206E+00 | | ·I |
| | | • | | | | | | | | | | Total | | 1.6206E+00 | | |
| 020/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA. | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | o.cococa. | 6.4787E-01 | 1.7510E-02 | .i |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| 021/1 | 4 | 8.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 8.20 | NA NA | NONEMP | | C-14 H-3 | 9.60000E+0 4.70000E+0 5.00000E+0 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | NP | Sr-90 Subtotal | 5.00000E+0 | 1.6798E-01 6.4787E-01 | 4.5400E-03 1.7510E-02 | -1 |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| FORM 541A (10-96) | ļ | | | | | | <u> </u> | | L | <u> </u> | <u> </u> | <u> </u> | 1 | | <u> </u> | <u> </u> |

FORM 541A UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER STALBAN-4032-01-001

3. PAGE 6 OF 12 PAGE(S)

| | • . | | | CONTAINER | LAND WAS | TE DESCRI | PTION (CONTINU | ATION) | | | | | | AGE USI IE | | 6.WASTE |
|--|--|----------------------|--|-------------------------------------|--|----------------------------|----------------|-----------------|---|-------------------|-----------------------------------|-------------------------|--|--------------------------|--|--|
| | DISPOSAL CON | TAINER DESC | UPTION | | | | | PHYSICAL DESCRI | | IN FOR EACH WASTI | COUPTION | NTAINER 15. | RADIOLOGICAL I | ESCRIPTION | | CLASSIFI- |
| 5. CONTAINER IDENTIFICATION NUMBER! GENERATIOR | E CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (mS) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURF CONTAM MBg/10 dpm/10 | INATION 20 cm2 0 cm2 | | 12. APPROXIMATE | 13. SOLIDIFICATION OR STABILIZATION | | WEIGHT % CHELATING AGENT | CONTAINER | ADIONUCLIDES A TOTAL; OR CONTA IND RADIONUCLID | INER TOTAL ACTI | AND I | CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| ID NUMBER(S) | Note 1A) | (mS) (tt3) | (kg) (lon) | mSv/hr mrem/hr | ALPHA | BETA- | | (F13) | | | iF>0.1% | RADIONUCLIDES | pCVgm | MBq | mCi | |
| 022/1 | 4 | 0.21 | 111.13 | <0.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA . | NONE/NP | NP | lĤ-à' l | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| , | | | | | | | l . | | | | | Total | | 6.4787E-01 | 1,7510E-02 | |
| | | - | | | | | | | | | | | 0.000000:01 | 4.8470E-01 | 1,3100E-02 | AS |
| 023/1 | 4 | 0.21 | 156.49 | <8.0000E-05 | NP | 3.3400E-06 | 39,29,40-H | 0.20 | NA - | NONE/NP | NP | ŭ.a ' | 9.60000E+01 4.70000E+01 5.00000E+01 | 2.3643E-01 2.5160E-01 | 6.3900E-03 6.8000E-03 | ~ |
| | | 7.55 | 0.17 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | , | Subtotal | | 9.7273E-01 | 2.6290E-02 | |
| | | | | | | | | | | | | Total | | 9.7273E-01 | 2.6290E-02 | |
| | | | | | | | | | <u> </u> | | | | 0.600005.01 | 3.2227E-01 | 8.7100E-03 | AS |
| 024/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | NР | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | |
| | | 7.35 | 0,12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | <u> </u> | | · · | | | | HONESID | | C-14 | 9.60000E+01 | 3.2227E-01 | 8.7100E-03 | AS |
| 025/1 | 4 | 0.21 | 111.15 | <8.0000€-05 | NP | 3.3400€-06 | 39,29-H | 0.20 | NA NA | HONEMP | КP | H-3 Sr-90 | 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | ļ | 7.35 | | | ļ <u> </u> | Subtotal | | 6.4787E-01 | 1.7510E-02 | ! |
| | | | | | | | 1 | | _} | | | Total | | 6.4787E-01 | 1.7510E-02 | 2 |
| | | | | | | | | | | | | 0.14 | 9.60000E+0 | 2 2227E A1 | 8,7100E-0 | 3 AS |
| 026/1 | 4 | 0.21 | 111.71 | <8.0000E:05 | NP | 3:3400E-06 | 39,29-#1 | 0.20 | | NONEMP | NP | C-14 H-3: - Sr-90 | 4.70000E+0 5.00000E+0 | 1.5762E-01 | -4.2600E-0: 4.5400E-0: | 3 |
| . , | | 7.3 | 5 0.1 | 2 <8.000E-03 | NP | 2.0000E+00 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1,7510E-0 | 2 |

Envirocare of Utah, Inc.

2. MANIFEST NUMBER STALBAN-4032-01-001

3. PAGE 7 OF 12 PAGE(5

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

| • | • | | | | | n=non | | | | | | | 3. | PAGE 7 OF 12 | PAGE(S) | |
|---|--|----------------------|--|-------------------------------------|--------------------------------------|-------------------|---|---|--|-----------------|-------------|--------------------------------------|---|--|--|---|
| | DISPOSAL CON | HAINEH DESC | HIPTION | CONTAINE | S.AND.WAS | TE DESCRI | PTION (CONTINU | | WASTE DESCRIPTION | N FOR EACH WAST | E TYPE IN C | DATAINER | | | | 16.WASTE CLASSIFI- |
| 6. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID MILITERIES | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURI CONTAN MBa/1 dpm/) | INATION 00 cm2 | 11, WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE | PTION 13. SOLIDIFICATION OR STABILIZATION | 14, CHEMICAL DE | WEIGHT | 15. REDIVIDUAL RA CONTAINER TO | ADIONUCLIDES . | DESCRIPTION - AND ACTIVITY (MB- AINER TOTAL ACTI DE PERCENT | q) AND | CLASSIFI- CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| ID NUMBER(S) | 11000 177 | (143) | (kg) (ton) | mrem/hr | ALPHA | GAMMA | | (, , , ,) | | | 1170.17 | RADIONUCLIDES | pCl∕gm | MBq | mCl | |
| . | | | | | | - | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | 1 | ŀ | | | | Į | | | 1 [| | . |
| 027/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NÞ | 3.3400E-06 | \$9,29-H | 0.20 | NA | NONEMP | N.P | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | 1 | 1 | 1 | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| <u> </u> | | | · | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | 1 | | | | |
| 028/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | H-3 | 9.60000E+0 4.70000E+0 5.00000E+0 | II 1.5762E-011 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | <u> </u> | | Subtotal | | 6.4787E-01 | | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | 1 | | 1 | 1 | | | 1 | 1 | | | | | | |
| 029/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39, 29 H | 9.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+0 4.70000E+0 5.00000E+0 | 1 3.2227E-01 1 1.5762E-01 1 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | . | - 7.95 | 0.12 | <8:000E-03 | ND- | 2.00005+02 | | 7.35 | | ŀ | <u> </u> | Subtotal | | 6.4787E-01 | 1.7510E-02 | 2 |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | 2 |
| | | | | | | | | | | | | | | | | |
| 030/1 | 4 | 0.21 | 111.18 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+0 4.70000E+0 5.00000E+0 | 1 1.5762E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | 3 AS 3 |
| | | 7.31 | 0.12 | 2 <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-0 | 2 |
| | | | | | | | | | <u> </u> | | | Total | | . 6.4787E-01 | 1.7510E-0 | Ž |
| | | | | | | | | | | | | | | | | |
| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc.

2. MANIFEST NUMBER STALBAN-4032-01-001

3. PAGE 8 OF 12 PAGE(S)

| | | | | | | TE DECOD | PTION (CONTINU | ATION). | | | | | 3.1 | AGE OUT 12 | | |
|---|---|------------------------------|--|---|----------|--|----------------|----------|-------------------|--|--|----------------------|---|--|--|-----------------------|
| | DISPOSAL CON | TAINER DESCR | RIPTION | TUNIAME | LANU WAS | 15.1752741 | PIRAMILAMINE | | WASTE DESCRIPTION | INFOR EACH WAST | E TYPE IN C | ONTAINER | RADIOLOGICAL C | TECODIOTION. | | 16.WASYE CLASSIFI- |
| 5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) (H3) | 8. WASTE AND CONTAINER WEIGHT | 9. 10. SURFACE 11. 1 SURFACE CONTAMINATION WASTE PADIATION MR0/100 cm2. (See Note 2 Level dpm/100 cm2 (See Note 2 A Note 2A) | | PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION 12. APPROXIMATE 13. WASTE SOLIDIFICATION CHEMICAL FORM: % CONTAINER MEDIA (See Note 3) [F73] PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION WEIGHT (SITE OF THE NO | | | | INDIVIDUAL F CONTAINER | RADIONUCLIDES AI TOTAL: OR CONTA AND RADIONUCLID | ND ACTIVITY (MBO | a) AND VITY | CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C | | |
| ID NUMBER(S) | Note 1A) | (#3) | (kg) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (1-10) | <u></u> | <u> </u> | 11 20.17 | RADIONUCLIDES | pÇVgm | MBq | _{тСі} 8,7100Е-03 | |
| 031/1 | 4 | 0.21 | | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | ٠, | 7.35 | | | <u> </u> | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | - | | | | | | | - | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | <u> </u> | <u> </u> | | | 0000000 | 0.00075.04 | 0.74005.02 | AS |
| 032/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | <u> </u> | <u> </u> | Subtotal | | 6.4787E-01 | 1,7510E-02 | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | <u> </u> | | | | | 9.60000E+01 | 3 2227E-01 | 8.7100E-03 | AS |
| 033/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | |
| | | 7.35 | 0.12 | <8.000E-03 | ЖР | 2.0000E+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | <u> </u> |
| | | | | | | | <u> </u> | | _ | | | Total | | 6.4787E-01 | | |
| | | | - | | <u></u> | | | | | | · · | | | 0.0075.04 | 0.71005.00 | <u> </u> |
| 034/1 | 4 | 0.21 | 111,1 | <8.0000E-05 | NP | 3.3400E-06 | \$9,29-H | 0.20 | NA . | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.5762E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | 31 |
| | | 7.25 | 0.1 | <8.000E-03 | NP | 2.0000E+02 | : | 7.35 | | <u> </u> | | Subtotal | | 6.4787E-01 | 1.7510E-02 | <u> </u> |
| | | | | | | | 1 | | _ | | | Total | | 6.4787E-01 | 1.7510E-02 | 1 |
| | | | | | | <u> </u> | | | | | | | 0.60005-0 | 3,2227E-01 | 9.7100E-0 | 3 AS |
| 035/1 | 4 | 0.2 | 111.1 | 3 <8.0000E-05 | NP | 3,3400E-00 | 39,29-H | 0.20 | NA . | NONEMP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.5762E-01 1.6798E-01 | 4.2600E-0 | <u>i</u> |
| | | 7.0 | 5 0.1 | 2 <8.000E-03 | NE | 2.0000E+0 | 2 | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-0 | 2 |

FORM 541A (10-96)

FORM 541A

| FORM 541A | | | | | | | | | | | | Forderson of the | i. in a l | ********* | | |
|---|--|------------------------------|---|---|--|--------------------------------------|---|---|------------------------------------|----------------------------------|--|----------------------|---|--|--|--|
| | | | U | NIFOR | - | - | RADIOACTI | VE | | | | Envirocare of Uta | ırı, inc. 2. i | MANIFEST NU -STALBAN | MBEH 4032-01-001 | |
| | | | | | WAST | E MANIE | EST | | | | | | | PAGE 9 OF 12 | DAGE(S) | |
| | DISPOSAL CON | MANUEL DESC | UPTION | CONTAINE | R AND WAS | TE DESCRI | ETION (CONTINU | IATION) | WASTE DESCRIPTION | MPARIENALIWAST | ETVOERIC | ONTAINED | <u> </u> | FAGE 9 OF 12 | · FAGE(S) | Isewaste |
| _ | ! | | | | | | | PHYSICAL DESCRI | PTION | 14. CHEMICAL DE | | | RADIOLOGICAL | DESCRIPTION | | 16.WASTE CLASSIFI- |
| CONTAINER FIDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | CONTAINER DESCRIPTION (See Note 1 & Note 1A) | 7. VOLUME (m3) (f3) | 8. WASTE AND CONTAINER WEIGHT (kg) (500) | 9. SURFACE RADIATION LEVEL <u>mSwhr</u> | 10. SURF CONTAM MBo/10 dpm/10 | INATION 20 cm2 10 cm2 BETA- | WASTE DESCRIPTOR (See Note 2 & Note 2A) | 12, APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (F13) | SOLIDIFICATION OR STABILIZATION | CHEMICAL FORW CHELATING AGENT | WEIGHT % CHELATING AGENT IF-0.1% | CONTAINER T | TOTAL: OR CONTAIND FADIONUCLE | | IVITY | CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| | | | (ton) | mem/hr. | ALT TIL | GAMMA | | | <u> </u> | | | RADIONUCLIDES | pCi/qm | MBq | mCi | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| 038/1 | 4 | 0.29 | 111.13 | <8.0000E-05 | НP | 3.3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.00005+02 | | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | <u> </u> | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| 637/1 | 4 | <u> </u> | | | | | 4444 | | NA NA | | | | | 0.00077-04 | 0.7400 F.00 | |
| | | 0.21 | 111.13 | <8.0000E-05 | NP | 3.3400E-06 | 39,29-H | 0.20 | l ma | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 8.7100E-03 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal . | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | Total | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | | | | | | | | |
| 038/1 | 11 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.3400E-06 | 39,29,40-H | 0.20 | NA | NONEMP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 8.0660E-01 3.9590E-01 4.1810E-01 | 2.1800E-02 1.0700E-02 1.1300E-02 | 21 |
| | | 7.95 | 0.27 | <8.000 E-03 | NP | 2.0000E+02- | | 7.35 | | <u> </u> - | | Subtotal | | 1.6206E+00 | 4.3800E-02 | <u> </u> |
| | | <u> </u> | | | | | | | | | į | Total | | 1.6206E+00 | 4.3800E-02 | |
| | | <u> </u> | | | | | | | | | | | | | | |
| 039/1 | 1 | 0.21 | 247.21 | <8.0000E-05 | NP | 3.340012-06 | 39,29,40-11 | 0.20 | NA . | NONE/NP | MP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 8.0660E-01 3.9590E-01 4.1810E-01 | 2.1800E-02 1.0700E-02 1.1300E-02 | AS 2 |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | <u></u> | 7,35 | | <u> </u> | | Subtotal | | 1.6206E+00 | 4.3800E-02 | 2 |
| | | | | | | | | <u> </u> | | | | Total | | 1.6206E+00 | 4.3800E-02 | 2 |
| | | <u> </u> | | | | | | <u> </u> | | | | | | | | |

Envirocare of Utah, Inc.

2. MANIFEST NUMBER STALBAN-4032-01-001

3. PAGE 10 OF 12 PAGE(S)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

| MASTE DESCRIPTION WASTE THE INCOMPANIED TO EACH WASTE THE INCOMPANIED. | | | | | | | | | | | | | | 16.WASTE | | |
|--|---|----------------|--|-------------------------------------|--|--|---|---|---------------|-----------------------------------|---|---|---|--|--------------------------|--|
| | DISPOSAL CON | TAINER DESCH | UPTKON | | | | | PHYSICAL DESCRI | | 14. CHEMICAL DES | CRIPTION | ATTAMOT | 15. RADIOLOGICAL D | DESCRIPTION | | CLASSIFI- CATION |
| 5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR | 6. CONTAINER DESCRIPTION (See Note 1 & | 7. VOLUME (m3) | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | 10. SURF CONTAM MBo/10 dpm/10 | INATION 20 cm2 10 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | WASTE WASTE DESCRIPTOR VOLUME(S) IN (See Note 2 CONTAINER | | CHEMICAL FORM/ CHELATING AGENT | WEIGHT % ICHELATING AGENT IF>0.1% | INDIVIDUAL RADIONUCUDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCUDE PERCENT | | | | AS-Class A Stable AU-Class A Unstable B-Class B C-Class C |
| ID NUMBER(S) | Note 1A) | (h3) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (, 10) | | | 1172.17 | RADIONUCLIDES | pCl/gm | MBq | mCi 8.7100E-03 | |
| 040/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | 39,29-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+01 4.70000E+01 5.00000E+01 | 3.2227E-01 1.5762E-01 1.6798E-01 | 4.2600E-03 4.5400E-03 | AS |
| | | 7.35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | \$ | 7.35 | | | | Subtotal | | 6.4787E-01 | 1.7510E-02 | |
| | | | | | | | | | 1 | | | Total | | 6,4787E-01 | 1.7510E-02 | |
| | | | | | | | 39-11 | | NA. | NONE/NP | | C-14 | 9.60000E+01 | 1.6095E-01 | 4.3500E-03 | AS |
| 041/1 | 4 | 0.21 | 65,77 | <8.0000E-05 | NP | 3.3400E-06 | 39-11 | 0.20 | - | | NP | H-3 Sr-90 | 4.70000E+01 5.00000E+01 | 1.6095E-01 7.8810E-02 8.3990E-02 | | |
| | | 7,35 | 6.07 | <8.000€-03 | NP | 2.00005+02 | | 7.35 | | | | Subtotal | | 3.2375E-01 | 8.7500E-03 | |
| | | ļ | | | | | | | 1 | | ' | Total | | 3.2375E-01 | 8.7500E-03 | 1 |
| | | | | | | <u> </u> | 39,29-H | | NA NA | NONE/NP | | C-14 | 9.60000E+01 | 3.2227E-01 | 8.7100E-03 | AS |
| 042/1 | 4 | 0.21 | 111.13 | <8.0000E-05 | NP | 3,3400E-06 | | 0.20 | ļ | | NP | H-3 Sr-90 | 4,70000E+01 5:00000E+01 | | | 3 |
| | | 7,35 | 0.12 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | <u> </u> | Subtotal | | 6.4787E-01 | | |
| | | | | | | | \$ | | 4 | | | Total | | 6.4787E-01 | 1.7510E-02 | 2 |
| | - · · · | | | | | <u> </u> | <u> </u> | | | NONE/NP | ļ | C-14 | 9,60000E+01 | 9.6570E-01 | 2.6100E-0 | 2 AS |
| 043/1 | 4 | 0.21 | 292.57 | <8.0000E-05 | NP | 3.340015-06 | 39,29,40-H | 0.20 | NA NA | WORLDAN | NP | H-3 Sr-90 | 4.70000E+01 5.00000E+01 | 4.7360E-01 | 1.2800E-0 | 2 l |
| | | 7.35 | 0.33 | <6.000E-03 | NP | 2.0000E+02 | <u> </u> | 7,35 | ļ | | <u> </u> | Subtotal | | 1.9425E+00 | 5.2500E-0 | 2 |
| | | | | | , | | _ | | _ | | | Total | | 1.9425E+00 | 5.2500E-0 | 2 |
| | | | | | | | | | <u> </u> | NONE/NP | | C-14 | 9.60000E+0 | 8.0660E-0 | 2.1800E-0 | 2 AS |
| 044/1 | 4 | 0.2 | 1 247.2 | <8.0000E-05 | NP | 3.3400E-00 | 39,29,40-11 | 0.20 | NA NA | NONE/NP | NP | H-3 Sr-90 | 4.70000E+0 5.00000E+0 | 4.1810E-0 | | 2 |
| | | 7.31 | 6 0.2 | 7 <8.000E-03 | NP | 2.0000E+02 | | 7.35 | <u> </u> | | | Subtotal | | 1.6206E+0 | 4.3800E-0 | 2 |

FORM 541A (10-96)

FORM 541A

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

Envirocare of Utah, Inc. 2. MANIFEST NUMBER
STALBAN-4032-01-001

| | | | | | WASI | E MANII | -ESI | | | | | | | 3 PAGE 11 OE 1 | 2 PAGE(S) | | |
|---|---|-------------|--|-------------------------------------|-----------|-----------------------------|---|---|---|-----------------|------------------------------------|---|-------------------------------------|--|--|---|--|
| | DISPOSAL CON | TARIER DESC | HIÈTKON | CONTAINE | R AND WAS | TE DESCRI | PTION (CONTINU | ATION) | WASTE DESCRIPTION | N EAD CACH WAST | E TVDE IN C | MYAINED | | 3. PAGE 11 OF 12 PAGE(S) | | | |
| 5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER(S) | 6. CONTAINER DESCRIPTION (See Note 1 & Note 1 A) | 7. VOLUME | 8. WASTE AND CONTAINER WEIGHT | 9. SURFACE RADIATION LEVEL | <u> </u> | INATION 00 cm2 00 cm2 | 11. WASTE DESCRIPTOR (See Note 2 & Note 2A) | PHYSICAL DESCRI 12. APPROXIMATE WASTE | PTION 13. SOLIDIFICATION OR STABILIZATION | 14. CHEMICAL DE | SCRIPTION WEIGHT % CHELATING AGENT | 15. F INDIVIDUAL RAI CONTAINER TO | DIONUCLIDE | CAL DESCRIPTION ES AND ACTIVITY (MBC DISTAINER TOTAL ACTI CLIDE PERCENT | AND (| CLASSIFI- CATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C | |
| ID NOMBER(S) | NOW IA | (113) | (kg) (ton) | mSv/hr mrem/hr | ALPHA | BETA- GAMMA | | (F13) | | | IF>0.1% | RADIONUCLIDES | pCl/gm | MBq | mCi | CORSC | |
| | | | | | | <u>-</u> | | | | | | Total | | 1.6206E+00 | 4.3800E-02 | 1. | |
| 045/1 | 4 | 0,21 | 247.21 | <8.0000E-05 | qи | 3,3400€-06 | 39,29,40-H | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 1.60000E+ 1.70000E+ 5.00000E+ | 01 8.0660E-01 01 3.9590E-01 01 4.1810E-01 | 2.1800E-02 1.0700E-02 1.1300E-02 | AS | |
| | | 7.35 | 0.27 | <8.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 1.6206E+00 | 4,3800E-02 | | |
| | | | | | | | | | | | | Total | | 1.6206E+00 | 4.3800E-02 | | |
| | | | | | | | | | • | | | | | | | | |
| 046/1 | 4 | 0.21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-11 | 0.20 | NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E+ 1.70000E+ 5.00000E+ | HO1 1.6095E-01 HO1 7.8810E-02 HO1 8.3990E-02 | 4.3500E-03 2.1300E-03 2.2700E-03 | AS | |
| | | 7.35 | 0.07 | <8.000E-03 | MP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.2375E-01 | 8.7500E-03 | | |
| | | | | | | | | | | | | Total | | 3.2375E-01 | 8.7500E-03 | | |
| | | | | | | <u> </u> | | | | | | | | | | | |
| 047/1 | 1 | 0,21 | 65.77 | <8.0000E-05 | NP | 3,3400E-06 | 39-H | 0.20 | NA - | NONE/NP | NP | IH-9 14 | 9,60000E+ 4,70000E+ 5,00000E+ | •01 7.8810E-02i | 4.3500E-03 2.1300E-03 2.2700E-03 | AS | |
| - | | 7.35 | 0.07 | ~6.000E-03 | NP | 2:0000E+02 | | 7:35 | | ٠ | } | Subtotal | | 3.2375E-01 | - 8.7500E-03 | + | |
| | | | | | | | | | | | | Total | | 3.2375E-01 | 8.7500E-03 | | |
| | | | İ | | 1 | | | | | | | | | | | | |
| 045/1 | 4 | 0.21 | 65.77 | <8.0000E-05 | NP | 3.3400E-06 | 39-H | 0.20 | NA NA | NONE/NP | NP | C-14 H-3 Sr-90 | 9.60000E4 4.70000E4 5.00000E4 | +01 1.6095E-01 +01 7.8810E-02 +01 8.3990E-02 | 4.3500E-03 2.1300E-03 2.2700E-03 | AS | |
| | | 7,35 | 0.07 | <5.000E-03 | NP | 2.0000E+02 | | 7.35 | | | | Subtotal | | 3.2375E-01 | 8.7500E-03 | -1 | |
| | | | | | | |] | | | | | Total | | 3.2375E-01 | 8.7500E-03 | 3 | |
| | | | | _ | | | | | | | | | | | | | |
| FORM 541A (10-96) | | | | · | | | | | - | | • | | | | <u> </u> | | |

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|---|---|--------------|---------|-------------|------------------|--------------------------------|--|---|--|--|---------------------------------|--------------------------|---|--|--|---|
| FORM 541A | | | 5 | NIFORM | UNIFORM LOW-LEVE | EVEL R | RADIOACTIVE | Į. | | | | Envirocare of Utah, Inc. | | 2. MANIFEST NUMBER STALBAN-4032-0 | NIFEST NUMBER STALBAN-4032-01-001 | |
| | | | | | WASIE | WASTE MANIFEST | EST. | - | | | | | <u>භ</u> | 3. PAGE 12 OF 12 PAGE(S) | 2 PAGE(S) | |
| | NOT CHARLES HAVE BELLEVILLE TO SECOND | VIAINERDESCH | | CONTAINER | AND WAST | EDESCRIP | CONTAINER AND WASTE DESCRIPTION (CONTINUATION) | ATTON | WASTEDESCRIPTIO | N FOR EACH WAST | TYPEINCO | YTAINER | | | Ť | WASTE |
| | | | | - | | ľ | | PHYSICAL DESCRIE | PHYSICAL DESCRIPTION 14. CHEMICAL DESCRIPTION | 14. CHEMICAL DES | CRIPTION | 15 | RADIOLOGICAL DESCRIPTION | DESCRIPTION | Ĭ | CASSIE- |
| 6. CONTAINER IDENTIFICATION NUMBER / GENERATOR | CONTAINER DESCRIPTION (See Note 1 & Morte 14) | 7. VOLUME | 5. | m w œ | \$ \$ 50° F | CE VATION Can 2 Can 2 | WASTE DESCRIPTOR (See Note 2 & Note 24) | 12. APPROXIMATE 1 WASTE VOLUME(S) IN (CONTAINER (m3) | 13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3) | WEGHT WEGHT WITH WEGHT WITH WEGHT WE | WEKGHT % CHELATING AGENT F>0.1% | | ADIONUCLIDES / TOTAL: OR CONT. AND RADIONUCLI | 58g | | AS-Class A Stable AU-Class A Unstable B-Class B |
| (c)UpperON (s) | fur annu | 9 | | manufic | APR | GAMMA | | | , | | | PADIOMICIDES | pCV/gm | MBq | ğ | |
| 049/1 | 4 | Ŋ | 65.77 | <8.0000E-05 | 9 | 3.3400E-08 | 39-H | 0.20 | ¥ | NONEMP | ÷ | | 9.60000E+01 4.70000E+01 5.00000E+01 | 1.6095E-01 7.8810E-02 8.3990E-02 | 4,3500E-03 2,1300E-03 2,2700E-03 | AS |
| | | 7.35 | 20.0 | <6.000E-03 | ş | 2,0000E+02 | | 7.35 | | | | Subtotal | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | | | | Total | - | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | | | | | | | | |
| 050/1 | 4 | LZ. | 65.77 | <8.0000E-05 | Ş | 3.3400E-06 | T-88 | 6.20 | NA | NONENP | ş | C-14 H-3 Sr-90 | 9.50000E+01 4.70000E+01 5.00000E+01 | 1.6095E-01 7.8810E-02 8.3990E-02 | 4.3500E-03 2.1300E-03 2.2700E-03 | ş |
| | | 7.35 | 0.07 | <8.000E-03 | ş | 2.0000E+02 | | 7.35 | | | | īs. | | | 8.7500E-03 | |
| | | | | | | | | | | - | | Total | | 3.2375E-01 | 8.7500E-03 | |
| | | | | | | | | | | | | | | | 1 | |
| Shipment Totals | | 10.50 | 6100.82 | | | | | | | | | · | | 3.6284E+01 | 9.8065E-01 | |
| | | 367,50 | 0679 | | : | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | · | | | | | | | - | -1- | | | | | : | |
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| FORM 541A (10-96) | | | | | | | | | | | | | | | | |

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UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST ISOTOPES REPORT

For Manifest # STALBAN-4032-01-001 Envirocare of Utah, Inc.

Total Activity

| isotope | (MBa) | (mCi) |
|---------|------------|------------|
| C-14 | 1.8051E+01 | 4.87862-01 |
| H-3 | 8.8386E+00 | 2,3888E-01 |
| 8r-90 | 9.3947E+00 | 2.5391E-01 |

WASHESHOPAGELOG

ST. ALBANS VAECC BUILDING 90 DECONTAMINATION/DECOMMISSIONING QUEENS, NY

| Date Stored | Drum # | Location Generated | Internal Sme dpm/1 min | | External Radio Res dpm/100cm² | | Contents |
|----------------|--------|--------------------|-------------------------------------|------|-------------------------------------|--------|--|
| 04-Oct-00 | 1 | Counting Room | 40 | 40 | <200 | <0.008 | PPE, METAL |
| 27-Sep-00 | 2 | Counting Room | 33 | 56_ | . <200 | <0.008 | PPE |
| 27-Sep-00 | 3 | Counting Room | 18 | 49 | <200 | <0.008 | PPE |
| 27-Sep-00 | 4 | Counting Room | 73 | 91 | <200 | <0.008 | PLASTIC, PPE |
| 27-Sep-00 | 5 | Counting Room | 14 | 15 | <200 | <0.008 | PPE |
| 27-Sep-00 | 6 | Counting Room | 34 | 63 · | <200 | <0.008 | PPE, PLASTIC |
| 29-Sep-00 | 7 | Counting Room | 50 | 68 | <200 | <0.008 | PPE, METAL, WOOD |
| 29-Sep-00 | 8 | Counting Room | 33 | 50 | <200 | <0.008 | PPE, WOOD, BULBS |
| 29-Sep-00 | 9 | Counting Room | 51 | 141 | <200 | <0.008 | PPE. RAGS, ELECTRICAL EQUIPMENT, METAL |
| 29-Sep-00 | 10 | Counting Room | 25 | 121 | <200 | <0.008 | PPE, METAL, WOOD |
| 29-Sep-00 | 11 | Counting Room | 37 | 73 | <200_ | <0.008 | PPE, GLASS,WOOD |
| 03-Oct-00 | 12 | Counting Room | 45 | 51 | <200 | <0.008 | PPE, PLASTIC, WOOD |
| 03-Oct-00 | 13 | Counting Room | 10 | 14 | <200 | <0.008 | PPE, METAL TABLE TOPS |
| 03-Oct-00 | 14 | Counting Room | 23 | 41 | <200 | <0.008 | PPE, GLASS, METAL, FILTERS |
| 03-Oct-00 | 15 | Counting Room | 53 | 60 | <200 | <0.008 | PPE, METAL |
| 03-Oct-00 | 16 | Low Level | -1 | 3 | <200 | <0.008 | PPE, METAL TABLE TOPS |
| 04-Oct-00 | 17 | Low Level | 33 | 42 | <200 | <0.008 | PPE, METAL |
| 04-Oct-00 | 18 | Low Level | n/a | 271 | <200 | <0.025 | PPE, CONCRETE, PLASTIC, TRANSITE (YELLOW DRUM) |
| 04-Oct-00 | 19 | Low Level | n/a | 119 | <200 | <0.008 | PPE, METAL, TRANSIT (YELLOW DRUM) |
| 04-Oct-00 | 20 | Low Level | -3 | 0.8 | <200 | <0.008 | METAL, GLASS |
| 04-Oct-00 | 21 | Low Level | 4 | 8 | <200 | <0.008 | METAL,GLASS |
| 04-Oct-00 | 22 | Low Level | 26 | 58 | <200 | <0.008 | PPE,METAL CABINETS,WOOD |
| 11-Oct-00 | 23 | Mens Room | -4 | -3 | <200 | <0.008 | PPE, MARBLE |
| 05-Oct-00 | 24 | Low Level | 17 | 70 | <200 | <0.008 | METAL, WOOD |

| Date Stored | Drum # | Location Generated | | ear Sample # 00cm² max | External Radio Res dpm/100cm² | • | Contents |
|--------------------|--------|--------------------|------------|-------------------------------------|-------------------------------------|--------|--|
| 05-Oct-00 | 25 | Low Level | -13 | 50 | <200 | <0.008 | METAL CABINET DRAWERS, WOOD |
| 05-Oct-00 | 26 | Low Level | ·15 | 21 | <200 | <0.008 | METAL WOOD,GLASS |
| 05-Oct-00 | .27 | Low Level | 2 | 23 | <200 | <0.008 | METAL, WOOD |
| 05-Oct-00 | 28 | Low Level | 158 | 169 | <200 | <0.008 | METAL, WOOD, GLASS, PPE |
| 10-Oct-00 | 29 | Low Level | 527 | 3225 | <200 | <0.008 | WOOD, METAL, PPE |
| 10-Oct-00 | 30 | Low Level | 24 | 137 | <200 | <0.008 | METAL TABLE |
| 10-Oct-00 | 31 | Low Level | n/a | 27 | <200 | <0.008 | METAL. |
| 10-Oct-00 | 32 | Low Level | 148 | 249 | <200 | <0.008 | METAL, SINK, WOOD |
| 10-Oct-00 | 33 | Low Level | n/a | 19 | <200 | <0.008 | METAL, TRASH,PPE |
| 10-Oct-00 | 34 | Low Level | 15 | 446 | <200 | <0.008 | SINK, CABINETS,BAGS,PPE |
| 10-Oct-00 | 35 | Low Level | 9 | 25 | <200 | <0.008 | METAL COUNTER, SHELVES, BAGS |
| 10-Oct-00 | 36 | Low Level | -5 | 28 | <200 | <0.008 | METAL SHELVES, COUNTER TOP, PIPES |
| 10-Oct-00 | 37 | Low Level | 54 | 81 | <200 | <0.008 | METAL SHELVES, BLACKBOARD |
| 11- 0-1- 00 | 38 | NUMBERMORUS | ED 1 STATE | | | | AL AL AL AL AL AL AL AL AL AL AL AL AL A |
| 13-Oct-00 | 39 | Mens Room | 284 | 304 | <200 | <0.008 | TILE, PPE |
| 13-Oct-00 | 40 | Mens Room | -7 | 22 | <200 | <0.008 | PPE, TRASH, FLOOR DIRT |
| 13-Oct-00 | 41 | Mens Room | 8 | 9 | <200 | <0.008 | PPE |
| 07-Oct-00 | 42 | Mens Room | -8 | 11 | <200 | <0.008 | METAL SHELVES, COUNTING FLOOR SWEEPINGS |
| 07-Oct-00 | 43 | Mens Room | -24 | -7 | <200 | <0.008 | CONCRETE, PPE |
| 07-Oct-00 | 44 | Mens Room | 8.0 | 12 | <200 | <0.008 | WOOD, CONCRETE, METAL, TILES |
| 07-Oct-00 | 45 | Mens Room | <u>-</u> 5 | 5 | <200 | <0.008 | CONCRETE, TILE, WOOD |
| 07-Oct-00 | 46 | Mens Room | -13 | -12 | <200 | <0.008 | PPE. TRASH |
| 23-Oct-00 | 47 | A-waste Corr.#45 | n/a | 4 | <200 | <0.008 | RAD PLASTIC FROM CORRIDOR 45 |
| 23-Oct-00 | 48 | A-waste Corr.#45 | n/a | -9 | <200 | <0.008 | RAD PLASTIC FROM CORRIDOR 45, TRASH |
| 23-Oct-00 | 49 | A-waste Corr.#45 | n/a | - 5 | <200 | <0.008 | RAD PLASTIC FROM CORRIDOR 45 |
| 23-Oct-00 | 50 | A-waste Corr.#45 | -13 | 5 | <200 | <0.008 | RAD PLASTIC FROM CORRIDOR 45 |

| Date Stored | Drum # | Location Generated | Internal Sme dpm/10 min | • | External Radio Res dpm/100cm² | • | Contents |
|-------------|--------|--------------------|--------------------------------------|-----|-------------------------------------|--------|---|
| 24-Oct-00 | 51 | "A" Lab Area | -3 | -11 | <200 | <0.008 | ASBESTOS HOOD, TILE |
| 24-Oct-00 | 52 | "A" Lab Area | -2 | 1 | <200 | <0.008 | ASBESTOS HOOD |
| 24-Oct-00 | 53 | "A" Lab Area | 11 | 29 | <200_ | <0.008 | ASBESTOS HOOD, GLASS, METAL, TOWELS FROM MASTIC |
| 24-Oct-00 | 54 | "A" Lab Area | -21 | -34 | <200 | <0.008 | PPE FROM "A" |
| 24-Oct-00 | 55 | "A" Lab Area | -10 | -12 | <200 | <0.008 | RAD WASTE FROM ASBESTOS REMOVAL |
| 25-Oct-00 | 56 | "A" Lab Area | · 11 | 14 | <200 | <0.008 | PLASTIC, METAL COUNTER |
| 25-Oct-00 | 57 | "A" Lab Area | 5 | 8 | <200 | <0.008 | METAL PLATE |
| 25-Oct-00 | 58 | "A" Lab Area | 5 | 13 | <200 | <0.008 | RAD WASTE FROM ASBESTOS REMOVAL |
| 25-Oct-00 | 59 | "A" Lab Area | n/a | 25 | <200 | <0.008 | METAL, PLASTIC, ASBESTOS MATERIAL |
| 25-Oct-00 | 60 | High Level Lab | 23 | 25 | <200 | <0.008 | METAL, COPPER, PLASTIC |
| 25-Oct-00 | 61 | High Level Lab | 8. | 8 | <200 | <0.008 | METAL SINK, GLASS |
| 25-Oct-00 | 62 | High Level Lab | -3 | 2 | <200 | <0.008 | METAL SINK, METAL CABINETS |
| 25-Oct-00 | 63 | High Level Lab | 0.7 | 30 | <200 | <0.008 | METAL SINK |
| 25-Oct-00 | 64 | High Level Lab | 11 . | 12 | <200 | <0.008 | METAL SINK, PPE |
| 26-Oct-00 | 65 | Hìgh Level Lab | 9 | 46 | <200 | <0.008 | TRASH, METAL SINK, PPE |
| 26-Oct-00 | 66 | High Level Lab | -23 | 0.5 | <200 | <0.008 | METAL SINK, METAL FROM HOOD |
| 26-Oct-00 | 67 | High Level Lab | -5 | 10 | <200_ | <0.008 | METAL SINK, METAL FROM HOOD |
| 26-Oct-00 | 68 | High Level Lab | - 7 | 19 | <200 | <0.008 | METAL SHELVES |
| 26-Oct-00 | 69 | High Level Lab | 12 | 22 | <200 | <0.008 | METAL CABINETS |
| 26-Oct-00 | 70 | High Level Lab | 2 | 21 | <200 | <0.008 | METAL CABINETS |
| 26-Oct-00 | 71 | High Level Lab | -12 | 35 | <200 | <0.008 | METAL CABINETS |
| 26-Oct-00 | 72 | High Level Lab | -16 | 5 | <200 | <0.008 | METAL CABINETS |
| 26-Oct-00 | 73 | Isotope Room Walls | 16 | 23 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 26-Oct-00 | 74 | Isotope Room Walls | -7 | -26 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 26-Oct-00 | 75 | Isotope Room Walls | -7 | 0.5 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |

| Date Stored | Drum # | Location Generated | | ear Sample # 100cm ² max | External Radio Res | | Contents |
|----------------|--------|--------------------|------------|---|-----------------------|--------|---------------------------------|
| 26-Oct-00 | 76 | Isotope Room Walls | -21 | 9 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 26-Oct-00 | 77 | Isotope Room Walls | -17 | -21 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 26-Oct-00 | 78 | Isotope Room Walls | 0.5 | 20 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 79 | Isotope Room Walls | -4 | -18 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 80 | Isotope Room Walls | 3 | 11 | <200 | <0.008 | WOOD |
| 27-Oct-00 | 81 | Isotope Room Walls | 8 | 16 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 82 | Isotope Room Walls | 4 | 25 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 83 | Isotope Room Walls | -9 | -22 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 84 | Isotope Room Walls | -2 | -3 | <200 | <0.008 | WOOD |
| 27-Oct-00 | 85 | Isotope Room Walls | - 5 | -17 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 86 | Isotope Room Walls | 16 | 21 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | 87 | Isotope Room Walls | 5 | 35 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 27-Oct-00 | _88_ | Isotope Room Walls | -4 | -0.2 | <200 | <0.008 | PLASTIC, WOOD |
| 31-Oct-00 | 89 | High Level Lab | 6 | 49 | <200 | <0.008 | WOOD FROM WALLS |
| 31-Oct-00 | 90 | Isotope Room Walls | 17 | 20 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 31-Oct-00 | 91 | Isotope Room Walls | -7 | -14 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 31-Oct-00 | 92 | Isotope Room Walls | 8 | 32 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 31-Oct-00 | 93 | Isotope Room Walls | 4 | 38 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 31-Oct-00 | 94 | High Level Lab | -9 | 11 | <200 | <0.008 | PPE |
| 31-Oct-00 | 95 | Isotope Room Walls | -3 | -10 | <200 | <0.008 | ISOTOPE ROOM WALLS AND CONCRETE |
| 31-Oct-00 | 96 | High Level Lab | 10 | -27 | <200 | <0.008 | WOOD FROM WALLS |
| 01-Nov-00 | 97 | High Level Lab | -15 | -0.5 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 98 | High Level Lab | -13 | -18 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 99 | High Level Lab | n/a | 9 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 100 | High Level Lab | -18 | 15 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |

| Date Stored | Drum # | Location Generated | Internal Sme dpm/1 min | • | External Radio Res dpm/100cm² | • | Contents |
|----------------|--------|--------------------|-------------------------------------|-----|-------------------------------------|--------|---|
| 01-Nov-00 | 101 | High Level Lab | -17 | -18 | <200 | <0.008 | WOOD FROM CEILINGS & LIGHTS |
| 01-Nov-00 | 102 | High Level Lab | 3 | 24 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 103 | High Level Lab | 1.4 | 43 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 104 | High Level Lab | 7 | 10 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 105 | High Level Lab | 11 | 21 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 106 | High Level Lab | - 5 | 19 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 107 | High Level Lab | -6 | -25 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 108 | High Level Lab | -6 | 13 | <200_ | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 109 | High Level Lab | -15 | -34 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 110 | High Level Lab | -4 | 12 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 01-Nov-00 | 111 | High Level Lab | -0.6 | 9 | <200 | <0.008 | HOOD MATERIAL "A" |
| 01-Nov-00 | 112 | High Level Lab | 10 | 16 | <200 | <0.008 | LIGHTS FROM LAB CEILING |
| 02-Nov-00 | 113 | High Level Lab | 19 | 25 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 114 | High Level Lab | 22 | 39 | <200 | <0.008 | METAL BURNER |
| 02-Nov-00 | 115 | High Level Lab | -11 | 22 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, SAWDUST |
| 02-Nov-00 | 116 | High Level Lab | 0.2 | 5 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, SAWDUST, S.S. |
| 02-Nov-00 | 117 | High Level Lab | -5 | 21 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 118 | High Level Lab | -6 | 15 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 119 | High Level Lab | -4 | 3 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 120 | High Level Lab | -0.8 | 9 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 121 | High Level Lab | - 5 | 18 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, DUCT WORK |
| 02-Nov-00 | 122 | High Level Lab | -2 | 8 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, DUCT WORK |
| 02-Nov-00 | 123 | High Level Lab | 6 | 26 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, DUCT WORK |
| 02-Nov-00 | 124 | High Level Lab | 13 | 37 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, DUCT WORK |
| 02-Nov-00 | 125 | High Level Lab | -32 | 22 | <200 | <0.008 | VENTILATION SYSTEM, RAD PPE/WASTE |

| Date Stored | Drum # | Location Generated | | ear Sample # 00cm ² max | External Radio Rest dpm/100cm² | | Contents |
|----------------|--------|--------------------|-----|---|--------------------------------------|--------|--|
| 02-Nov-00 | 126 | High Level Lab | -7 | 26 | <200 | <0.008 | VENTILATION SYSTEM, PIPE |
| 07-Nov-00 | 127 | Counting Room | 5 | 23 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 02-Nov-00 | 128 | High Level Lab | -6 | 4 | <200 | <0.008 | PPE |
| 02-Nov-00 | 129 | High Level Lab | 14 | 21 | <200 | <0.008 | PIPE INSULATION "A" |
| 03-Nov-00 | 130 | High Level Lab | 9 | 36 | <200 | <0.008 | VENTILATION SYSTEM |
| 03-Nov-00 | 131 | High Level Lab | -3 | 13 | <200 | <0.008 | VENTILATION SYSTEM, PIPE INS.,FLOOR SWEEPING |
| 03-Nov-00 | 132 | High Level Lab | 9 | 36 | <200 | <0.008 | VENTILATION SYSTEM |
| 03-Nov-00 | 133 | High Level Lab | 12 | 29 | <200 | <0.008 | VENTILATION SYSTEM |
| 07-Nov-00 | 134 | Low Level | 15 | 22 | <200 | <0.008 | WOOD WALL / COPPER PIPE |
| 07-Nov-00 | 135 | Distalation Closet | 15 | 22 | <200 | <0.008 | METAL FITTING |
| 07-Nov-00 | 136 | Low Level | 19 | -29 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 137 | Low Level | -3 | 3 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 138 | Low Level | -4 | 22 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 139 | Low Level | 109 | 178 | <200 | <0.008 | WOOD AND METAL LIGHT FIXTURES |
| 07-Nov-00 | 140 | Low Level | 77 | 128 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 141 | Counting Room | 40 | 250 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 142 | Low Level | 13 | 23 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 143 | Low Level | 6 | 26 | <200 | <0.008 | LIGHT FIXTURES |
| 07-Nov-00 | 144 | Counting Room | 38 | 61 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 145 | Counting Room | -14 | 18 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, METAL |
| 09-Nov-00 | 146 | Low Level | -3 | 48 | <200 | <0.008 | WOOD WALLS, ELECTRICAL LINE |
| 07-Nov-00 | 147 | Counting Room | -7 | 21 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 148 | Counting Room | -13 | 0.2 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 149 | Counting Room | 6 | 16 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 150 | Low Level | 4 | 10 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |

| Date Stored | Drum # | Location Generated | | ear Sample # 00cm ² max | External Radio Res | - | Contents |
|----------------|--------|--------------------|------------|--|-----------------------|--------|--|
| 09-Nov-00 | 151 | Counting Room | 61 | 70 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, ELECTRICAL LINES |
| 09-Nov-00 | 152 | Low Level | -3 | 17 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 153 | Low Level | -24 | 12 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 154 | Counting Room | 5 | 29 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 155 | Low Level | -10 | 19 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 156 | Low Level | 12 | 14 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 07-Nov-00 | 157 | Low Level | -4 | 19 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 158 | Counting Room | -3 | -16 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 159 | Counting Room | -27 | 21 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 160 | Counting Room | -6 | 22 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 161 | Low Level | 22 | 23 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, DUCTWORK METAL |
| 09-Nov-00 | 162 | Counting Room | 8 | 17 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 163 | Low Level | 6 | 8 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 164 | Low Level | -20 | 4 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 165 | Counting Room | -6 | 27 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 166 | Counting Room | -17 | 24 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |
| 09-Nov-00 | 167 | Counting Room | -6 | -17 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, METAL |
| 09-Nov-00 | 168 | Counting Room | 7 | 22 | <200 | <0.008 | WOOD WALLS & CEILINGS, METAL, TRANSFORMERS |
| 09-Nov-00 | 169 | Counting Room | -8 | 15 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, METAL, FILTERS |
| 09-Nov-00 | 170 | Counting Room | 4 | 8 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS, METAL, FILTERS |
| 09-Nov-00 | 171 | Low Level | -9 | 5 | <200 | <0.008 | FLOOR SWEEPINGS |
| 09-Nov-00 | 172 | Low Level | 3 | 14 | <200 | <0.008 | CORK FROM DUT WORK |
| 09-Nov-00 | 173 | Counting Room | 14 | 20 | <200 | <0.008 | DUCT WORK AND CORK |
| 09-Nov-00 | 174 | Counting Room | 4 | 14 | <200 | <0.008 | METAL DUCT WORK AND WOOD |
| 09-Nov-00 | 175 | Low Level | - 5 | 8 | <200 | <0.008 | WOOD FROM WALLS & CEILINGS |

| Date Stored | Drum # | Location Generated | | ear Sample # 00cm ² max | External Radio Res | | Contents |
|----------------|--------|------------------------|------------|--|-----------------------|--------|------------------------------------|
| 14-Nov-00 | 176 | Low Level | 7 | 8 | <200 | <0.008 | METAL VENTAILATION SYSTEM |
| 14-Nov-00 | 177 | Counting Room | 36 | 41 | <200 | <0.008 | LAB DOOR MOTOR |
| 14-Nov-00 | 178 | Counting Room | 0 | 5 | <200 | <0.008 | WOOD, METAL, STEEL, COPPER |
| 14-Nov-00 | 179 | Counting Room | -20 | 21 | <200 | <0.008 | METAL PIPE, ELECTRICAL SYSTEM |
| 14-Nov-00 | 180 | Counting Room | 6 | 65 | <200 | <0.008 | PPE |
| 14-Nov-00 | 181 | Counting Room | 9 | 31 | <200 | <0.008 | RAD TRASH, HEPA FILTERS |
| 14-Nov-00 | 182 | Low Level | 8 | 11 | <200 | <0.008 | LIGHT FIXTURES, PIPE SYSTEMS |
| 14-Nov-00 | 7183 | Ejector Pit | CLASS B | WASTE | ≥: ≪200 - ∶ | 0.160 | PAPERROME INCHESCORE LIST OF MAKES |
| 14-Nov-00 | 184 | Ejector Pit | 3 | 7 | <200 | <0.008 | PIPE, PPE |
| 14-Nov-00 | 185 | Ejector Pit | 4 | 13 | <200 | <0.008 | EJECTOR TANK DEBRIS |
| 14-Nov-00 | 186 | Ejector Pit | 16 | 30 | <200 | <0.008 | EJECTOR TANK DEBRIS, PIPE |
| 14-Nov-00 | 187 | Ejector Pit | -2 | 9 | <200 | <0.008 | EJECTOR TANK DEBRIS |
| 14-Nov-00 | 188 | Ejector Pit | -0.6 | 22 | <200 | <0.008 | PIPE |
| 14-Nov-00 | 189 | Ejector Pit | - 6 | 5 | <200 | <0.008 | ELECTRICAL COMPONENTS |
| 14-Nov-00 | 190 | Ejector Pit | -0.4 | 19 | <200 | <0.008 | PIPE |
| 14-Nov-00 | 191 | Ejector Pit | -3 | 11 | <200 | <0.008 | PIPE |
| 14-Nov-00 | 192 | Ejector Pit | 3 | 16 | <200 | <0.008 | MOTOR & PIPE |
| 14-Nov-00 | 193 | High Level Lab | 7 | 8 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | 194 | High Level Lab | 69 | 121 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | | High Level Lab | -8 | 24 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | 196 | High Level L ab | -25 | 12 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | 197 | High Level Lab | 4 | 17 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | 198 | High Level Lab | -8 | -13 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | 199 | High Level Lab | 6 | 17 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 14-Nov-00 | 200 | High Level Lab | -3 | 10 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |

| Date Stored | Drum # | Location Generated | Internal Sme dpm/1 min | ear Sample # 00cm² max | External Radio Res dpm/100cm² | • | Contents |
|----------------|--------|--------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------|-----------------------------------|
| 20-Nov-00 | 201 | High Level Lab | -9 | 26 | <200 | 800.0> | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 202 | Low Level | -29 | -23 | . <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 203 | High Level Lab | 7 | 15 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 204 | Low Level | 1 | 11 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 205 | High Level Lab | 5 | 15 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 206 | High Level Lab | -11 | 3 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 207 | High Level Lab | -11 | 3 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 208 | Ejector Pit | 4 | 5 | <200 | <0.008 | STAINLESS STEEEL TANK |
| 20-Nov-00 | 209 | Ejector Pit | 9 | 21 | <200 | <0.008 | STAINLESS STEEEL TANK |
| 20-Nov-00 | 210 | Ejector Pit | 11 | 39 | <200 | <0.008 | STAINLESS STEEEL TANK, PIPE |
| 28-Nov-00 | 211 | High Level Lab | 0.7 | 16 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 212 | High Level Lab | 2 | 19 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 213 | Low Level | 19 | 40 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 214 | Low Level | 31 | 35 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 215 | NUMBER-NOT US | ED J | | | | |
| 20-Nov-00 | 216 | Ejector Pit | -10 | 9 | <200 | <0.008 | STAINLESS STEEL TANK, VALVE HEAD |
| 20-Nov-00 | 217 | Ejector Pit | -4 | -3 | <200 | <0.008 | PIPE, FLOOR SWEEPINGS, VALVE HEAD |
| 20-Nov-00 | 218 | Ejector Pit | 13 | 28 | <200 | <0.008 | CEILING VALVES, HEPA FILTERS, PPE |
| 20-Nov-00 | 219 | Low Level | -3 | 13 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 220 | Corridor 15 | 5 | 35 | <200 | <0.008 | PPE FROM LAB OPERATIONS |
| 28-Nov-00 | 221 | Low Level | 7 | 19 | <200 | <0.012 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 222 | Low Level | <u>-1.5</u> | 17 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 223 | Low Level | 7 | 9 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 224 | Low Level | -16 | 22 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 20-Nov-00 | 225 | Low Level | -3.6 | 11 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |

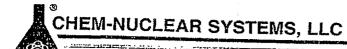
| Date Stored | Drum # | Location Generated | | ear Sample # 00cm ² max | External Radio Res | - | Contents |
|----------------|--------|--------------------|----------------|--|-----------------------|---------|--|
| 28-Nov-00 | 226 | Ejector Pit | 1 | 2 | <200 | <0.008 | EJECTOR PIT VALVE HEADS |
| 28-Nov-00 | 227 | Ejector Pit | 4 | 21 | <200 | <0.008 | EJECTOR PIT VALVE HEADS |
| 28-Nov-00 | 228 | Ejector Pit | 2.6 | 2.3 | <200 | <0.013 | FLOOR DEBRIS |
| 28-Nov-00 | 229 | Low Level | 16 | 21 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 230 | Ejector Pit | 1 | 9 | <200 | <0.008 | EJECTOR TANK AND PIPING |
| 28-Nov-00 | 231 | Low Level | -3 | -0.6 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 232 | Low Level | -12 | -15 | <200 | <0.008 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 233 | Low Level | -10 | -6 | <200 | <0.008 | CONCRETE FLOOR DEBRIS, PIPE |
| 28-Nov-00 | 234 | Low Level | - 7 | -0.6 | <200 | <0.008 | PPE |
| 28-Nov-00 | 235 | Low Level | -18 | 17 | <200 | <0.008 | REBAR, CONCRETE, PLASTIC |
| 28-Nov-00 | 236 | Low Level | 9 | 23 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 28-Nov-00 | 237 | Low Level | 6 | 8 | <200 | <0.010 | SAND FROM PIPE TRENCH |
| 28-Nov-00 | 238 | Ejector Pit | -1.54 | 15 | <200 | <0.010 | STEEL TANK, PPE, HEPA FILTER |
| 28-Nov-00 | 239 | Ejector Pit | 5 | 25 | <200 | <0.008 | STEEL DRAIN PIPES |
| 01-Dec-00 | 240 | Low Level | -14 | 5 | <200 | < 0.010 | SOIL FROM PIPE TRENCH |
| 01-Dec-00 | 241 | Low Level | 7 | 15 | <200 | <0.010 | 2" S.S. DRAIN LINE |
| 01-Dec-00 | 242 | Ejector Pit | -0.6 | 9 | <200 | < 0.010 | EJACTOR TANK AND PIPE |
| 01-Dec-00 | 243 | Lab pipe trench | 1 | 5 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 01-Dec-00 | 244- | Low Level | 13 | 18 | <200 | < 0.010 | SOIL FROM PIPE TRENCH |
| 01-Dec-00 | 245 | Lab pipe trench | -21 | -15 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 01-Dec-00 | 246 | Ejector Pit | 12 | 23 | <200 | <0.010 | STEEL TANK, PPE, HEPA FILTER, CONCRETE |
| 01-Dec-00 | 247 | Counting Room | -3 | 11 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 01-Dec-00 | 248 | Counting Room | -17 | 2 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 01-Dec-00 | 249 | Counting Room | 3 | 4 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 01-Dec-00 | 250 | Counting Room | 12 | 25 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |

| | · | | | | · · · · · · · · · · · · · · · · · · · | <u> </u> | <u> </u> |
|------------|---------------------|--|---------------|-----------------------|---------------------------------------|----------------------|--|
| Date | D***** # | Location Generated | l . | ear Sample # 00cm² | External Radio | ological Survey | Contents |
| Stored | יווטוט # | Location Generated | min | max | dpm/100cm ² | mr/hr | Contents |
| 12-Dec-00 | 276 | Ejector Pit | -2 | 11 | <200 | <0.008 | PIPE, FLOOR SWEEPINGS, PPE |
| 12 Dec 00 | Name and the second | | (CONSTRUCTION | | | \$120 <u>*</u> U7/11 | A GAST DRAINLINE PIPE |
| 12-Dec-00 | 744247 | Control of the second second second second | CLASS "B" | | 24.34 % | | CASTORAINLINE PIPE SCIDING DOCRTHACK SAMPEL |
| 12-Dec-00 | | Corridor 15 | -3 | 13 | <200 | 0.0260 | PPE |
| 18-Dec-00 | 280 | Corridor 45 | 2.6 | 5 | <200 | <0.008 | PPE |
| 18-Dec-00 | 281 | Corridor 45 | 5 | 13 | <200 | <0.008 | PPE |
| 18-Dec-00 | 282 | Counting Room | -10 | 7 | <200 | <0.008 | CONCRETE DEBRIS |
| .18-Dec-00 | 283 | Corridor 45 | 5 | 23 | <200 | <0.008 | PPE |
| 318-Dec-00 | 284 | e Corrdor 45 | GLASS "B" | WASTE | | 2-30 ui//iii | 4 CAST DRAINLINE PIPE |
| 18-Dec-00 | 285 | Corridor 45 | -3 | 15 | <200 | <0.008 | SOIL FROM PIPE TRENCH, VACUUM DEBRIS |
| 18-Dec-00 | 286 | Counting Room | -2 | 1 | <200 | < 0.010 | CONCRETE FLOOR DEBRIS |
| 18-Dec-00 | 287 | Counting Room | 11 | 24 | <200 | <0.010 | POLY, CONCRETE FLOOR DEBRIS, SOIL FOR TRENCH |
| 18-Dec-00 | 288 | Corridor 45 | -7 | 3 | <200 | <0.010 | VACCUM DEBRIS, POLY |
| 18-Dec-00 | 289 | Corridor 45 | -3 | 15 | <200 | <0.008 | PPE |
| 18-Dec-00 | 290 | Ejector Pit | 14 | 31 | <200 | < 0.010 | CONCRETE FLOOR & WALL DEBRIS |
| 18-Dec-00 | 291 | Ejector Pit | 9 | 17 | <200 | <0.010 | CONCRETE FLOOR & WALL DEBRIS |
| 18-Dec-00 | 292 | Counting Room | -9 | -3 | <200 | <0.010 | SOIL FROM PIPE TRENCH, PPE |
| 18-Dec-00 | 293 | Ejector Pit | -1 | 9 | <200 | <0.010 | CONCRETE FLOOR & WALL DEBRIS |
| 18-Dec-00 | 294 | Ejector Pit | -3 | 1 | <200 | <0.010 | CONCRETE, POLY, VACCUUM DEBRIS |
| 18-Dec-00 | 295 | Corridor 45 | -5 | -4 | <200 | <0.010 | POLY, PPE |
| 18-Dec-00 | 296 | Corridor 45 | -2 | -1 | <200 | < 0.010 | POLY, PPE, FILTER HOUSING |
| 18-Dec-00 | 297 | Corridor 45 | -10 | 0 | <200 | <0.010 | POLY |
| 18-Dec-00 | 298 | Corridor 45 | -13 | 7 | <200 | <0.010 | CONCRETE FLOOR & WALL DEBRIS |
| 18-Dec-00 | 299 | Ejector Pit | -16 | 8 | <200 | <0.010 | CONCRETE FLOOR & WALL DEBRIS |
| 18-Dec-00 | 300 | Corridor 45 | 14 | 16 | <200 | < 0.010 | WOOD, PPE, POLY |

| Date Stored Drum # | Drum # | Location Generated | Internal Smear Sample # dpm/100cm ² | | External Radio Res | | Contents |
|--------------------|--------|--------------------|---|-----|------------------------|--------|--|
| | | | min | max | dpm/100cm ² | mr/hr | |
| 18-Dec-00 | 301 | Ejector Pit | 3 | 19 | <200 | <0.010 | CONCRETE EJECTOR ROOM |
| 18-Dec-00 | 302 | Ejector Pit | -13 | 2 | <200 | <0.010 | CONCRETE EJECTOR ROOM |
| 18-Dec-00 | 303 | Ejector Pit | -1.5 | 13 | <200 | <0.008 | CONCRETE EJECTOR ROOM, S.S. PIPE |
| 18-Dec-00 | 304 | Ejector Pit | -3 | 19 | <200 | <0.006 | HEPA FILTER AND VACCUUM DEBRIS |
| 04-jan-01 | 305 | Counting Room | 0.46 | 17 | <200 | <0.008 | PPE |
| 04-Jan-01 | 306 | Counting Room | 2.6 | 5 | ·<200 | <0.008 | PPE |
| 04-Jan-01 | 307 | Counting Room | -1.54 | 21 | <200 | <0.008 | CONCRETE DEBRIS |
| 04-Jan-01 | 308 | General | 5 | 25 | <200 | <0.008 | PPE |
| 04-Jan-01 | 309 | General | 2.6 | 13 | <200 | <0.008 | PPE, POLY |
| 04-Jan-01 | 310 | General | -3 | 23 | <200 | <0.008 | VACUUM / HEPA USACE # 43064 |
| 04-Jan-01 | 311 | General | 5 | 17 | <200 | <0.008 | PPE, CONSTRUCTION DEBRIS, vaccuum head USACE #43066 |
| 04-Jan-01 | 312 | General | -7 | 23 | <200 | <0.008 | RAD TRASH, CONSTRUCTION DEBRIS, vacuum head USACE #43085 |
| 04-Jan-01 | 313 | General | -13 | 15 | <200 | <0.008 | RAD TRASH, CONSTRUCTION DEBRIS HEPA filter housing, Porter Cable saw |

NOTE: TOTAL OF 307 DRUMS OF CLASS "A" WASTE NOTE: TOTAL OF 4 DRUMS OF CLASS "B" WASTE

| Date Stored | Drum # | Location Generated | Internal Sme dpm/1 min | . * | External Radio Res | • | Contents |
|----------------|--------|--------------------|------------------------------|------------|-----------------------|---------|-------------------------------|
| 01-Dec-00 | 251 | Counting Room | 11 | 14 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 01-Dec-00 | | Counting Room | -4 | 4 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 01-Dec-00 | | Counting Room | -13 | -6 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 01-Dec-00 | | Corridor 15 | 5 | 19 | <200 | <0.010 | PPE |
| 01-Dec-00 | | Corridor 15 | -28 | 17 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 12-Dec-00 | 256 | Corridor 15 | -20 | 4 | <200 | < 0.010 | CONCRETE FLOOR DEBRIS |
| 12-Dec-00 | 257 | Low Level | -19 | -13 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 12-Dec-00 | 258 | Counting Room | -21 | 5 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 12-Dec-00 | 259 | Low Level | 4 | 6 | <200 | < 0.010 | SOIL FROM PIPE TRENCH |
| 06-Dec-00 | 260 | Corridor 15 | 5 | 9 | <200 | < 0.010 | CONCRETE FLOOR DEBRIS |
| 06-Dec-00 | 261 | Corridor 15 | 4 | 36 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 06-Dec-00 | 262 | Corridor 15 | -4 | 17 | <200 | <0.010 | PPE |
| 06-Dec-00 | 263 | Corridor 15 | -11 | 25 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 06-Dec-00 | 264 | Corridor 15 | -4 | -3 | <200 | <0.010 | PPE |
| 06-Dec-00 | 265 | Corridor 15 | 8 | 16 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 06-Dec-00 | 266 | Counting Room | -21 | -2 | <200 | <0.010 | WOOD FROM BEHIND SLIDING DOOR |
| 06-Dec-00 | 267 | Corridor 15 | -17 | -9 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 06-Dec-00 | 268 | Counting Room | -12 | 9 | <200 | <0.010 | CONCRETE FLOOR DEBRIS |
| 06-Dec-00 | 269 | Counting Room | -15 | -12 | <200 | <0.010 | WOOD AND PLASTIC DEBRIS |
| 06-Dec-00 | 270 | Counting Room | -7 | - 5 | <200 | <0.010 | SOIL FROM PIPE TRENCH |
| 12-Dec-00 | 271 | Lab Area | -3 | 5 | <200 | <0.008 | STAINLESS STEEL DRAIN PIPE |
| 12-Dec-00 | 272 | Corridor 15 | 7 | 17 | <200 | <0.008 | PPE |
| 12-Dec-00 | 273 | Counting Room | 2.6 | 15 | <200 | <0.004 | WOOD, VACUUM DEBRIS |
| 12-Dec-00 | 274 | Ejector Pit | 4.7 | 13 | <200 | <0.008 | STEEL TANK |
| 12-Dec-00 | 275 | Ejector Pit | 2.6 | 23 | <200 | <0.008 | PPE, TANK, CONCRETE, PIPE |



Subsidiary of Duratek

740 Osbom Road • Barnwell, South Carolina 29812

November 6, 2002

ATTN: Harold Stout DURATEK, INC. P.O. BOX 2530 1560 BEAR CREEK ROAD OAK RIDGE, TN 37830

Reference: Radioactive Waste Shipment - Shipment ID Number 11595

Dear Harold Stout,

As required by 10 CFR Part 20, South Carolina Title A, and Barnwell Waste Management Facility Disposal Criteria (S20-AD-010), this letter is notification that the shipment referenced above has been received and disposed of at the Barnwell Waste Management Facility. A signed copy of the Form 540 for this shipment is attached as acknowledgment of the acceptance of this waste shipment. This waste meets all the Barnwell Waste Management Facility acceptance requirements and was disposed of in accordance with the Barnwell Site's License.

If you have any questions regarding this letter, please contact the Prior Notification Plan Department at (803) 541-5017.

Sincerely,

James W. Latham

Vice President, Barnwell Operations

Outbound Manifest Breakdown Report

By Outbound Manifest Id

| Manifest Nbr | | | Transport | Permit Number | Shipping Date | Site Name | | | |
|---|--------|-------------------------|---|--------------------------|---------------|--------------|-----------------------|-----------|-----------|
| 1024083 | | | 0272-41-02-X | • | 10/31/2002 | Barnwell Was | te Management Facilit | <u>y</u> | |
| Customer Name | Number | Phone Number | Manifest Number | Received Date | Wst Wgt (Lbs) | Vel (Ft3) | Activity (mCi) S | NM Grams | SM Lbs |
| Aventis Pharmaceuticals/Cincinnati | 2812 | (513) 948-6557 | 648-G7\$-01-031 | 12/21/2001 | 16.0 | 6 | 83.876 | 0 | 0E+00 |
| Dominion Generation/Millstone | 77 | (860) 444-4227 | 77-02-076-2 | 08/16/2002 | 291.0. | 6.8 | 1170.9359 | 0 | 0E+00 |
| Exelon Corporation/Amergen/Oyster Creek | 357 | (609) 971-4544 | 357-OC-1018-01 | 09/04/2001 | 602.0 | 12 | 567.208 | 0.0000725 | 0E+00 |
| Exelon Corporation/Dresden Unit 1 | 2164 | (815) 942-2920 x2368 | 2164-DW-02-045 | 04/24/2002 | 539.0 | 12.8 | 626 7038 | 0.0013386 | 00:00 |
| Exelon Corporation/LaSalle Station | 240 | (815) 415-2395 | 240-LW02-11 240-LW02-19 | 06/07/2002 08/12/2002 | 11.0 | 1.36 | .2582 | 0 | . 07:+00 |
| Northrop Grumman / Linthicum | 1481 | (410) 765-2318 | 54-12302 | 01/23/2002 | 46.0 | 2.5 | 2129 | 0 | OF:+G0 |
| Rochester Gas & Electric Co./Ginna | 331 | (585) 771-3118 | 331-2001-31 | 10/31/2001 | 120.0 | 4.6 | 1637.4718 | 0.0004952 | 0F.+00 |
| US Army Corp of Engineers | 2926 | (410) 962-9184 | 2167-T013850 | 07/23/2001 | 967.0 | 13.1 | | | |
| , | | . , | | | | Measured: | 113.4904 | 0 | 0E+00 |
| Viacom/Waltz Mill | 481 | (724) 722-5924 | 481-LRW2001-316-RT 481-LRW2001-347-RT | | 1,332.0 | 40.44 | 1350.8963 | 0.084644 | 3.891F-03 |
| Wyeth-Ayerst Research/Lederle | 673 | (845) 732-3784 | 673-T015802PEARLR 673-T021070 673-T022688 | | 365.0 | 13.2 | 453.27 | 0 | 0E÷00 |
| · William | | | | Totals | 4,289.0 | 112.8 | 8019.62 | 0.0865502 | 3.891E-0 |
| | | | | | | Measured: | 113.4904 | 0 | OFICE |
| | | | | | | Grand Total: | | 0.0865502 | 3.891E-0 |

| FORM 540 | | | | | | | • | | | |
|--|--|--------------------------|---|---|---|---|-----------------------------------|---------------------------------------|--|---|
| ſ | Barnwell Waste Management Fac | ility 5. SHIPPER | R - NAME AND FACILITY | | 1 | | | | A5# | 72759 |
| UNIFORM LOW-LE WASTE M SHIPPING | ANIFEST | P.O. Box 1560 Bea | inc. / Bear Creek Operations · 2530 Ir Creek Road | • | SHIPMENT ID NUMBER 1102-11595 COLLECTOR | FORM 541 AND 5 FORM 542 AND 5 | 41A 42A | 10 F 2 F | PAGE(S) 8. MANIFES PAGE(S) (Use this i | T NUMBER sumber on all continue |
| 1. EMERGENCY TELEPHONE NUMBER (Incl.) | ide Area Code) | 7 | e, TN 37830 | | X PROCESSOR | ADDITIONAL INFO | | NONE P | PAGE(S) | T024083 |
| (400) 401-0222 | | | PORT PERMIT NUMBER 0272-41-02-X | SHIPMENT NUMBER T024083 | GENERATOR TYPE (Specify) | 9. CONSIGNEE - Na Barnwell Waste Ma | ne and Facility was ement Faci | Address | CONTACT | |
| ORGANIZATION Duratek, inc. | | CONTACT | | 777100 | TELEPHONE NUMBER | Operated By Chom Oshom Road | Nuclear System | ms | Licensing D TELEPHONE | NUMBER |
| 2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? | 3 YOTAL AUGUSTA | Harold Sto | • | | (Include Area Code) (865) 481-0222 | Barnwell, SC 2981 | 2 | | (Include Area | Coda) 803-259-1781 |
| MYES []NO | PACKAGES IDENTIFIED ON THIS MANIFEST | 6. CARRIER | Name and Address ransport Services | ······································ | EPALD, NUMBER | SIGNATURE - Author | zed consigner | acknowledgi | ng DATE | 000-209-1701 |
| 4 DOES ED A DESIGNATION | | 1560 Bear | Creek Road | | TND-98-778-9065 SHIPPING DATE | Bile & | <u> </u> | | 11- | 6-02 |
| WASTE REQUIRING A MANIFEST ACCOMPANY MO | EPA MANIFEST NUMBER | CONTACT CONTACT | . TN 37830 | | 10/31/2002 | | | 10, CERTA | FICATION | |
| THIS SHIPMENT? | | ł | • | | HIDCHIGA Area Codel 1 | This also certifies that the | mala mer alam | All and the same | classified, described, pack likeable regulations of the D | epariment di Transocolalio |
| if "Yes", provide Manifest Number | N/A | Karen Kirby SIGNATURE | Authorized carrier acknow | | 600-233-9933 | transportation and disposal regulations. | in accordance wi | ith the tedricewer sweer backsided | ilicable regulations of the Da marked, and labeled and in his of 10 CFR Parts 20 and | proper condition for 61, or equivalent state |
| 11. U.S. DEPARTMENT OF TRANSPORTAT | | Da | my Blano | viedging waste receipt | 10-31-02 | AUTHORIZED SIGNAT | VRE // | TITLE | | DATE |
| (Including proper shipping name, he UN ID number, and any additional in | izard class, DOT LARE! | 13. | 1 14 | | 15. | 7 | Syst | | al Speak (# | |
| RADIOACTIVE MATERIAL - LOW SPECIFIC ASSE | ATY NOST IN 1992 | INDEX | CHEMICAL FORM | RA | ndivioual Dichuclides | TOTAL PACK | AGE ACTIVITY | | 18. TOTAL WEIGHT OR VOLUME | 19. IDENTIFICATE NUMBER OF |
| AIR FILTERS: RUIT DING BURDE & CASE TO | . 1 | NA · | SOLID METAL OXIDES | | I; CE-141; CE-144; CM-242; 0-58; CO-60; CR-51; CS-134 | CM- 300925,0848 | | | (Use appropriate units | PACKAGE |
| LIQUID FILTERS; METAL; SMOKE DETECTORS | | | 4 | 59; NI-83; PU-238; PU- | -59; H-3; I-129; MN-54; NB-9; 39: Pi L240: Pi L244: Di L400 | 5: NI- | | | 330 g | C NS- 21-300 -10 |
| | | | | ZR-95 | 99; U-234; U-235; U-238; Z\$L | 65; | | | | IP-2 |
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| FOR CONSIGNEE USE ONLY | 1 | | 20 "Course | | | | | | | |
| | INIT. | •• | prepared in accord | ereby made to the South dance with a radioactive | Carolina Department of He waste management progra in accordance with the req | aith and Environment | i Control that | this shipment | of low-level radioactiv | e waste has been |
| | ON-SITE INSPECTOR | 1 | regulatory agency effective Barnwell | and has been inspected Site Disposal Criteria w | waste management progra in accordance with the req thin 48 hours prior to shipt | ruicements of South Ca | roved by the h wollna Radioa | luciear Regula ctive Material I | atory Commission or a License No. 097 as am | n Agreement State ended and the |
| | SC DEPT, OF HEALTH | .1 | with all applicable | laws, rules and regulati | in accordance with the requiring 48 hours prior to shipt one." | nenz, and further corti | ication is mad | e that the Insp | ection revealed no ite | ns of non-compliance |
| | THE PROPERTY OF THE PARTY OF TH | | | | 41. / I.B. | | | | | |
| | & ENVIRON CONTRO | ₩ | Date /0/3/// | | Vi LAH | | | | | |

APPENDIX D RADIATION WORK PERMITS

| ST. A | AI LBANS PROJECT R | P-012-01 ADIATION WORK P | ERMIT |
|--|--|--|--|
| Job Supervisor | Date (| 7-19-00 | No. 00-01 |
| Location of Work : | | | |
| Description of Work: INS | Dect, Sample | mastic, perform | initial Butry |
| Survey | | | • |
| | | PLOGICAL CONDITIONS | |
| Location | Contamination Levels | ; Radiation Levels | Airborne Concentrations |
| Bidg 90 · | tenknown | ·/WR/hr | unknown |
| | | | |
| - | DEGULDED DADIO | | |
| 3 & Coveralls Hood Surgeons Ca &Surgeons Glo | p oves | Glove Liners Plastic Shoe Covers Rubber Shoe Covers Tape Gloves to Sleeve | Coverage |
| ∴ KRubber Glove Trained Radia | es ation Worker(s) | Plastic Suit | ኢ ፐLD |
| SPECIAL INSTRUCTIONS: (Covers use double Inital entry (3) | O Tope All Co E plastic shoe TXVEX | | - No Rubber Shoe erators required for |
| SIGNATURE INDICATES THA | | UNDERSTAND THE RA | DIOLOGICAL CONDITIONS AND |
| . Name | Signature | Name | Signature |
| Stranel | A. The second second | | |
| CARLOS JOFAT (8 | Los Stet | | |
| Curtis Afriles C | into Vals | | |
| <u> </u> | | • | |
| APPROVED BY: ut | 5/Kal- | ک <u>۔</u> DA | TE: 9-19-00 |
| REAPPROVED BY: | | DA | TE: |
| RWP TERMINATED BY: _ C | to J. Holes | DA | TE: 9-21-00 |
| | | | |
| AP-012 | Cabrera Se | rvices, Inc. | Page 9 of 11 |

| , | | AP-012 | | | | |
|--------------------------|------------------------|----------------------|---------------------------------------|---------------|------------------|-----------|
| ST. A | ALBANS PROJE | CT RADIA | TION WORK | PERM | NT . | · . |
| Job Supervisor | | te 9-20 |)- 00 | | No. 00-03 | |
| Location of Work: Bldg | 90 LAB | | ibans ' | | | |
| Description of Work: Ins | ped, Soms | zle, con | i remeva | 1 04 | 16irstant | |
| | SUMMARY OF | RADIOI OG | ICAL CONDITIO | NS | | |
| Location | Contamination Le | | Radiation Leve | | Airborne Conce | ntrations |
| LAB | = 186-1675 d | pm/ | 10 ur/ | an | * midi | 9 |
| Holein floor | 2 210 dpm | | £85 u€ | 2/2- | >mda | |
| | DECUMPED : | - - | M. CONTROL | | | |
| X Coveralis | | | CAL CONTROLS ove Liners | <u> </u> | ⊀1 anal Air Sa | molor |
| Hood | TyveX | | astic Shoe Cove | rs | | uhiei |
| Surgeons Ca | | R | ubber Shoe Cove | ers | x Pre-Job Mee | ting |
| XSurgeons GI | oves | ЗХTa | pe Gloves to Sle | eeves | Continuous I | ₽Ţ |
| アメルダイド い Rubber Glov | | ÐI. | astic Suit | • | Coverage | |
| | es iation Worker(s) | . 1 | astic ouit | | X TLD | |
| SPECIAL INSTRUCTIONS: | | | · · · · · · · · · · · · · · · · · · · | | | |
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| | ey for is | CERTICIO | respiator | 786 | duired when | irestino |
| SIGNATURE INDICATES THA | T YOU HAVE REAL | D AND UND CONTROL | ERSTAND THE | RADIOL | OGICAL CONDITION | ONS AND |
| Name | Signature , | | Name | 1 | Signature | |
| EDWARD Totaken ES | man Johnson | - Combin | John | | Cornelius Jacks | on |
| James Brackson Hon | re Bisden | 60 / | lans | _ 4 | 100n S | |
| Scott Wynord & | of upon | Fanh | MAY | Jon Son | knay! | |
| KUNT OOSHIMAL S | he | <u> </u> | - | | | |
| APPROVED BY: Cuts | d. Holes | | | DATE:_ | 9-20-00 | |
| REAPPROVED BY: | | · | , | DATE:_ | - | |
| RWP TERMINATED BY: | | | | DATE:_ | | |
| | | • | | | | |
| AP-012 | Cabro | era Service | s, Inc. | | Page 9 of 1 | 11 |

| | ST. ALBANS PROJEC | AP-012-01 CT RADIATION W | ORK PERN | at, |
|---|---------------------|--|---------------------------------------|--|
| Job Supervisor | Dat | 9-25-00 | | No. 80-03 |
| Location of Work: B | 169 96 - LAI | 3 - St Alt | 325 | |
| Description of Work: | Somple St | | . easy | Sec. |
| | | 7 0 7 | / | J |
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| | / | reis Raulation | Levels | Airborne Concentrations |
| Hole in floor | | dem = £85 | uR/lu | |
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| · | | ADIOLOGICAL CON | | |
| 入Coveral Hood Surgeor 入Surgeor | | ∠Glove Liners ∠Plastic Shoe Rubber Sho ∠Tape Gloves | Covers e Covers | Lapel Air Sampler Lab Coat Pre-Job Meeting Continuous HP |
| . X Rubber X Trained | Radiation Worker(s) | Plastic Suit | | Coverage |
| SPECIAL INSTRUCTION: | S: O. Lew-yel | must be | Yunnens 1 | use instead of |
| Lapel Lecons | e of time). | Respirator | required | when collecting |
| 25mg/6 | | | | |
| SIGNATURE INDICATES | THAT YOU HAVE READ | AND UNDERSTAND | THE RADIOL | OGICAL CONDITIONS AND |
| Name | , Signature | Name | | Signature |
| Henry W. Sigrat | Keny W. Signit | | | |
| Curlis HAles | Cuts Nals | | | |
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| · | | | | |
| APPROVED BY: Cou | to LHales | Hrus 9/85/00 | DATE:_ | 9-25-00 |
| REAPPROVED BY: | - | ······································ | DATE:_ | |
| RWP TERMINATED BY:(| into L. Hale | · | DATE:_ | 10-3-00 |
| | | | • • • • • • • • • • • • • • • • • • • | |
| AP-012 | Cabre | ra Services, Inc. | | Page 9 of 11 |

Page 9 of 11

AP-012

| • | | AP-012-01 | |
|--|--|--|--|
| ST | '. ALBANS PROJEC | CT RADIATION WORK | PERMIT |
| Job Supervisor | , , , , , , , , , , , , , , , , , , , | | The second secon |
| Kurt ofsterna | Date | 10-4-00 | No. 00 - 03 |
| Location of Work: Ducc | -DING 10 11- | INJECTOR PUT | |
| Description of Work: Roci | form RADIOLOGIC | AL BURUAYS (SK | |
| VISUAL IUSTIC | | u & confoleris | |
| Location | Contamination Lev | RADIOLOGICAL CONDITION Pels Radiation Levels | |
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| | | ADIOLOGICAL CONTROLS | |
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| ()Rubber Gl | | Plastic Suit | XCoverage (wrexumin XTLD |
| | adiation Worker(s) | - 0 | -1-0 |
| SPECIAL INSTRUCTIONS | | SAMPLES OR VIVE | |
| required when Nea | |) toca sook agos es | C11 (9) /CWF116/04/2 |
| | | | |
| MONATURE NIDIOATES | | | · . |
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| SIGNATURE INDICATES T | HAT YOU HAVE READ | AND UNDERSTAND THE R CONTROLS Name | ADIOLOGICAL CONDITIONS AND Signature |
| Name | VIII. | CONTROLS Name | |
| Name Lanc Burnico | VIII. | Name Name Name | |
| Name lanc Burnes | VIII. | Name Name Name Scott Wynat | |
| Name Marc Burinson Robert Test TOHN DEVINE | VIII. | Name | Signature Signature Lobbitation Educate Solvane Johnson |
| Name Hanc Burner Robert Test | VIII. | Name Name Name Scott Wynat | Signature Signature Lobbitation Educate Solvane Johnson |
| Name Marc Burner Robert Test TOHN DEVINE Curtis L. NACE | Signature Signature Signature Signature | Name Name Name Name Name Name Scott wynat E OLINO Tombar James Brackson | Signature Signature Lobbitation Educate Solvane Johnson |
| Name Marc Burnes Robert Test TOHN DEVINE Curtis L. NACE PPROVED BY: FOMENTO | Signature Signature Signature Signature | Name | Signature Signature Success Success Success Showns |
| Name Marc Burinco Robert Test TOHN DEVINE | Signature Mar Main Luto J. Hol M. Jaral 6 | Name | Signature Signature Switcher Showing Phane Showing DATE: 10-4-00 |

Cabrera Services, Inc.

| ST. | ALBANS PROJEC | AP-012-01 T RADIATION | WORK PERM | /IIT |
|------------------------------|--|--------------------------|------------------|--|
| Job Supervisor MICHAE | GREEN Date | <u> </u> | | No. 00-05 |
| Location of Work: Blds | | 70 7 00 | | 00-03 |
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| Location | Contamination Lev | eis Radiatio | on Levels | Airborne Concentrations |
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| | DECUIDED D | | | entries |
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| AP-012 | Cabrera | Services, Inc. | | Page 9 of 11 |

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APPENDIX E

RADIATION SURVEYS

(PRE-JOB, DURING JOB, & POST JOB)

| DPM/10cm'2 Danubo Counts Counts | Location: work zone , B | 149 90 | RWP# | 00-02 | | | Survey # | 087 | | Survey T | уре: | 77-10 | | <u> </u> |
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| 20 45 21 46 22 47 23 48 24 49 25 50 Comments All PPPE Ends Sealed with Fearn. Surveyed By: Date: Instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key 12-18-00 4345 6 508 13-19-19 W/hr Surveyed By: Boundary | | | |
| 21 46 22 47 23 48 24 49 25 4 50 26 50 27 28 1 48 29 3 - 10 uy/4 Comments All Pipe Ends Sealed with Fear Surveyed By: Date: Instrument Serial # a Eff. B Eff. a Bkg. B Bkg Cal. Due Key Col No.l. 12-18-00 4365 6 508 4365 6 508 4365 6 508 10 uy/4 3 - 15 uy/a 1 ft - 12 uy/hy 1 Surveyed By: Date: Instrument Serial # a Eff. B Eff. a Bkg. B Bkg Cal. Due Key 1 3 uy/b 1 2 uy/hy 3 - 15 uy/a 1 ft - 12 uy/hy 1 ft - 12 uy/h | | { | · APPOR 26/2 W/Lip |
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| Comments All pipe Ends Sealed with Figure Surveyed By: Date: Instrument Serial # $\alpha \to \text{Eff.}$ $\beta \to \text{Eff.}$ $\alpha \to \text{Bkg.}$ $\beta \to \text{Bkg.}$ $\alpha \to \text{Bkg.}$ | | 10.00947 | |
| Comments All pipe Ends Sealed with Figure Surveyed By: Date: Instrument Serial # $\alpha \to \text{Eff.}$ $\beta \to \text{Eff.}$ $\alpha \to \text{Bkg.}$ $\beta \to \text{Bkg.}$ $\alpha \to \text{Bkg.}$ | | 3 10 47/4r | 20 w/h 12 w/h |
| Surveyed By: Date: Instrument Serial # \alpha \in \floor | | | 3.44/2 |
| ft - 12 ur/hr | All pipe Ends | 1 ft - 10 w//4 * | 3. 15. 16 |
| ft - 12 ur/hr | sealed with | Ι | 1 = 10-12 uy/hr 3 13 wyan |
| Surveyed By: Date: Instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key CS No.ls 12-18-00 4389 558 0.1832 314 3-14-01 0 Smear 3 Boundary | +62m | | 1 ft - 12 w/hr |
| Color 12-18-00 4385 0508 0.1822 314 3-14-01 0 Smear 1- Boundary | | Supra - 2 D | |
| C3 No. 12-18-00 4389 0508 0.182 3-14-01 0 Smear : Boundary | | 1130 001 | The state of the s |
| | | | 6.873 0.1873 014 3-14-01 0 Smear 1: Boundary |
| Reviewed By: Date: Avs Location Dose Rate miritar Avs Location | F | | Dose Rate millor W A/S Location |
| Reviewed By: Date: madely 87/32 NA NA NA 2-28-01 Direct Reading DPM/100 cm ² 2 | | mede | 119 8 / 130 NA NA NA 2-28-01 Direct Reading DPM/100 cm ² |
| △ Grab Sample | - | | |

| | ST. ALBAN | 5 BLDG 90 OP-001-1 | 02 Radiological S | urvey Sheet | | |
|----------|---|------------------------|-------------------------------|---------------------|------------------|---------------------------|
| | Location: US LOCAL S Smear Results | RWP# OC Z_ | Survey | # 079 | Survey Type: | 2775 |
| win. | DPM/100cm^2 No. η η η η η η η η η | MATORIA L | | · Snear th | = (00% WLASSLIAN | (C/m) DIRECT FILSK (KU) |
| Jours. 3 | 2 164 -7.3 27 7 3 162 64 28 1 4 148 -21.2 29 11 | 10 12"×12"×0.5" | Lead - | - 0 - 6 | Sucure. | 40 |
| | 5 198 30.2 30 | 3 3'X15'XZ" | (OAT) | - @ | 6.000 | C+0 |
| | 8182128 33 / 9 52 17.1 34 / | 3'X1.5'X3" | "L" (cours)— | - (12) ! | Lww | <40 |
| | 10 156 -13.0 35 / 11 186 11.7 36 12 112 3.5 37 | CREW : JAMES BLA | EXTUN | | 1 |) |
| - | 13 38 14 39 15 40 | 7 | | | | |
| | 16 41 17 42 18 \ 43 | - - - | | : | , | |
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| | 21 / 46 22 / 47 23 / 48 | | 1 | , | | |
| | 24 49 25 50 Comments | | A | | • | ' |
| • | Continents | | | | | |
| | | Surveyed By: Date: In: | | • | | |
| | | Y/////////////// | nstrument Serial # u Eff. | ß Eff. α Bkg. β Bkg | Cal, Due | Key |
| | | 12-18-tact. | -177 94714 N 2929 163827 A | 10.47. 21/ 40 Bin | 3-7-01 Q. Smar | *-* Boundary |
| 1 | | Reviewed By: Date: | -16-7 V 00 7 E-1 / A | 48.4% /A 24.540 | 2 23' LI Dose Ra | ile mr/hr A/S Location |
| [| | Date: | | | Direct Ri DPM/10 | eading |
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| Location | LDV4.504 | | | • • |
|--------------------------------------|-------------------------------|--|--|--------------|
| Oldy 90 work | Zone RWP# | Survey # 0 8.1 | Survey Type: | T |
| DPM/100cm^2 | - O. Floor Bully 15 | 5 courts | Kelege | pg. 1 of 1 |
| No. α β No. α β 1 29 26 2 9 27 | D. scrosson Holder# | 164 combs | | |
| 3 -0 28 4 29 | J3 11 11 #3 | 153 counts | | |
| 5 Q 30 6 0.2 31 | D. voc nozzk | 169 counts | · | |
| 7 -O 32 8 -O 33 9 34 | Smeans 5-8 po | enformed on Lead | | |
| 10 35 11 36 |] | | | • |
| 12 37 . 13 38 31 14 39 | 100% | Direct frisk < 1000 com | | |
| 15 40 16 41 17 42 | | | | |
| 18 43 19 44 | | Smeared 100 c | m? - counted on L. counts detected | 2929 |
| 20 45 21 46 22 47 | | C-501 4 2/1 G | | |
| 23 48 24 49 | <u> </u> | Dose Rode < B | 3KG BKG= 8-120 | 11/0- |
| 25 50 Comments |] | | | |
| All counts | | | | |
| 2 mm | + | | | |
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| | Surveyed By: Date; Instrument | Serial # a Eff. ß Eff. a Bkg. ß Bk | g Cal. Due Key | |
| | CSHoles 12-15-00 2929 | 78. | 3 2-38-01 O Smear | Boundary |
| | | 97/77 | 7 3-07-0 Dose Rate multur Direct Roading | A/S Location |
| | | 01132 1132 113 | DPM/100 cm^2 | |
| | | | △ Grab Sample | |

| Location: | RW | P# | | · · · · · · · · · · · · · · · · · · · | | | | | | |
|--|--------------|-----------|---------------------|---------------------------------------|-------------------|----------|-------|---|-------------|--------------|
| Bldg 90-Co | gridar 15 | C0-00 | • | Survey# 08 | ሚ | Survey | уре: | | | T |
| Smeat Results DPM/100cm^2 | | | | | | IIn | +ox w | ative | - | pg. 1 of 1 |
| No. α β No. α β 1 -12 26 2 244 27 3 23 28 4 -68 29 | Smean doors. | Survey | Performed | on inte | celing | rente. | ge- | occess | | • |
| 5 -2 30 6 31 7 32 8 33 9 34 | | | Ceiling | Corridor | 15 | | | | | · : |
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| | Ed young | | 2929 163827 | 480 | α Bkg. β Bkg | Cal. Due | | Key | | |
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| | Reviewed By: | Date: **. | | | | | · | Dose Rate mr/hr Direct Reading DPM/100 cm^2 | | A/S Location |
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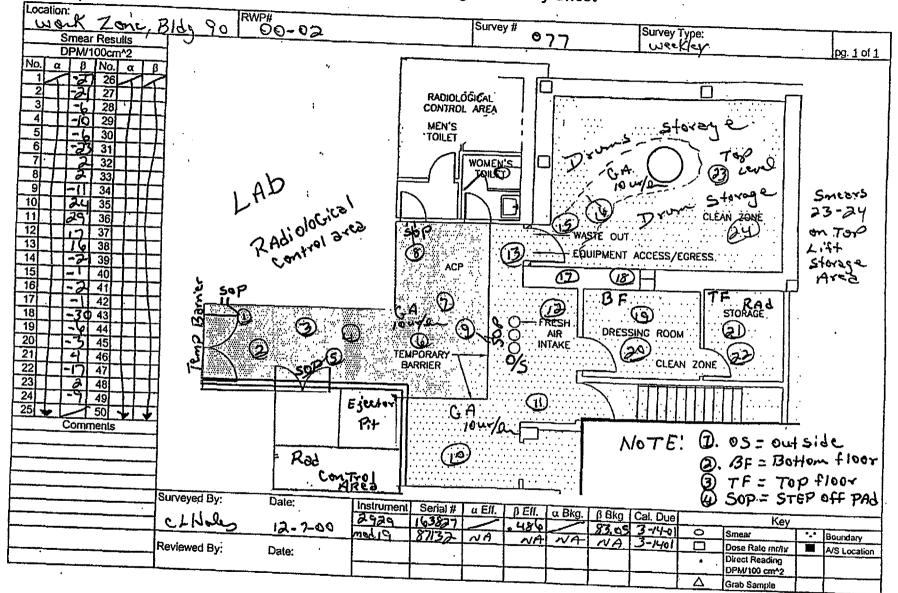
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| Smear Results | ork Zone RWP# 00-02 | Survey# 0 \$ 0 | Survey Type: | | |
| DPM/100cm^2 | | | 1 1010000 | | pg. 1 of 1 |
| Νο. α β Νο. α β | D. Radio - Flows light | ~ ~ ~ ~ * | | | |
| 1 -10 26 | H @ C . A . L . J . T | 58 counts | | | |
| 3 -8 28 | Q. Crey Bucket | | | | |
| 4 -5 29 | 3. mine. / Razor - wre | och shoops mut | | | |
| 5 14 30 6 -8 31 | O T V W | 400 CUAS | | | |
| 7 12 32 | Q. Jock Hommen #1 | 163 courts | | | |
| 8 8 33 | B. Occk Hommen stand | # 181 Cm. + | <i>:</i> | | |
| 9 -/9 34 | 6. SKil Dull w/cord | 181 00000 | | | |
| 11 -3 36 | 9 24 9 | 160 counts | | | • |
| 12 -24 37 | Q. Roby? cordless Dill | 179 counts | | | |
| 13 - 6 38 14 39 | - 1 80. 1 90 meaning (a) | · · · · · · · · · · · · · · · · · · · | | | |
| 15 40 | 19 0 1 | //0 (000075 | 1 | | , |
| 16 41 1 | 1. Point brush - vice gripe 1. Hammer / Dry bon 1. Sow - cork con 1. Took Homes | s - wrench: 149 | counts | | |
| 17 42 18 43 | W. Harmor / pry bon | 158 cant | | | |
| 19 44 | 1 (1) Sour - cark com | 115 | | | |
| 20 45 21 46 | | 163 Counce | -5 | | |
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| 23 48 | B. Jock Hammen Stan | d =t | | | |
| 24 49 | 0.000 | 4 /62 cm | .J. | • | |
| 25 V V 50 V V Comments | 4 | | | | |
| All counts | | | | | |
| 2 min. | | | | | |
| | | | | | |
| | Surveyed By: Date: Instrument Son | | | | |
| | 2636 | | g Cal. Due | Key | |
| | | 100 | 142-25-01 0 Pa 3-5/41 0 | Smear | Boundary |
| | Reviewed By: Date: | | PA 3.5/4 - | Dose Rate mr/hr Direct Reading | A/S Location |
| | | | | DPM/100 cm^2 | |
| | • | | <u>_</u> | Grab Sample | I |





| Somer Results DPM/100cm/2 No. a 1 No. a 1 1 3 | Location: Bld9 96 | | • | | | |
|--|---|--------------------------------------|--------------------|---|--|--|
| DPM/100cm2 DPM | Count room. | | 02 | Survey # 082 | | - |
| CB (Coles 12-11-00 Model 19 87132 N/A N/A N/A 104/1 3/7/61 0 Smear - Boundary | DPM/100cm ² 2 No. α β No. α β 1 26 2 27 3 28 4 29 5 30 6 31 7 32 8 33 9 734 10 35 11 36 12 37 13 36 12 37 13 38 14 39 15 40 16 41 17 42 18 43 19 44 20 45 21 46 22 47 23 48 24 49 25 49 25 49 Comments | Surveyed By: Date: | 2) 30 30 30 1 | X = 3 X = 1 X | Dixect/contact - All ends of pions one 41 meters - meter and appex 3 | 1-17 mg hr t = 10 mg no. |
| Reviewed By: Date: A Direct Reading | ŀ | Cot Holes 12-1 Reviewed By: Date: | 1-00 model 19 8713 | | OWAL 3/7/61 O Smear Dose Rate mriter | *-* Boundary A/S Location |

| Location: | RWF | ·# | | 10 | <u> </u> | | • | |
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| Location; Blag 90 - we described Street Results | Kzone | 00-02 | | Survey# C3 | 078 | Survey Type: Unve Stricted | Release | 00 1 0/ 1 |
| DPM/100cm^2 | Smean | s : | • | | | | | · · [ba· T oi T |
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| 2 3 27 3 7 28 | 1 Carcion | · | 1 190 04: | S | | | | |
| 4 .1 29 | 2 Contain | er # | 2 171 co | كلاس | | | | |
| 5 30 30 6 -2 31 | & Sompl | le containe | 2 171 co ~#1175 | counts | 10 ux | -/D | | |
| 7 22 32 8 33 | \mathcal{D} | | | c ounts | | • | | |
| 9 34 10 35 | 6 . | 1 | | | | • | | |
| 11 36 | _ | | # 3197 | Carres | 4 0 | ythen | | |
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| 23 48 | NOTE: | Smean | 9 4-7 4 | ake. | 7 • | la a C | ı | |
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| | | above | BKC, | , | J | ican's courts | | , |
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| , , | Surveyed By: | Date: | Instrument Serial # | α Eff. β Eff. α | Bka (1 Bka | Cal. Due | | |
| | CS6/ales | 12-8-00 | 2989 163827 Madel 19 87132 | - 486 | 84 | 2-28-0 Smer | Key | Boundary |
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| L | | | 449 150382 | 18490 | 60 | 201/0 | 100 cm*2 Sample | |



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| Control Cont | Location: | DIAID | ** | | | | _ | | | | | | |
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| Smear Results DPM100cm2 No. a p No. a p 2 4 27 3 5 28 9 4 5 28 9 4 5 28 9 5 5 7 30 9 6 7 31 9 6 7 33 9 7 1-17 33 9 8 9 15 34 9 10 1-3 35 9 9 1-15 34 9 11 -5 36 9 12 -7 37 9 13 13 13 33 9 14 15 20 20 35 15 2 2 -7 37 9 14 15 20 20 20 20 15 20 20 20 20 20 16 17 20 20 20 20 17 20 20 20 20 18 18 20 20 20 19 20 20 20 10 1-2 30 10 20 2 2 -7 37 10 20 2 2 -7 37 10 20 2 2 -7 37 30 10 20 3 20 20 20 20 15 20 20 20 15 20 20 20 15 20 20 20 15 20 20 20 15 20 20 20 15 20 20 20 15 20 20 20 15 20 20 20 15 20 20 15 20 20 20 15 20 20 20 15 2 | 1 | 1de 90 100 |) | | Surve | y# 0 = 1 | , | | Survey T | ype: | | | |
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| 3 - 5 28 | | | | - 174 | Counts | | | | | | | | |
| Section Sect | | | 265 | - 183 | Commente | | | | | | | | |
| Section Sect | 4 29 | 13 | #26k | | CANALS | | | | | | | | |
| 6 -17 31 9 12 32 9 15 34 34 34 34 34 34 34 3 | 5 30 | | | | | | | | | | | | |
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| Surveyed By: Date: Instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key | |] , | ** | | | | | | | | | | |
| Comments All Councils 3 min Surveyed By: Date: Instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key C J. Hole 13-7-00 mg/19 87/33 NA 9 3-7-01 Dose Rate mr/hr No Surveyed By: Date: Date: Dose Rate mr/hr No Surveyed By: Date: Date: Dose Rate mr/hr No Surveyed By: Date: Date: No Surveyed By: Date: N | | | | • | | | | | | | | | |
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| C J. Color Ja-7-00 A929 16387 C Bkg Skg Cal. Due Key | | | ` | | | | | | | | ` | | - 1 |
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| Reviewed By: Date: | | ه لما هـ م ا | | 2929 | | | α BKg. | | Cal. Due | | | | |
| Reviewed By: Date: Dose Rate mt/hr Dose Rate mt/hr Direct Roading DPM/100 cm²2 DPM/100 cm²2 DOSE Rate mt/hr Direct Roading DPM/100 cm²2 DOSE Rate mt/hr Direct Roading DPM/100 cm²2 DOSE Rate mt/hr DOSE RATE mt/hr DOSE | | La. Moles | 12-7-00 | | 12/2 LA | 486 | | 73'02 | 3-14-01 | | | *-* | Boundary |
| DPM/100 cm ² 2 | • | Reviewed Bu | | | W/136 /V/4 | - | | | 2-2-01 | | Dose Rate mr/hr | | A/S Location |
| | | | Date; | | | |] | |] | • | Direct Reading | | |
| | | <u></u> | | <u> </u> | | | | | | | | | <u> </u> |

Radiological Surveys

| • | OD 004 0- | | | Radiological Surv | /evs |
|-------------------------------|------------------------------|------------------------------|---------------------------------------|---------------------------|----------|
| | OP-001-02 Radi | ological Survey Sheet | / | • | |
| Location: DT- 413445 BUDG. | (RWP# | o oncer. | ~ (EA) | | |
| THE ALISANS DUDG. | 10 002 | Survey # 0 .7 ^L / | | | |
| Smear Results | | 074 | Survey Type: MATZ-1214 C | | |
| DPW/100cm^2 | | 1 | MATERIAL | KETERNES DO | 1.1 of 1 |
| No. α β No. α β | way a Devens of | - him in- | <u> </u> | _ | 7.2.0.1 |
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| | Instrument Seria | # CFE OFE T | 20.0 12) 11. | 7 | . |
| TUV | M 17-52 62929 1682 | 7 1/2 982 144 | kg Cal. Due | Key | |
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| | Date: | | | se Rate mr/hr | cation |
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| Sinear Results | 70 1 | 60-02 | | 07 | 5 | | x iched | releas | | pg. 1 of 1 |
| DPM/100cm^2 No. α β No. α β | S BO BO BO BO BO BO BO BO BO BO | 100 # 260 - 261 - 263 - 4264 - | 157 158 169 169 164 177 149 | ents counts counts counts counts counts counts counts | ≤ BKG. | ÷ | | | | 168- T OI T |
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| | CIAloles | 12-5-00 | 180 19 87137 | WA | 1/8/3 | 3-7-0 | <u> </u> | Smear | | Boundary |
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OP-001

CABRERA SERVICES, INC.

Page 15 of 15

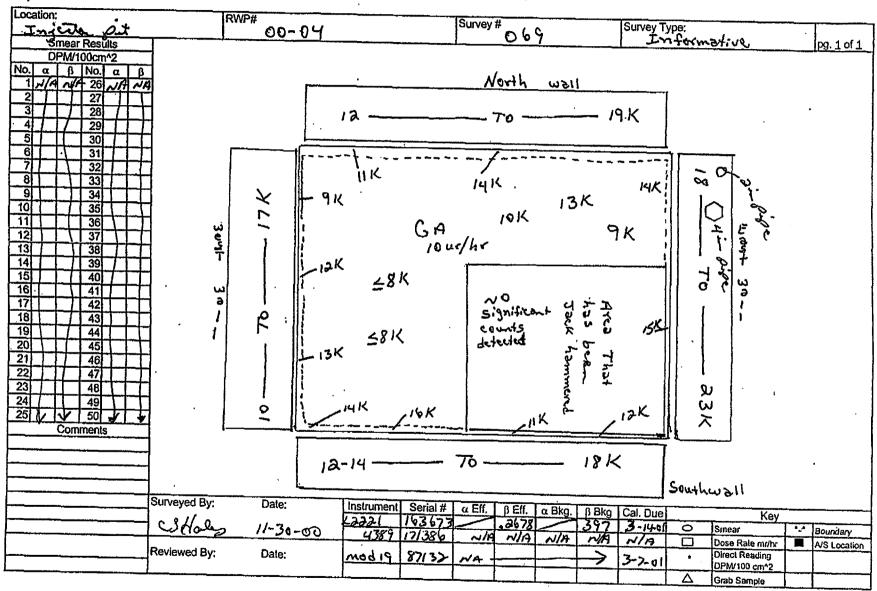
| | (642) |
|--|--|
| ST. ALBANS SLDG: 90 RWP# 002 | Survey # Survey Type: |
| Smear Results | 073 MATERIAL POLENSE pg. 1 of 1 |
| DPW100cm ² Sugar 2 Brenco / | 55 gal.) OF LEAD STRABS ~ 21'WIDE |
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| Smear Results DPM/100cm/2 No. a B No. a B 1 | Location: RWP# | Sur | vey# | Current Turn | | |
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| Shele 17-4-00 d929 16387 -486 83.4 314-01 ○ Sntear - Boundary Reviewed By: Date: 97132 NA - 73-2-01 □ Dose Rate mi/hr ■ A/S Location | No. α β No. α β Smeans | - 147 Counts - 154 Counts - 148 Counts - 172 Counts - 146 Counts - 171 Counts - 173 Counts | 5 5 5 5 | 6=10ur/hr | | |
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| Smear Results' DPM/100cm^2 | | | TKOMOG ECI | 238 pg. 1 of 1 |
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| Location: | | | |
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| Smear Results | I'VE IVENCY | 070 | Survey Type: Informative pg. 1 of 1 |
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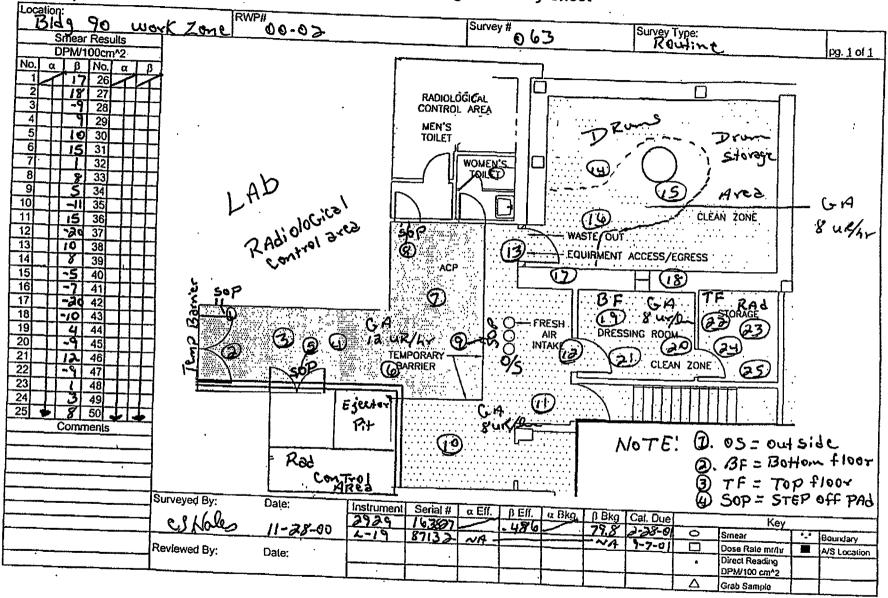
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| | | | MO9 19 | 87135 | WA | | | -3 | 3-200 | | Dose Rate mr/hr | Boundary A/S Location |
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| Bldg 90 St | Albans " | 60-00 | | Survey# | 1. ~ | Survey Ty | pe: tricted | | |
| Smear Results | | | | <u> </u> | 65 | K67 | wored | Acies? | Q pg. 1 of 1 |
| DPM/100cm^2 | ح اح | A | | | • | | | | |
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| Location: Bld9 90' St Albans RWP# 00-07 Survey # 067 Survey Type: Smear Results Survey # 067 matrical release | |
| Smear Results | pg. 1 of 1 |
| DPM/100cm/2 Lead - 12 × 12 - 1/2 mel thick sheets - 15 Sheets | : , |
| 1 7 26 7 P | |
| 2 27 1 | |
| 3 -17 28 | |
| | |
| 5 -3 30 6 21 31 7 -15 32 2 1000 cpm | |
| 7 1-15 32 11 | |
| | |
| * 9 -5 34 Smeared 100 cm² - counted on 4-2929 | |
| 11 1 (25 1 1 1 | |
| * 12 -23 37 NO Significant counts detected 2600 BKG | |
| 13 1-3 3 38 1 1 de tected | |
| | |
| 15 -2 40 16 7 41 Dese R2+5 5 BKC BKC 10 200 | |
| Dose R2+e ≤ BKG BKG= 0.008 mr/s | کس |
| | |
| 19 44 4 | |
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| 21 46 Note: | |
| X Denotes Leads sheets | |
| 24 1 49 11 | |
| 25 that had greater that 1000 cpm. | |
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| Surveyed By: Date: Instrument Serial # u Eff. \(\beta\) Bkg \(\beta\) Bkg \(\call \) Due \(\beta\) Key | |
| CS Hale 11-29-00 1119 19754 NA 1042 NA 6044 9.7-01 0 Smear | Boundary |
| Dose Rate my/hr | AVS Location |
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| Reviewed By: Date: 2929 163877 - 486 81 2-38-01 Direct Reading OPM/100 cm ² 2 | |

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| Selear Results DPM/100cm^2 | Smears Days Days Days Note! | # # # # # # # # # # # # # # # # # # # | - 175 - 161 - 157 - 159 - 148 - 145 - 159 - 159 - 159 - 159 | 161 158 163 cts cts cts cts cts cts cts cts cts cts | c+5 | | | | ed rele | 226 | pg. 1 of 1 |
| | | Date: | 2929 11 | erial# α 2837 _ 2773 ~ | Eff. BEff. | | β Bkg Cal. Du 79.8 2-28 | 0 0 | Key Smear | | Boundary |
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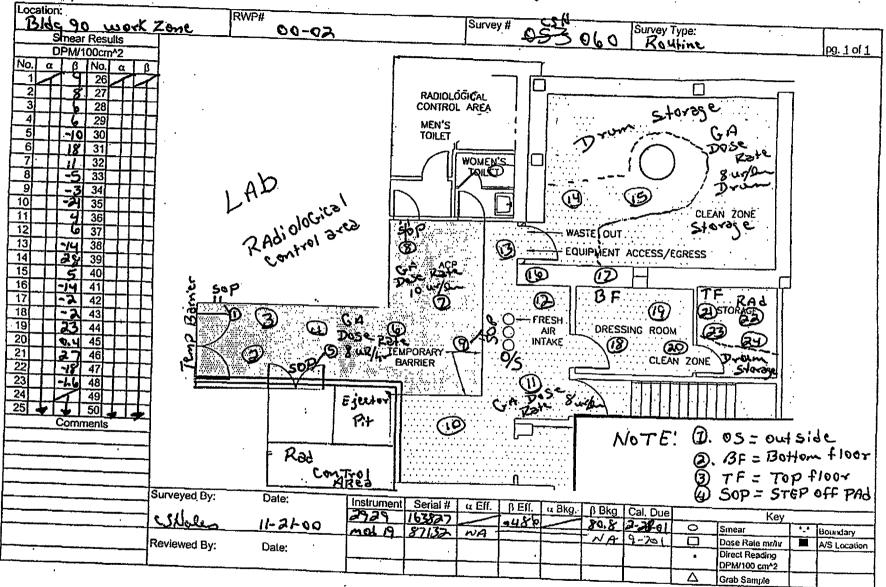
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| Location: Bldg 90 St Smear Results | Albans RWP | 00-07 | - | | Survey # | 9 6 | 6 | | Survey T | • | l reless | - -e | 00.1.051 |
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| · . | | 11-28-00 | 2-19 | 87132 | NA. | | | | 7-7-81 | | Smear Dose Rate mr/hr | | Boundary A/S Location |
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| DPM/100cm ² 2 No. α β No. α β 1 C.3 26 2 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | (EAD - ~12" X 12" (~1/2" THICK) SHEETS - 54 TOTAL - |
| 3 -3 28 4 3 29 5 -7 30 6 3 31 7 32 8 2 33 | 100 %. DIKKET THISIC BKG = Go chu |
| 9 -18 34 10 -14 35 11 -10 36 12 04 37 13 -15 38 | 100%. MASSLIND STUERN SLIKERY |
| 14 | BKG CONTRET IN MARTH SHEET |
| 18 | BK6 = 0.008 mr / 4x |
| 23 48 24 49 25 50 Comments | LAD PLACED IN 55 gal. Dannis, a 70 SHEETS form |
| Comments | SMOANS (1) to (20) Commo on 2929. |
| | Surveyed By: Date: 11-27-Φ Instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key L-171 94154 ΝΑ ΝΑ ΘΕΙΚΑ 9.7-ΟΙΟ Sinear |
| | Reviewed By: Date: Date: Date: Date: Dose Rate mr/hr Dose Rate mr/hr Direct Reading DPM100 cm ⁻² A Grab Samplé |

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| Bldg 90 work | RWP | <u> </u> | | Survey# | 14 | Survey Type: | | |
| Sinear Results | | 00-02 | | 050 | 7061 | Survey Type: | Release | pg. 1 of 1 |
| DPM/100cm^2 | ا حسم | • | | | | | | 153.7.7 |
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| 12 16 37 | 1 80 | - 11 | 163 ets | | | | | |
| 13 38 | 1 (2) | # 223 | 172 (45 | | • | | | |
| 14 39 | (A) | 223 | | | | | | |
| 15 40 | | 4k | 170 (+3 | | | | | |
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| | cello | | 2929 163827 | -486 | α Bkg. β Bkg | Cal. Due | Key | |
| · · · · · · · · · · · · · · · · · · · | CJ Hales | 11-27-00 | mod 19 87/32 | NA | 01.3 | 3-7-01 | | Boundary |
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| Smear Results DPM/100cm^2 | | | | | 2 107 | 11102141 | CLA SEIGNE | pg. 1. of 1 |
| Νο. α β Νο. α β | Smeans | | | | | | | |
| 1 -13 26 | ₽ | 44 | | | | | | |
| 2 -2 27 | | | 149 cts | | | | | |
| 3 3 28 | 2 | 012 | 160 cts | | • | | | |
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| B -38 33 | (a) | 7214 | 174 cts | | | | | |
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| 10 -29 35 | ② | #215 | 150 cts | | | | | |
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| 18 43 19 44 | (3) | #227 | 167 cts | | | | | |
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| 21 46 | G 4 | 255 | , 165 cts | | | | | |
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| 25 50 Comments | | | centact reso | ling w/mo | 19 € | e BKG | | |
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| | Surveyed By: | Date: | Instrument Serial # | α Eff. β Eff. | α Bkg. β Bkc | LOSI OLI | | |
| | 01110 | _ المعي | 2429 163827 | 486 | 10 BKG. 15 BKG | Cal. Due | Key | |
| | CLHORES | 11-531-00 | med 19 87132 | NA | = " " 3 | 3-7-0 | O Smear Dose Rate mr/hr | Boundary |
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| Location: Bide 90 wor Swiear Results | K Zone | #9WP | | Survey # 0.5 B | Survey Type: Restricted | Release | pg. 1 of 1 |
| DPM/100cm ² 2 No. α β | දූ ලඟුල් මැති මැති මැති මැති මැති මැති ද | ~ A | : 155 tes | | Reading w/m BKG=1 | | |
| | Surveyed By: | Date: | Instrument Serial# | α Eff. β Eff. α Bkg. β | Bkg Cal. Due | Kev 3 | |
| | c thole | 11-20-00 | 2929 163827 mod 19 87132 | 486 7 | 6.5 2-28-01 0 s | mear *_* | Boundary |
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| Location: | - Inc | 4.75.77 | | | | | | | | | | | |
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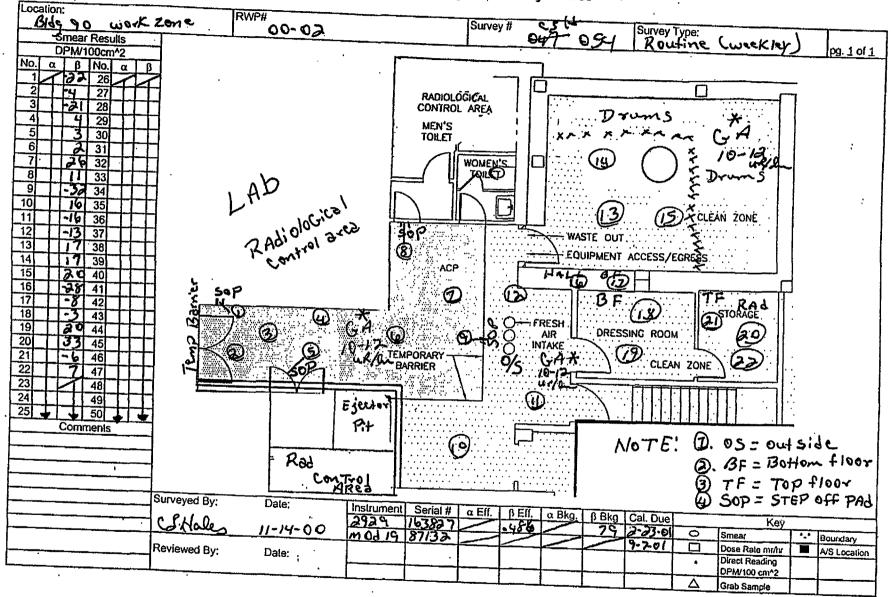
CABRERA SERVICES, INC.

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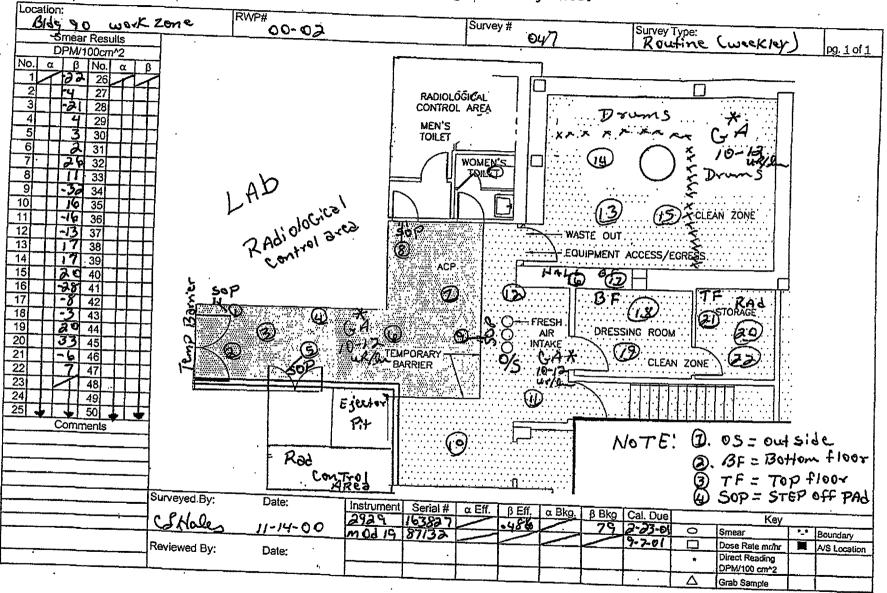


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| DPW/100cm²2 No. α β No. α β 1 56/ 26 2 159 27 3 3 28 4 33 29 5 89 30 6 46 31 7 10 32 8 27 33 9 34 10 35 11 36 12 37 13 38 14 39 15 40 16 41 17 42 18 43 19 44 20 45 21 46 22 47 23 48 24 49 25 50 Comments A il Yeading S Airect Unites S Comments A il Yeading S Airect Unites S Airect Unite | 11520 (x 109) | 1 3 K | 7788) (1) (2) (3) (1) | 34K 33K 25930 (x100) | K (X lea) | 3 34K 22K | | 29 47,910 (x19) 28K | South The Calmer Calmer Calmer Calmer | Not Are | • | وخااط | Some |
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| direct unless | , | + | | • | | | | | - 1 | | | | _ |
| other wise note | . CHOIC | Ð . | HA | 1 2 | | | | | -4. | | | | - |
| | | | | L- WE | .5.7 | | | | | | | | |
| - | Surveyed By: | Date: | Instrume | nt Serial# | α Eff. | β Eff, | α Bkg. | ß Bkg | Cal. Due | | | | |
| | Ch. Holas | 11-13-00 | 2929 | 163827 | | 486 | | 79.3 | 2-28-01 | 0 | Smear | ∌y •_• | Boundary |
| } | | " L L 1 3-014 | 1666 | 163673 | | 76.00 | | 4.0 | 1 | | 1 | | IPORUGELA |
| | | | 1 | | | -2618 | | 9020 | 11-18-09 | | Dose Rate mr | hr I | A/S Location |
| | Reviewed By: | Date: | | | | 0.070 | | 903.6 | 11-18-69 | | Dose Rate mri Direct Reading | hr III | A/S Location |
| | | | | | | 0.010 | | 403.0 | 11-18-69 | <u>.</u> Δ | Dose Rate mr/ Direct Reading DPM/100 cm^ Grab Sample | hr III | A/S Location |





| - Pee Swevey - | | | OP-001-02 | 2 Ra | diolog | ical St | urvey | Sheet | | | | Radiolog | iour o | |
|---|----------------|---------------------------------------|--------------------------------|---------------|---|-------------|------------|---------|-------------|-----------------------------|--|---|--------|--------------|
| Location: High Level Lab Smear Results | , Bldg c | RWP# | 0-02 | | *************************************** | Survey | * 0 4. | 3 | | Survey Ty | /pe; | ارد | • | pg. 1 of 1 |
| DPM/100cm^2 No. α β No. α β | | | | • | • | Ea | <u>s</u> + | | | | | | | |
| 1 3 6 26 2 6 7 27 3 1 28 | 151 | (3) 21k | 16K | 13 | K (A) | 5K | אלו | ć | go K | ① . | | (D) | | |
| 4 5 29 5 30 6 44% 31 7 7 74 32 | 104 | | 10 ⁻ / ₄ | 18 | | | 3 | | ور و | K | Saula Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa | Mak | | |
| 8 | | 23-30 | <u>^</u> \ @ | <u> ज्याच</u> | 181 | | OK | | | | 10 K | | out | 7 |
| 11 13 36 1 12 238 37 1 13 27 38 | 0 | 7940004 | · ② | Q | | (5) | 8.6K | 97 | · _ · | 6) | 131 | W C C C C C C C C C C C C C C C C C C C | | |
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| All readings direct unless. Otherwise wated | | . 40K | | 2 | 8.6K | | 45K | | | нK | 4.8° | CHI CHI | ice) | |
| | Surveyed E | y: Date: | Inet | rument | Serial # | \ \ | est | - Di- 1 | | | | | | |
| | CJ. Hal | - | 296 | 39 | 163827 | | . 486 | α Bkg. | 80 | Cal. Due a-৯৪-৩ । | 0 | Smear | | Soundary |
| | Reviewed E | | زدو ٥٥٠ | 21 | 163673 | | -2678 | | <i>3</i> 97 | 11-13-60 | * | Dose Rate mr/ Direct Reading DPM/100 cm^: | hr 🔳 | A/S Location |
| | - : | · · · · · · · · · · · · · · · · · · · | - | | | | | | | | Δ | Grab Sample | | |

| Location: | | 12\ <i>\\\</i> 12\ <i>\</i> 1 | | | | | | | | | |
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| | zone | 8WP# 00- 9 2 | | Sur | rey # • ज़्र्स | 050 | Su | vey Type: ZeStricte | | | |
| Smear Results | | | | | च्यन | 45~ | | <u> Kestricte</u> | d Release | <u>.</u> | pg. 1 of 1 |
| DPM/100cm^2 | 1 | | | | | | | | | | |
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| 3 -0- 28 | @ @ @ | 177 | 200 | C+2 | | • | | • | | | |
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| Location: | | | RWP# | | | | Survey | # 51 | 4 | | Survey Ty | ,00°, | • | | · |
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| High Level Lab | \mathcal{B} | <u>98 201</u> | <u> </u> | 02 | | | | 04 | 3 0 | 49 | INF | ormati | ارد | | pg. 1 of 1 |
| Smear Results DPM/100cm^2 | 1 | • | | | | | | • | | | | | | | JES - S - A |
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| 1 36 26 | 1 | J | ③ | 16K | | (え) | , | バフベ | غ ا | 20 K | 1 | | iK | | |
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| | ين ا | Hales | 11-10-0 | 0 22 | 27. I | 163827 | | .486 | | 80 | 2-28-01 | 0 | Smear | • | 120010017 |
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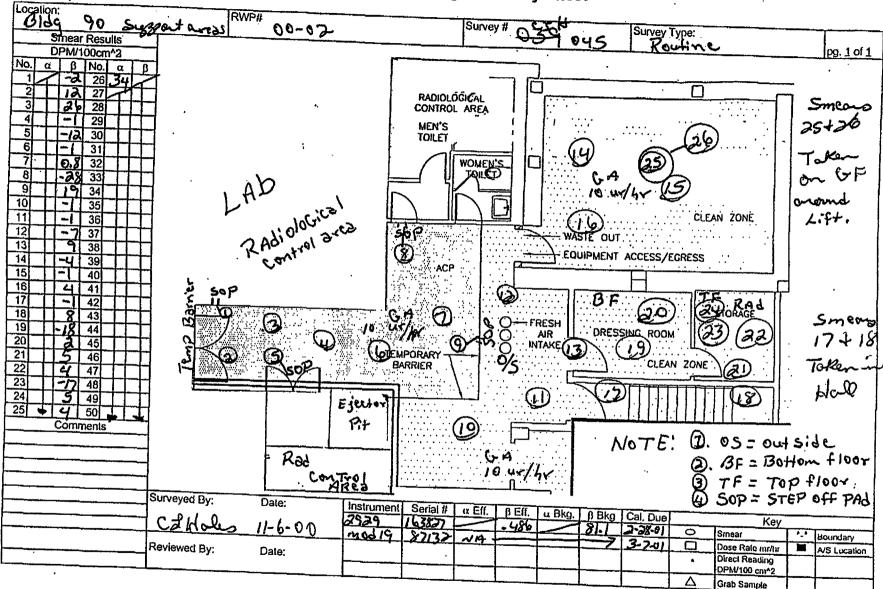
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| Bldg 90 wor | K Zone | <u>" 00-0></u> | | | Survey | # 648 | <u>.</u> | Survey | Гуре: | | | T |
| Smear Results | | | · | | | OHAN | <u> </u> | Rest | ricted | Release | | pg. 1 of 1 |
| DPM/100cm^2 | Smears | 4 | | | | | | | | | | 1100 |
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| 1 8 26 | 1 · @ Bon | ~eb #162 | 165 | C+2 | | | a). i | Barrel | 〉 ヰ | 175 4 | 529 | c#s |
| 2 - 27 3 27 28 | 1 2 | i [≠] /65 | 151 | cts | | | <u></u> | | | • • | | |
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| 7 -16 32 | (5) | #167 | 180 | cts | | | | | | | | |
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| 9 7 34 | Š | | | | | | | | | | | |
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| 11 75 36 12 · 4 37 | 1 80 | 168 | 178 | cts | | | | | | | | |
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| 18 - 20 43 19 4 44 | (3) | #171 | 165 | 645 | | | | | | | | 1. |
| 19 44 44 20 14 45 | | 1 | | | | • | • | | Note | : cts = c | <i>.</i> 0 | ₩ |
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| 25 50 | | | | | | | | | | | | |
| Comments | | 173 | 176 | C+2 | | | | | | | | |
| ALL courts 2 min | لاي ا | : #174 | 161 | くよ | | | | | | | | |
| | (ಇವ) | 174 | 17/ | 045 | | | | | | | | |
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| | 0 1 11 0 | F | | Serial # | u Eff. | β Eff. α Bkc | | Cal. Due | | Key | | |
| | CL. Note | 11-9-00 | Mad 19 | 87132 | NA | . 486 | 185 | 2-28-00 | 0 | Smear | •-• | Boundary |
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| • | , | Pate. | | | | | | 1 | • | Direct Reading DPM/100 cm*2 | | |
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| Location: Blog 90 wer | R | WP# | • | Sun av # C.S. | 10 | | |
|------------------------------|--------------|-------------------------|-----------------------|--------------------------|-------------------------|--------------------------------|--------------|
| Smear Results | (Zone | Z0-00 | | Survey # CS POUT | Survey Type: Restricted | Release | pg. 1 of 1 |
| DPM/100cm^2 | Smes | e • | | | | 72010050 | Iba- I or I |
| No. α β No. α β 1 19 26 -6 | - Times | Ta . | | , | <i>1</i> 0 7 | 4 | . • |
| 2 -4 27 2 | 0 Ban | elo # 157 | 178 Cts | <u>a</u> | Borrels 7 | ± 158 14 | • |
| 3 -13 28 2 | | # 157 | 156 cts | (E) | · | | 57 cts |
| 4 0.2 29 17 5 16 30 6 | 3 | 4 148 | 147 cts | (23) | | #159 13 | 34 cts |
| 6 6 31 8 | 49 | 148 | 160 cts | ं इन् | İ | 159 18 | eto 08 |
| 7 10 32 73 | | #149 | 175 cts | 25 | | | s1 ets |
| 8 4 33 4 9 (c) 34 | 6 | 149 | 166 cts | (26) | | 160 18 | 54 cts |
| 10 70 35 | | #150 | 170 cts . | AGALARARA BEE | : | ± 161 18 | • |
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| 12 -3 37 13 -24 38 | (<u>0</u>) | #151 | 219 045 | <u> </u> | | | 76 C+5 |
| 14 12 39 | | 151 | 228 cts | . (2) | | ±163 1 | 66 043 |
| 15 29 40 | | #152 | 176 cts | . 3 | | | |
| 16 5 41 17 - JO 42 | 9999 | 152 | 157 cts | (A) | a | | |
| 18 19 43 | | # | • • | | | 107 1 | 40 cts |
| 19 | | # ₁₅₃ | , , | . (33) | + | 164 1 | 64 cts |
| 21 -16 46 | 39 | 153 | 171 643 | | | | |
| 22 -3 47 | | # 154 # 154 # 155 | 188 45 | | Vate: cts = | counts | |
| 23 -27 48 24 21 49 | 909 | * F5# 13 | 4 165 cts | | | | 211 |
| 25 1 23 50 1 | | #155 | 150 cts | contact | redling w/ | wag 18 = | 3KG |
| Comments | | 155 | 178 cts | BKG | 10 ur/hr | | |
| All counts 2 min | (B) | #156 | 171 cts | | | | |
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| | Surveyed By: | Date: | Instrument Serial # | α Eff. β Eff. α Bkg. β B | kg Cal. Due | | |
| | CLHales | 11-8-00 | 2939 163827 | -486 79 | 9 2-28-01 0 | Key Smear | Boundary |
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| Location: 13 49 90 we Smear Results | *KZone | て0-00 | | | Survey | # 63.63 | 046 | Survey | ľype: ► S√~:c | Hed Rel | · · · · · | |
| DPM/100cm^2 | C 40m | | | | ···· | | | | | sive Ker | <u> </u> | Upg. 1 of 1 |
| Νο. α β Νο. α β | Smea | | | | • | 5 1.5 | | | • | | | . – |
| 1 5 26 -14 | $\underline{\mathcal{Q}}$ | Barrels | # 127 | | 162 | Cts | | EU Bon | صلعه | | | 63 C45 |
| 3 15 28 -3 | (2) | 1 | 127 | _ | 179 | cts | • | (E3) | · [| | ~ 1 | 87 CHS |
| 4 22 29 21 5 19 30 57 | (3) | | # 134 | | 171 | C+3 | | <i>23</i> | | ±144 | - 2 | .16 CHS |
| 5 19 30 -7 | ී විමිතිවිතිවැඩ කඩ සිට ලිය ඉගල ගඩ ගුහිප | | , 134 | • | 178 | 2+0 | (| A BAKATA ABBAS | | 144 | - 1 | 940+5 |
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| 8 3 33 9 -13 34 | @ | | 135 | _ | 129 | 2+3 | (| 26 | - | 145 | - 1 | 43 045 |
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| 11 -4 36 | Ø) | | 136 | ••• | 0 جا 1 | cts | 1 | (<u>)</u> | | 146 | | 54 US |
| 12 22 37 13 178 38 | <u> </u> | j | #37 | _ | 144 | cts | • | | ļ | | | 77 045 |
| 13 178 38 14 109 39 | Ö | | | _ | 189 | C+5 | | | | #147 | | 50 45 |
| 15 128 40 | 9 | | #138 | _ | | | | (30) | 4 | 147 | 1 | J 0 4 J |
| 16 77 41 17 240 42 | \mathcal{H} | | 138 | | 153 | CfS | | | | | | |
| | | | 138 #139 | ~ | 178 | CHS | | | | | | |
| 19 23 44 | V3 | | # 157 | ~ | 330 | c+5 | | | | | | |
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| 21 6 46 22 2 47 | (5) | | #140 | _ | 281 | ८+७ | | Note: (| its = | ethnoo: | | |
| 23 61 48 | W) | 1 | 140 | _ | 23Z | শ্ৰে | | | 5 | un ens | Inc 8 | 1 10 |
| 24 38 49 25 18 50 1 | \bigcirc | | #141 | _ | 400 | c+s | ۳ | , 34.18 0.7 | *4.0 | | ,,,,, | ,, ', |
| Comments | (8) | | #141 | | 196 | c+S | | = BICG | . 13 | KG = 10 | u + // | hr |
| ALL Counts 2mm | s (9) | | #142 | _ | 179 | | | | | | | |
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| | 123 | ◆ , | 1 10 | | . • 1 | -,- | | | | | | |
| 5 | Surveyed By: | Date: | Instrument | Serial to | α Eff. | β Eff. | e. Die Las | V. 16 . 5 | · | | | |
| | C& Hole | 11-7-00 | 2929 | 16387 | 7 | 486 | α Bkg. β E | kg Cal. Due | 0 | Key Smear | 1 | |
| | | 11-1-40 | mag 19 | 87132 | NA | | | 7 3-7-0 | | Dose Rate mr/hr | | Boundary A/S Location |
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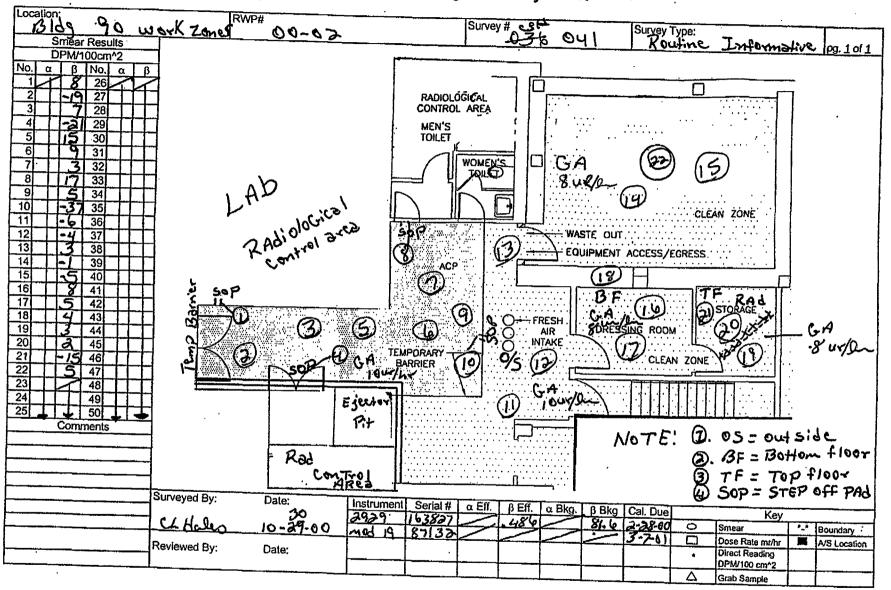
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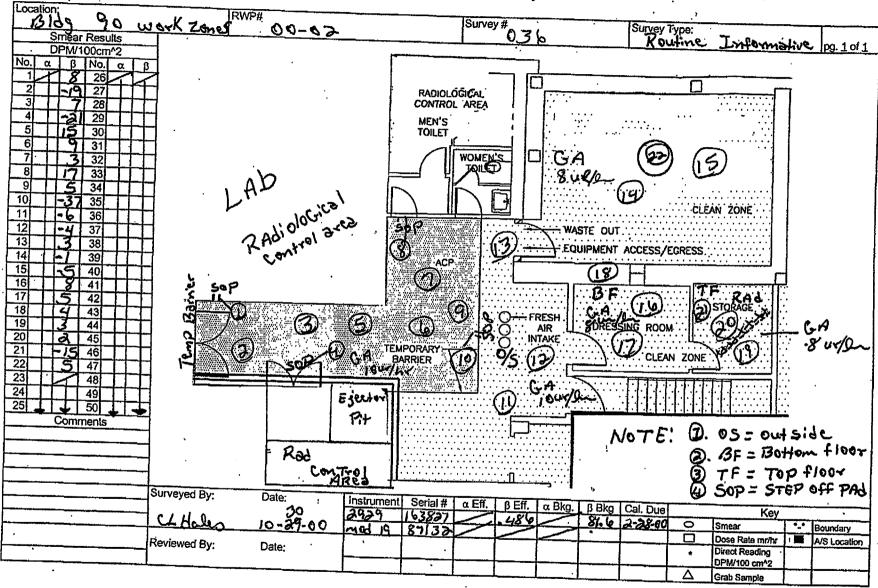
CABRERA SERVICES, INC.

Page 15 of 15

1 TOK INTOKMATION Radiological Surve OP-001-02 Radiological Survey Sheet KWi ₩ Survey # BRIDGE 90 HIGHLEVEL LAG SURVEY TYPE: INVESTIGNATIONAL 00-02 Survey of France How pg. 1011 Sinear Results DPM/100cny/2 a B INO. I a B Franc view M4 /100 26 27 100 to 6000 char Ð -O FLOOR 4 29 (6) ZOK CPM (t) 30 DIRECT 200 115 TOP VIEW Zico 33 Mountes 34 Conscere 35 PIRING (VENETICLE) TO 11 Fran 36 12 37 131 1 38 TORAIN (W/GRAVEL 14 NG /100 40 16 41 17 42 18 43 19 44 METAL WHETEL FRAME 20 45 106E 146 (DETACHED) 21 FRANT VIEW LOK Clin 22 47 Zios cemi Hoop Pawars 23 48 Direct Frisk 24 49 (LEFT, BASK, RIGHT, & FROLT) Frame 50 Œ) Comments 6100 to 100 chm DIRECT FRISK ധ 4 CTROUGH DRAIN Surveyed By: Date: Instrument | Serial # α Eff. β Eff. a Bkg. β Bkg | Cal. Due 4-177 150396 1/4 9-7-01 *-* Boundary Smear 6-2929 163827 NA 77.5 8-30-01 0.486 Dose Rate mr/hr A/S Location Reviewed By: Date: Direct Reading DPM/100 cm^2 Grab Sample RADIOCOCOICAL FACTS & POTENTIAL FOR CONTAIN THAIN PIPILS BENEATH CONCRETE THE TO ELEVATED ACTIVITY ON FROM * MINIMAL BONTAMINATION ON HOS SURFACES (LOW CEVEL) IN FROM SURFACE, THAN PIPINS, & TROUGH ARE OP-001 CABRERA SERVICES, INC. THE WASTER CONCERNS. Page 15 of 15 RECOMMENDATION & VACUUM CHEAN INTERIOR SURFACES PRIOR TO DISASSONBLY.

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| Location: Bldg 90 work | Zone RWP# 00 | -02- | Survey# 038 | Survey Type: ReStricted | Polossa | 4 - 64 |
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| Location: Bldg 90 Lab | RWP# | | Survey | #654 | c4 | Survey Typ | e: | <u> </u> | | pg. 1 of 1 |
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| Smear Results DPM/100cm^2 No. α β Νο. α β | Smeans Taken | نسعناه | ونسلت | | / | 1-2-17017 | | <u> </u> | <u> </u> | ING. I OI I |
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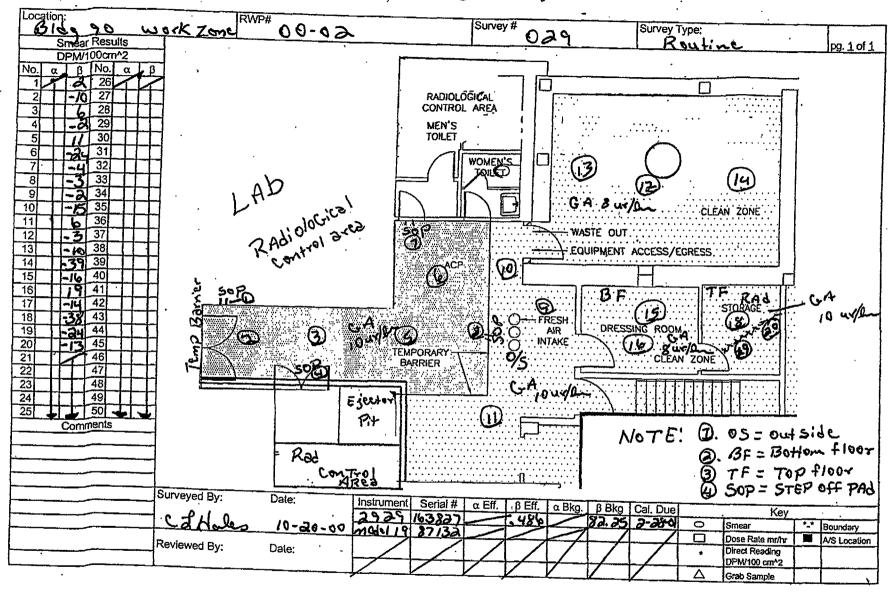
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| Srifear Results DPM/100cm^2 | - C. | 4 2 2 5 1 | • | | · · · · · · · · · · · · · · · · · · · | | 1 17 700 1 2 1 | V/UC | 326013A | | Thât T oi T |
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| an 2929 for | 25 | | # 3 | 7 | t 154 | | | | | | |
| - G | | • | 79 | /7 (sh | ~ · ~ | | | | | | |
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| | ct. Has | les 10-2 | 293 | 9 163827 | . 486 | | 2-28-01 | 0 | Smear | *.* | Boundary |
| | | | 0-40 | | | | | | Dose Rate mr/hr | | A/S Location |
| | Reviewed By: | Date: | | | | | | • | Direct Reading DPM/100 cm^2 | | |
| \$ | L | | | | | | | Δ | Grab Sample | | |

| Location: BIG9 90 WOY | K Zenc RWP# | 00-02 | Survey # 03 4 | Survey Type: Restricted | Release pg. 1 of 1 |
|---|---------------------------------------|--|--|----------------------------|---|
| Smear Results DPM/100cm^2 | Smears: | | | Kestricies | Release pg.1 of 1 |
| No. α β No. α β | Q. Barrel | o #56 | 173 Cts | | [|
| 2 14 27 3 8 28 | (G) | #56 | 176 c+5 | | |
| 4 5 29 5 -4 30 | 9 9 | # _{= 7} | 170 cts | | |
| 6 25 31 7 23 32 | (5) | # ₅₉ | 158 cts | | |
| 8 25 33 9 8 34 | © | #5 7 7 7 9 # 5 # 5 # 5 # 5 # 5 # 5 # 5 # 5 # 5 # | 187 C+S | | |
| 10 8 35 11 2 36 | 0 | # 60 | 185 c+5 | | |
| 12 -3 37 13 0.7 38 | ② | . #60 | 187 Cts | Note: cts= | counts |
| 14 30 39 15 17 40 | | #61 | 165 C+s | | |
| 16 11 41 17 42 | 9 | #62 | 170 C+5 | | |
| 18 43 19 44 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | a | #62 | 159 cts | | |
| 20 45 21 46 | S S S S S S S S S S S S S S S S S S S | # 63 | 163 Cts | | |
| 22 47 23 48 | (L) | # 63 # 64 | 191 C+3 | | |
| 24 49 50 50 50 | (I) | 464 | 174 cts | | |
| Comments | (19) T | # 64 | 173 6+5 | + + + | TKC |
| All Smears | | Contact | reading toke | en w/mod 19 # 8 | BKG=10 uy/4 |
| 2929 for 2 min | Surveyed By: D | ate: Instrum | , | | : * |
| | | 0-25-00 Instrum | nent Serial # α Eff. β Eff. γ 16383-7 .486 | | Kéy Smear *-* Boundary |
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| 15 40 16 41 · | 9 | 世 52 | 162 | | | |
| 17 42 18 43 | (| # 53 | 174 | | | |
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| 2 min Cruits | | • | | | BKG. | = 10 ur/e |
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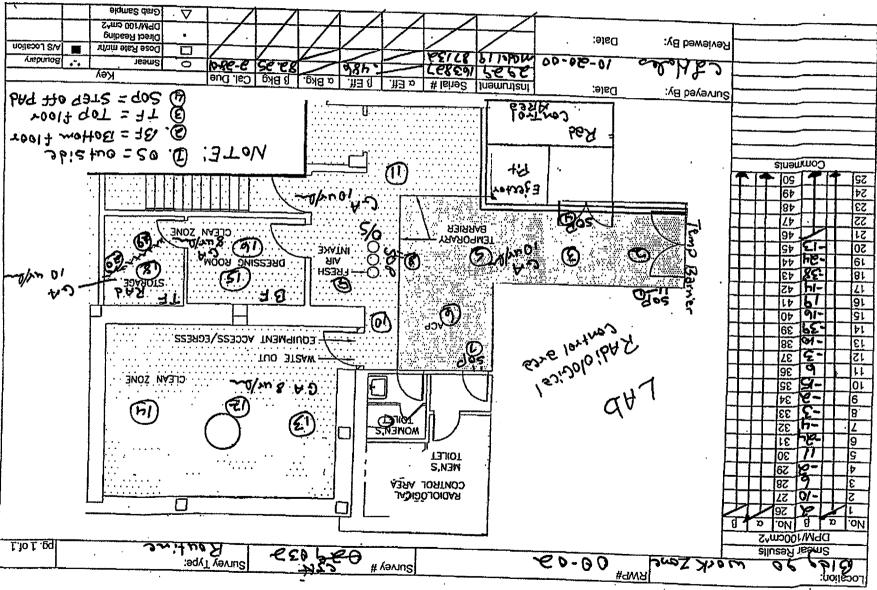


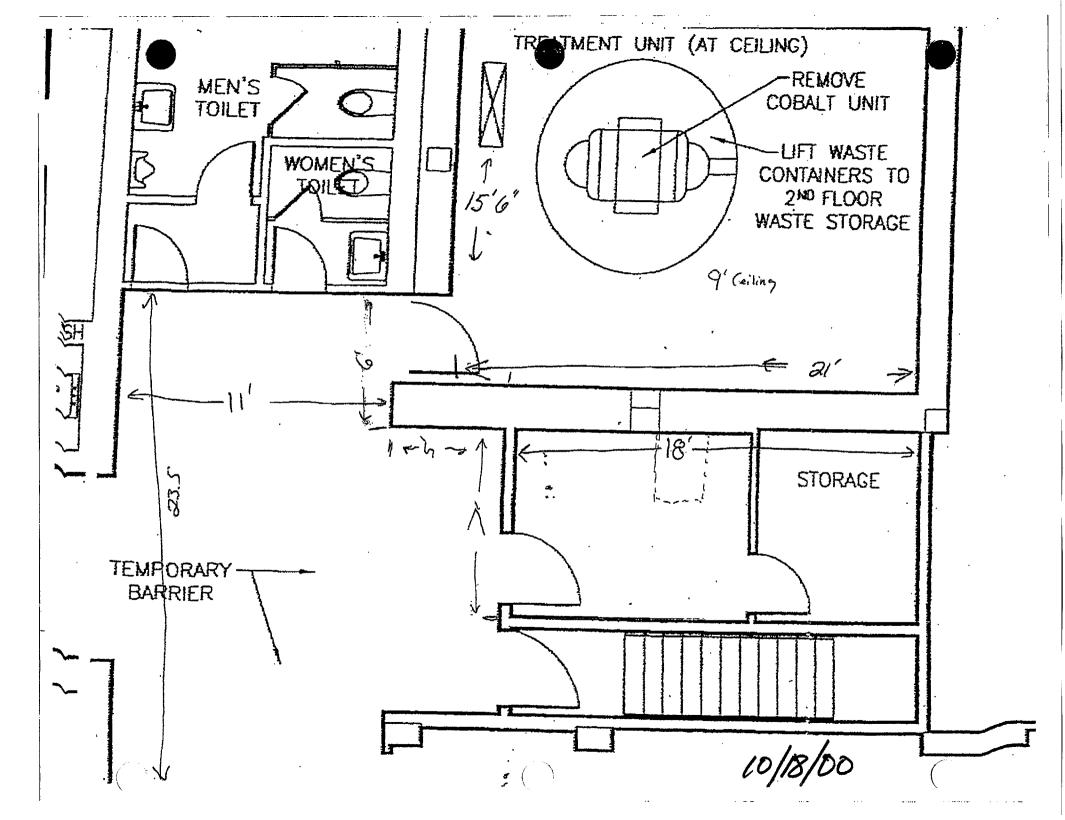
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CABRERA SERVICES, INC.

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| Location: | RWP# | | | | 16 | | , | ! | 7 | | | | |
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| Smear Results | | | | | | 000 | <u> </u> | , | 17.4311 | crea | · v/10926 | <u>-</u> | pg. 1 of 1 |
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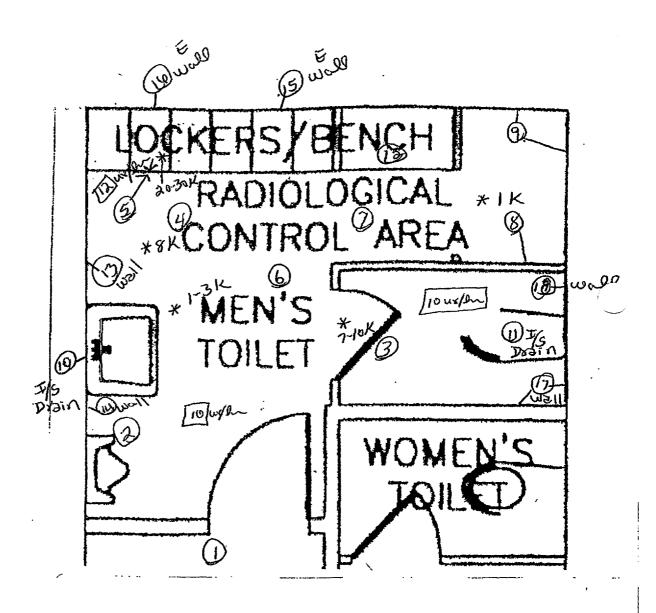
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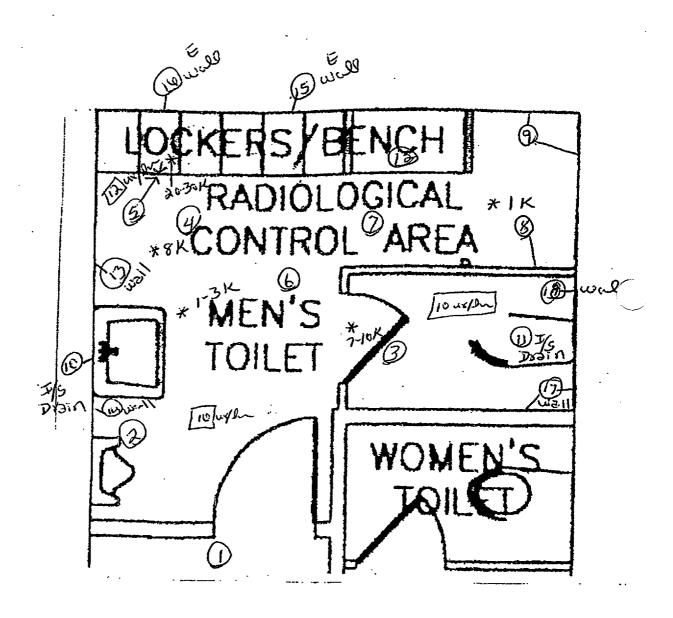


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OP-001

CABRERA SERVICES, INC.



| Location: Exector p:+ Smear Results | Room KWP# | 00-03 | Survey # 55 | 91504 Survey Type: In:tiel | Entry pg. 1 of 1 |
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OP-001-02 Radiological Survey Sheet FT , ALBAUS Survey 1400 (Exterior) Survey OF Drums pg. 1011 KWI # Hirrory # 016 Buccone 20 00-02 Smear Results DPM/100cm/2 Notal B Notal Denn # BKG = Somewar # LARGE AREA LLIASSLIND # 0.008 M (1) 's (2) 60,008 (3) & (J) 12 31 10 11 5 38 8 14 18 NA LIW 19 20 20,008 21 22 THE UPSTAIRS (RILLOWS 90) CATICACTIVE WIATERIALS 23 Comments STONAGE AREA. ALL TOKUMS TAGGETS. Date: 10-3.00 Surveyed By: Instrument | Serial # α Eff. β Eff. α Bkg. β Bkg | Cal. Due 6-127 AD) 396 631 q.7.01 10% Smear 6.2929 Boundary 163827 Na 48.6% 77.5 8.8-01 211190 Dose Rate mr/hr

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CABRERA SERVICES, INC. THE MAJOR CONCERNS. Page 15 of 15

RECOMMENDATION & VACUUM CLEAN INTEXIOR SURFACES PRIOR TO DISASSIMBLY.

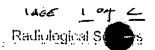
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OP-001

CABRERA SERVICES, INC.





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CABRERA SERVICES, INC.

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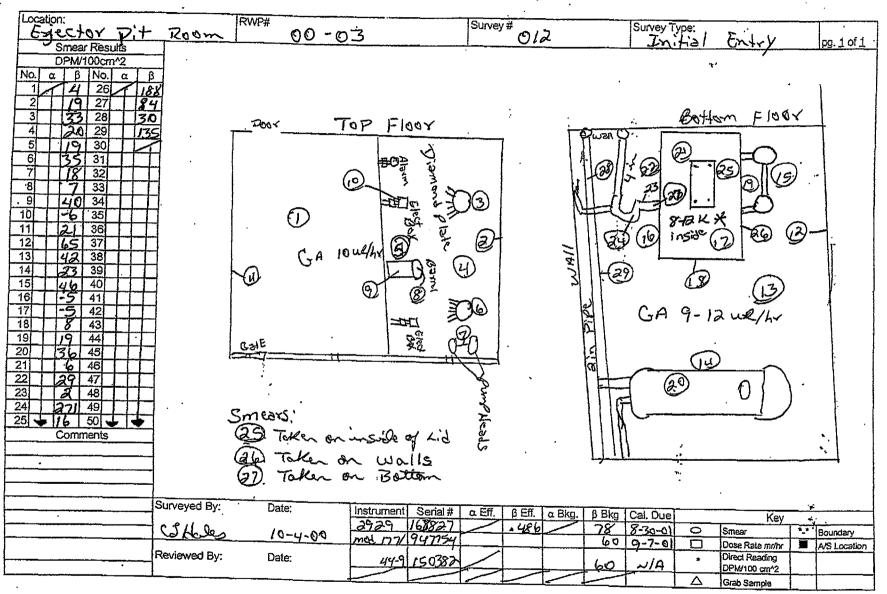
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CABRERA SERVICES, INC.

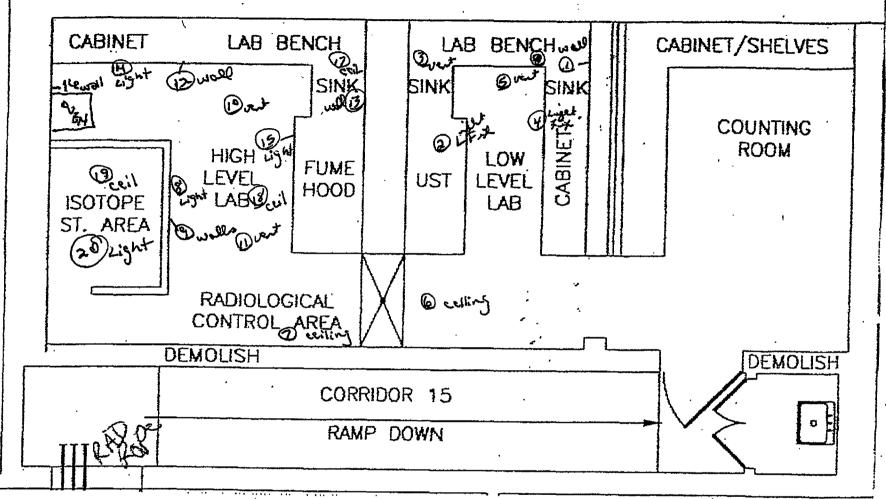




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OP-001

CABRERA SERVICES, INC.



46' X8' HAIL TO CHARCE

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| Location: BH9 90 LAB RWP# | 00-03 Surv | vey# c3th 007 Survey Type: Release | |
| Smear Results DPM/100cm^2 | | A0 0 001 VE16476 | pg. 1 of 1 |
| No. a B No. a B (). Barrel | T/ Top 45, de | 102 cpm | |
| 1 54 26 (2) | 1# Bottom + side | 109.5 com | |
| 2 69 27 3 Banel | # a Toot side | 1072 000 | |
| 3 56 28 3. Banel | # Top + Side I## Bottom + Side # a Top + Side # a Bottom + Side | 16 103 CD 200 | |
| | | 101.2 com | |
| 6 40 31 S. Rad (| waste # I/s(1) | le 103 cpm 107.5 cpm | |
| 8 56 33 | I/s (i) | 95 com 96 com 103 com | ł |
| 9 56 34 | I/S (1) | . 010 | |
| 10 33 35 11 46 36 Pad U | 1/3 (1) | 76 Com | |
| | uaste I/s (j) | 103. Com | ľ |
| | 巧自 | 103 com | |
| 15 855 40 | I /S (3) · | 92 c8m | |
| 16 327 41 D. SOR | #1 E2 | 95 cm | |
| 17 30/ 42 18 204 43 | 型A SZ | | |
| 19 66 44 (3) yeart | I/S | 93.5 com | |
| 19 662 44 20 195, 45 21 46 (Y) | %s | 186 com 283.5 com | |
| 21 46 22 47 | در مد د | : 283,5 cpm | |
| 23 1 48 1 1 2, Luge | 1 Fatture | 491.5 cpm | |
| 24 49 16 Tron | + futture Supports | 834.5 com | |
| Comments | 11 | 3.77 | |
| 16 327 41 17 30/ 42 18 20 43 19 662 44 20 195 45 21 46 22 47 23 48 24 49 25 50 10 10 10 10 10 10 10 10 10 10 10 10 10 | : , \ | 334.5 cpm 337.5 cpm 397.5 cpm | |
| 1 min counts | i i | نندهی | [|
| @ U | , 11 | 397.5 Com | |
| | : 9/// Instrument Serial # c Eff | 1027 Com | |
| Cutod. Ho | 1 1 1 1 1 1 1 1 1 1 | 4 486 76.95 8 0 Smear | |
| | | 기양이 □ Dose Rate mr/l | Boundary A/S Location |
| Reviewed By: Date | | NWS 18/1400 Direct Reading DPW/100 cm^2 | |
| - HWARADOC 10 | [16]00 | △ Grab Sample | |



| Location: BNG 90, LAB | RWP# 00-03 | Survey# | Survey Type: | atives wh | pg. 1 of 1 |
|-----------------------------------|------------------------------|-----------------------|--------------|--------------------------------|--------------------------|
| Smear Results DPW/100cm^2 | | | Lntux | 341746 | Ibb Tor |
| Νο. α β Νο. α β | e | , , , | | • | } |
| 1 26 27 | 5 mears taken inside | | 2 ab. | | |
| 3 28 29 7 | D. 10863/2min count | o = 5432 neticounds | | I. | |
| 5)) 30) | 2. a1264/2min con | = 11015 DPm/100 cm | > | | |
| 6 (31) (7) 32 (| W. alaby amin con | nts = 10632 met count | <u>, s</u> | | į |
| 8 33 9 34 | | = 21716 Dpm/100 | cmd | | |
| 10 7 35 | | | ; | | |
| 11 / 5 36 5 / | | | • | | |
| 13 () 38 (() 14) (39) (| | | | • | |
| 15 () 40 () | | | | | |
| 17 / 42 / 2 | | | | . • | |
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| 20 | | • | | | |
| 22 \ (47 \) \ 23 \ (48 \) \ (| | | | • | |
| 24 \ 49 \ 50 \ 50 \ 6 | • | | • | | |
| Comments | | | | | , |
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| | | · | | • | |
| | Surveyed By: Date: Instrumen | | Cal. Due | | * |
| | CJ. Holes 9-25-00 2724 | 163827 -486 78 | 8-30-01 0 | Smear *** Dose Rate mr/hr | Boundary A/S Location |
| | Reviewed By: Date: | | | Direct Reading DPM/100 cm^2 | |
| | L/ | | | Grab Sample | |

| | | | <u> </u> | • | | | | | |
|------------------------------|--------------|-------------|--|----------------|------------|--------------|-----------------|-----|--------------|
| Location: | RWP | , , , , , , | | Survey# | | Survey Type: | · | | |
| BNG 90, LAP | | 00-03 | | L 006 | : | Trafe | rmatine Read | | pg. 1 of 1 |
| Smear Results | | | | | | 1 | - 11.10 110 - 1 | | ba To T |
| DPM/100cm^2 | | | | • | | | | | |
| Νο. α β Νο. α β | 5 meare | 1. 4 | | | 49 | | • | | |
| 26 | - Willer 3 | token | inside. Oi | pe in ho | le in | Lah | | | |
| 2 / 27 / 3 | 0 4001 | / | | • | • | -0. | | | |
| | m. 1086 | 3/2m~ | - courts = 5 | 432 net co | nts. | | | | |
| | | | - counts = | 1015 70 am /11 | 00 6 3 | | , | | |
| | (7) 212 | hu/2-1. | | OIS DE MAN | ou com- | | | | |
| | (a), (A)A | 141 271 C | - counts = | 10632 met | - count | ے | | | |
| 7)) 32 ((8 () 33 () | | • | | | 4-0- | | | | |
| 9 / 34 / | | | | 21716 DP | m //00 0 | im | | | |
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| 11 / 4 36 () | | • | | | | | • | | |
| 12 5 7 37 2 7 | | | | | | | | | |
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| 14) / 39 \ | | | | | | | | | |
| 15 (40 () | | • | | | | | | | |
| 16) / 41 /) | | | | | | | | | |
| 17 / 42) | | | | | | | | | |
| 18 / / 43 | | | • | | | | | | |
| 19 \ 44 \ (| | | | | | | | | |
| 20 / 45 } | | | | | | | • | | |
| 21 >) 46 > / | | | | | | | | | |
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| 24 { 49 / } | | | | | | | | | |
| 25 🚣 💜 50 🕹 🕹 | | | | | | | | | |
| Comments | | | • | • | | | | | |
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| | | * | | | | | | | |
| · | Surveyed By: | Date: | Instrument Serial # | | Bkg. β Bkg | Cal. Due | Key | | |
| | CJ. Hales | 9-75 | 2929 16382 | - 986 - | | 3-30-01 | O Smear | *-* | Boundary |
| | | 9-25-00 | | 1 1 | | 2/28/01 | Dose Rate mr/hr | | A/S Location |
| | Reviewed By: | Date: | / / | | | HW) | Direct Reading | | |
| | HI bearist | 10/16/00 | | | /_ | 1 / - 7 - | DPM/100 cm^2 | | |
| | | 11418 V | | <i>Y</i> ///// | <i></i> | <u> </u> | △ Grab Sample | | i |

OP-001-02 Radiors cal Survey Sheet

| Location: RWP# c { } |
|--|
| Jouvey # Jouvey Type. |
| Lab 6369 90 (Re) 605 00-03 005 Informative pg.10f1 Smear Results |
| |
| No. a B No. a B Survey is for Pipe under hole in Lab. |
| |
| 2 1 27 +BKG 652 /2min = 326 CPm |
| $\frac{1}{1}$ |
| $\frac{4}{5} \frac{1}{30} \frac{29}{30} \frac{1}{100} \frac{1}{30} \frac{1}{100} \frac{1}{30} \frac{1}{100}$ |
| |
| ١ - ١ - ١ - ١ - ١ - ١ - ١ - ١ - ١ - ١ - |
| 1 1 1 33 1 1 1 1 1 1 2 2 2 2 3 4 8 7 2 0 . 10 13 uci contact) |
| 9 34 Read a = 146407 dom = 0.0659 uci (1 = Reading) |
| |
| 12 |
| 13 38 5 6 6 |
| 14 39 Cotimated activity in Cast Iron Bipe it uniformly |
| Estimated activity in cast iron sipe if uniformly contaminated, take average of 0.1 + 0.0 = .08 uci/cm2 |
| 1 17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| 18 143 Then based on a 3 inch ID Pipe have |
| 19 1 44 1 1 |
| 20 45 1 38 act for running foot of 160. Itsome pipe |
| 22 1 47 1 DONS /3 FULL MARKET DER TURNING FOOT OF |
| 1 23 1 1 1 1 4 1 1 1 Pipe. |
| 24 49 4 |
| 25 - 50 - Direct Gamma reading in hole w/kudlum model |
| Comments 19 = 90-110 uz/2_ Easy spect #09981135 reading in hole yeilded 33-42 ur/2_ |
| Frey 500 + # 00001/75 - 10 have "10 1/2 23-117 11/2 |
| 7781(33 Action) 11 1010 Mellace 32 42 41/34 |
| |
| Surveyed By: Date: Instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cai. Due Key |
| $\frac{1}{2}$ |
| 35 VI 43-89 17 1386 AVA Dose Rate mr/hr AVS Location |
| Reviewed By: Date: Direct Reading DPW100 cm/2 |
| Her Riegrot 9/27/00 DPM/100 cm^2 |

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CABRERA SERVICES, INC.

| Location; | [DWD# 8]] | | VIII. | • | |
|------------------|---------------------|--------------------|--------------------|---|----------------------|
| Lah Blde 90 | (DPE) RWP# SH 00- | . ~ | Survey # 0.05 | Survey Type: | |
| Smear Results | 100- | -02 | | Trifermative | pg. 1 of 1 |
| DPM/100cm^2 | | . - | | <u></u> | actual |
| Νο. α β Νο. α β | Survey is for | Aige un | rder how in | 1.1 | Size |
| 1 26 | , | | - Aute in | · Fab. I o / | of rist |
| 2 27 | *BKG 652/2mm | " " ra | 1 00 | 1 / 2 | |
| 3 28 | Post 1 | | 6 Chim | | Particky |
| 4 29 | Kead 1 1211 | 14/2 mm | - = 60597 CA | m on 60071 m | iet Com thim |
| 5 30 | Read 2 34 | 563 / 1 m : | ~ = 395636.2 | $\frac{1}{2}$ on $\frac{6000}{3900}$ | let com from pipe |
| 6 31 | | | 01000 | M &C <u>J 1007</u> | wer fry 1 - 1 - 2 mm |
| 7 32 33 | .771 1 - 0. | · · · · · • | | | thick |
| 9 34 | Read 1 = 22489 | 12 dem = |) أعنى 1013 (روة (| contract) | Imace |
| 10 35 | Read 2 = 1464 | 07 dom - | 12 1 PS 10 00 | () - "2-51" 0 | 1 2 |
| 11 36 | | | - 0.003 / c.c. | () The second of | |
| 12 37 | | | | 4 2 | . |
| 13 38 | 6 | | _ | • | |
| 14 39 . | Estimated acti | V. ty : (| Cast is 20 | re if uniformly | 1 |
| 15 40 | Contamination | 1. 380 000 | | | |
| 16 41 | corresponding, | care 914 | 2.00 et 6.14 | 0.0 b = . 03 act/cm | - |
| 17 42 18 43 | | | | | |
| 18 43 1 19 44 | Then based | an or | 3inch ID | Pipe have e. Assume pig er running foot | } |
| 20 45 | 58 uci Per | Primary | Const of Dia | r acs. a a | ~ 1 |
| 21 46 | 713-06 V2 E. 1 | hali | 7000 | C. 11530416 1.11 | 500 |
| 22 47 | 107(3 /3 Fall | 11916 | ~ अर् तरा कु | er running tost | 9+ |
| 23 48 | Pipe. | | | _) | |
| 24 49 | • | | | | |
| 25 + 50 + 5 | Direct Ga. | mand was 1 | 100 5 1.40 | | |
| Comments | 96 | 1110 1 (88 | ing in hole | w/Ludlum mod | ٤ / |
| | 11 1 | II U UKIO | | • | |
| · | E35X 50 cd # | 09981135 | reading in | hole yeilded 33- | 43 4×10 |
| | , , | . 7 70 1 10 | | voi = "yenede" 55 | 75/ |
| | | | | | |
| 1 | | strument Serial# | | g Cal. Due Key | |
| | Cuits Males 9-25-00 | 1391 163673 | 1.164 65 | | - Boundary |
| | 120-00 | 43-24 17 138 | 1368 | | A/S Location |
| R | Reviewed By: Date: | | | * Direct Reading | 77 40041011 |
| | Her Right 9/25/100 | | | DPM/100 cm^2 | |
| | y | | 1 1 | ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ | |

| Location: Bldg 90, LAB | RWP# | Survey# | Survey Type: | |
|------------------------------|--|--|---|----------------------------|
| Sinear Results DPM/100cm²2 | D. TOOLS D. 4100x around J. I/S Drain J. Sink Drain Sink Drain Note: Smea Lady's GA J Direct | 161 cpm B Id Disin 147 cp 174 cp 153 c 153 c 154 n Cop 143 Ars 2-6 Toke bathroom. Dose Rate 210 u frisk Near drain | on B pm B com B R/hR in 574 Dpm/100 cm ² | pg. 1 of 1 |
| | 1 | strument Serial # α Eff. β Eff. α Bkg | 79 8-30-01 O Smear | *-* Boundary A/S Location |
| | Date. | | DPM/100 cm^2 | |

| Location: | RWP# | Survey# | ٦٥ | | |
|--------------------------------|--|---|--------------|--------------------------------|--------------|
| Bldg 90, LAD | | OCI | Survey Type: | mative | pg. 1 of 1 |
| Smear Results | | | 171/40 | · MIGHT V | Iba· T or T |
| DPM/100cm^2 No. α β No. α β | D. Tools 161 2. 4loor around Dosin | Ams loping | | • | |
| 1 4 26 | | CAUNT | | • | |
| 2 -10 27 | D. TOOLS 161 | COM 13 | | | |
| 3 16 28 | | | | | j |
| 4 -4 29 | . a. floor around Distin | 147 Com 13 | | | |
| 5 -4 30 6 -/4 31 | _ | , , O() | · 2 | | |
| 6 74 31 32 | 3. I/s Drain | 174 cpm | > | • | · |
| 8 33 | O T/5 - | , , | _ | | |
| 9 34 | 3. Ils Drain (1) Ils Drain | 153. cdm | jűs | | |
| 10 35 | | | | | |
| 11 36 12 37 | 1 Sink Drain #1 | 154 | | | |
| 13 38 | | | | | |
| 14 39 | @ Sink Drain Cops | 143 | | | |
| 15 40 | - | 4 | | | |
| 16 41 | | • | | | |
| 17 42 18 43 | */ n n * * * * * * * * * * * * * * * * | مر بسب | 3 | | ; |
| 19 44 | Note: Smears ix- | be looken. | ~~ . | | |
| 20 45 | | | | | |
| 21 46 | tady's bath, | bure. | | | |
| 22 47 | | • | | | |
| 23 48 | GA DOSE RA | 12 -10 21 | | | |
| 24 49 50 49 | | | | | |
| Comments | Direct frisk Reading | Near grain s | 574 Dam/ | /c o c 2 | |
| All Can Counter | Reading | - · · · · · · · · · · · · · · · · · · · | VI DPAN | 100 CNC | |
| 2 min on | , | | | | |
| 2535 | • | | | | |
| | Supposed During | | | | ; |
| | | | Cal. Due | Key | • |
| · | Cuito & Hales 9/23/00 2939 103227 - | | 3-34-01 O | Smear *- | Boundary |
| | | - - - - | May 01 | Dose Rate mr/hr | A/S Location |
| | Reviewed By: Date: | | Hus | Direct Reading DPM/100 cm^2 | |
| L | HW Seinst 10/16/00 | | | Grab Sample | |

OP-001-02 Radio Cal Survey Sheet

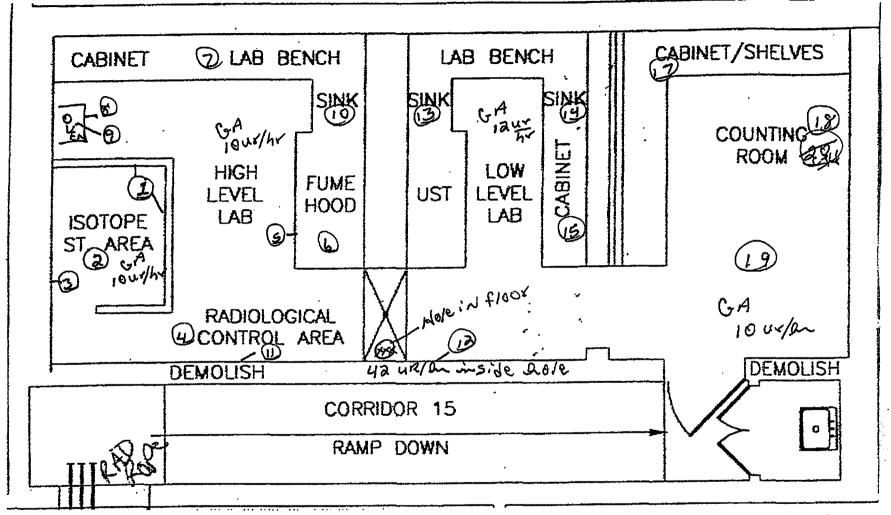
| Location: | RWP# C.S.H | | • | |
|-----------------|-------------------------------|----------------------------|-------------------|--------------|
| B1d9 90 Las | RWP# 65 00-02 | Survey# 0 0 3 | Survey Type: | 1 : |
| Smear Results | 000 00-00 | 1 003 | I Tayformative | pg. 1 of 1 |
| DPM/100cm^2 | 0 | R | | 1155 |
| Νο. α β Νο. α β | D. Somple Jars 1 | 96 cpm 13 | | |
| 1 39 26 | _ | • | | |
| 2 210 27 | @ Residue in Hole | 362 CPM 18 . | | |
| 3 -10 28 | | | | |
| 4 2 29 | 3. Concrete I/s Hol | e 148 com B | • | |
| 5 2 30 | | | • | |
| 6 35 31 | D. Concrete around 1 | · · · | <u> </u> | |
| 7 32 | or concrete grown t | 101e 157 Com. | | • |
| 8 6 33 | | | 1 | |
| 9 34 | B. closet Rm Equipo | ment 160 com | ø | |
| 10 35 | ، هيئ . | 50 | | |
| 11 36 | D. closet Rm Sink | 191 0 0 | 7 5 | |
| 12 37 | | in Com | | |
| 13 38 | D. closet Rm wall | | B | |
| 14 39 | - wall | 15/ Cpri. | \sim | |
| 15 40 | 8, closet Rm \$1000 | | | j |
| | e, closer Km 7/000 | 163 com | ~ | |
| | | -3 | | |
| 18 43 1 | | | | |
| 20 45 | | | | |
| 21 46 | • | • | | |
| 22 47 47 | CA Dose | Padasa : | | · |
| 23 48 | 6,7 3 426 | Rates ≥ 10 Rate in Hol | uR/ax | |
| 24 49 | · CCF Dece | · | | , |
| 25 50 50 | GH JOU | Kate IN Hol | e 90.00 | |
| Comments | | · · | 10 argin | |
| All Com Counter | 1 | | • | |
| 2 min on | | • | ₩* ን_ | • |
| 2929 | | | Tre . | • |
| | | | • | |
| Surveyed | By: Date: Instrument Serial # | | · | |
| | | α Eff. β Eff. α Bkg. β Bkg | Cal. Due Key | • |
| Cust | 5 Hales 9/22/00 2929 /163827 | .486 79 | | *-* Boundary |
| | | | ☐ Dose Rate mr/hr | A/S Location |
| Reviewed | By: Date: | | * Direct Reading | |
| | | | DPM/100 cm/2 | |
| | 4. | | △ Grab Sample | |

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CABRERA SERVICES, INC.

| Location: Bidg 90 Lab Similar Results | RWP# 25 H 90-02 | Survey# 0 0 3 | Survey Type: Towformative | pg. 1 of 1 |
|---|--------------------------------------|------------------------------|---------------------------------------|--------------|
| DPM/100cm ² 2 No. α βΑΔΝο. α β 1 9 26 | Q. Sample Jars | 196 Counts B | | |
| 5R2 - 2 2 6 27 3 -10 28 4 & 29 5 2 30 | ②. Residue in Hole ③. Concrete I/s 1 | | B | |
| 5 2 30 6 35 31 7 | Q. Concrete examb | . Hole 157 de | ing B | • |
| 9 34 10 35 11 36 | 6. Closet Rm Eq. | ignest 160 eg | m ^B | · |
| 12 37 1 13 38 38 1 14 39 1 | 2). Closet Rm w | 10-11 157 6 | Fire KS | |
| 15 40 16 41 17 42 18 43 | 8. closet Rm 7 | 100a 163 c | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | |
| 19 44 20 45 21 46 | | | | |
| 22 47 23 48 24 49 49 | CA Dos | se Rates > | 10 uR/ar. Hole 90 uR/an | |
| Comments All Com Counts | : | 1,0 | Hore yourgen | . • |
| 2771 0 2929 Surveyed E | N. Date | | • | |
| | Date: Instrument See | rial# α Eff. β Eff. α Bkg. [| Bkg Cal. Due Key | ^-* Boundary |
| | 1,30,00 | | 2-18-of Dose Rate mr/hr | A/S Locatio |

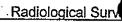
| Location: ST Albans LAB | BN990 RWP# 00-01 | Survey# | Survey Type: Initial entry pg. 1 of # |
|--|--|---|---|
| Smear Results DPM/100cm^2 | 1). Rear Room W. 3). Rear Room of (1) Noon 11 | last | |
| 5 14 30 6 11 31 7 38 7 32 | 3: Hood | 99 080 | |
| 8 | @. Head flour (a), counter Top (b), over 0/5 | 132.5 com 267 com | |
| 13 | 10. over I/s 10. sink #1 11 wall #1 | 168.5 cpm 201.5 cpm | - |
| 19 89 44 20 / 45 21 / 46 22 / 47 23 / 48 | (1) Sink # 7 (1) Sink # 7 | 165 com 96.5 com 649.5 com | . No76: |
| 24 49 25 50 Comments | (15) cobinet (16) ponels. (17) I/s cobinet | 869 cpm 123 cpm 256 cpm 164.5 cpm | SEE AHOCHMENT |
| All Counts is | Surveyed By: Date: | Instrument Serial # or Eff or Eff or Blog or Blog | Cal. Due Key Smear *-* Boundary |
| | Reviewed By: Date: | | □ Dose Rate mr/hr ■ A/S Location Direct Reading □ DPM/100 cm^2 □ Grab Sample |



Smeans Taken

D. eliside over

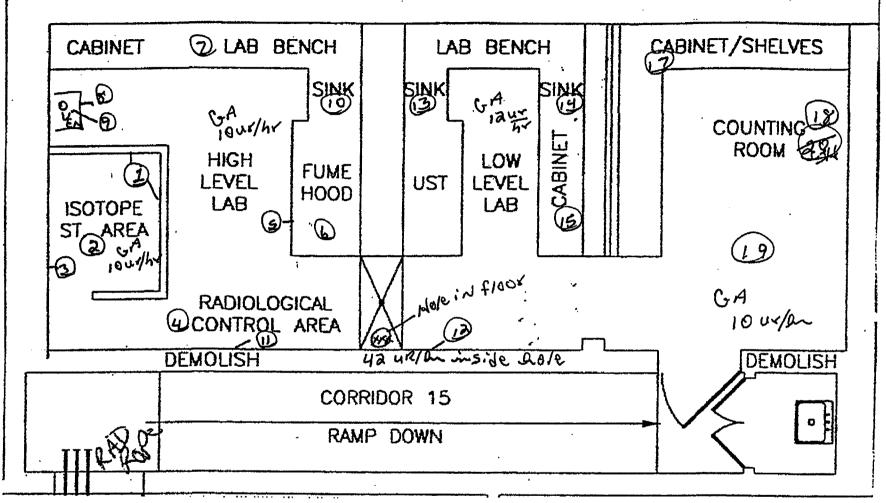
- D. walls
- Wall 3
- Fune Alord Alord floor outside over





| STAIDS-BELLAB BAGGO 00-01 Street Results DPA1/00cm/2 NO 0 1 | Locatio | \n· | Piamu | | ······································ | | | | | <u> </u> |
|--|--------------|---------------|---|---------------|--|-----------|--------------|-----------------|-----------------|------------|
| Sincer Results | 1 | | | -1 | | | Survey Type: | | | |
| DPM/100cm/2 | ساست | Smear Results | DIAG INI 40- | <u> </u> | 1 0 | 00 | 1 Initial | entry | | pg. 1 of 1 |
| | | | 1 Rona Das | | ~ | | | • | | |
| 1 | | | | | .91 6 | m | | | | |
| 3 86 28 | 1 | 195 26 | 1 2. Rean Ros | om floor | | | | | | |
| 13.5 cpm 14.5 cpm 14.5 cpm 14.5 cpm 15.5 cpm 16.5 cpm | 71 2 | 85 27 | @ Rear Ko | om wall. | 162 | GM | | | | |
| 133.5 cgm 133.5 cgm 132. | | | | | 121 | cpm | • | • | | |
| S | | | (a) HB11 +10 | 8 0 X | 123.5 | | • | | | |
| 37 32 3 | | | | | 12017 | -0 / | | | | |
| 1 | 7 - | | (5); HOOG | | બ વ | cpm | | | | |
| 132.5 cgm 132.5 cgm 132.5 cgm 132.5 cgm 132.5 cgm 122 37 37 35 | 8 | | a shoul Cin | L 81 14.7 | . , | • | • | | | |
| 10 | _9 | | | | 132 | 1.5 cpm | | | | |
| 1 | - | 353 35 | (7). counter | Top | | | | | | |
| 13 | | | = | - | ~ ~ · | 0 1 com | • | | | |
| 14 1636 39 16 16 16 16 16 16 16 1 | | | @ over 0/5 | i | , 4. 1 | 86 ~ | : | | | |
| 16 304 41 | | 1/75 38 1 | (A) - (- T) | | 7 7 | 4,2 CBm | L | | | |
| 16 304 41 | | 9 (40 | A) ever T/2 | | ı / | ٠ | | • | | ; |
| 177 42 | | | (78 c) 12 # | • | , (| ons com | _ | | | |
| 18 | | | | | ~ ^ | 11 5 6 0- | | | | |
| 19 84 44 20 1/45 21 1/46 22 1/47 23 1/48 24 1/49 25 1/5 cobinet Comments Comments Comments 10 penels 12 1/49 13 2pm 1649.5 cpm 125 cpm 13 2pm 1649.5 cpm 1649.5 | 18 | 51 43 | (1) Wall # 1 | | | • | | | | |
| 21 | - | | | | 169 | 5 cpm | | | | |
| 22 | | | To make the | 4 | | _ | | | | |
| 23 | | | (13) CINK # - | | | | | | | |
| 24 49 49 | | | | • | 6 | 49.5 cpm | | | | |
| 25/ | | | (A) 2 | • | | | | | | |
| Comments (16) Panels. (17) It's councet (19) Floor Front All Counts is Surveyed By: Date: Instrument Serial # a Eff. B Eff. a Bkg. B Bkg Cal. Due Key For Beta/Camma United Serial # a Eff. B Eff. a Bkg. B Bkg Cal. Due Key (17) Thouse 9-20-00 Dose Rate mr/hr A/S Location Reviewed By: Date: Date: | | | (15) cabinet | | | • | | | | |
| The property of the property | | | 200 000 | | | - | | | | |
| All counts is Surveyed By: Date: Instrument Serial # \alpha Eff. \beta Big. \text{ \text{GBM}} \text{ \text{GBM}} \text{ \text{Surveyed By:} Date: Instrument Serial # \alpha Eff. \beta Big. \text{ \text{B Big. Cal. Due} Key \text{ \text{For Beta/Cam/hg}} \text{ \text{Direct Reading DPM/100 cm/2} \text{Direct Reading | | • | | . L | а | 156 com | • | | , | • |
| All Counts is Surveyed By: Date: instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key For Beta/Camma CJ. Koles 9-20-00 Reviewed By: Date: instrument Serial # α Eff. β Eff. α Bkg. β Bkg Cal. Due Key Dose Rate mr/hr A/S Location Reviewed By: Date: | EFF | m 2929 | UD I/S COM | - | | | | | | |
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| Location: | RWP# | т | | | | |
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| ST Albans LAB | BH990 00-01 | | Survey# | Survey Type: | entry | pg. 1 of 2 |
| Smear Results DPM/100cm^2 No. α β Νο. α β | 1. Rear Room | wolls | 91 cpm | 1 | CATTY | 1pg. 1 of 2 |
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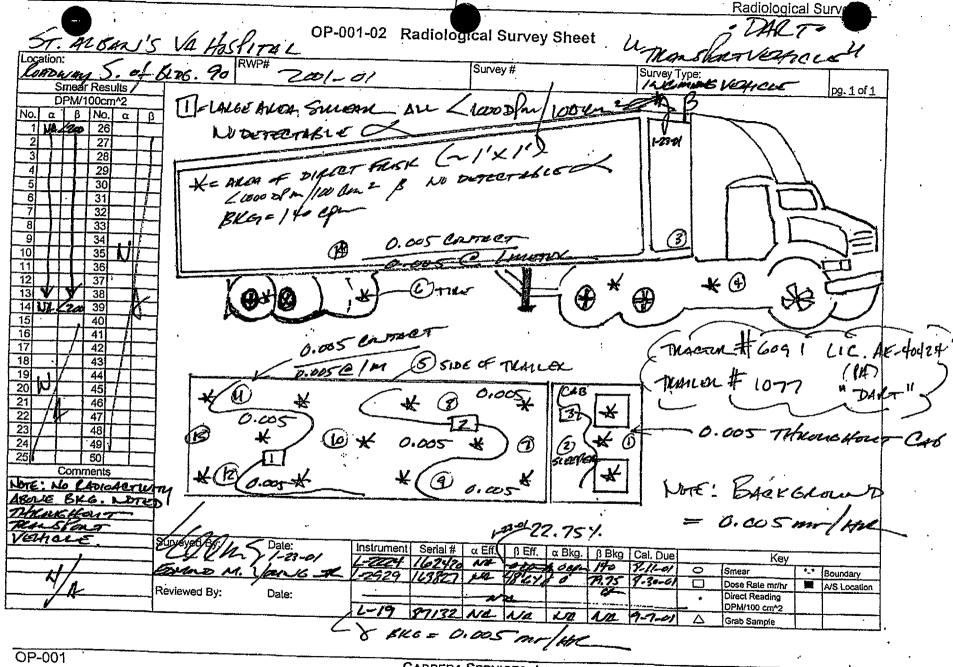


Smeans Taken

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| Location: St Albans | AB RWP# | 0 | | Survey# | | Survey Ty | /08' · | | | · - |
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CABRERA SERVICES, INC.

APPENDIX F ASBESTOS VARIANCES

AYLOR ENVIRONMENTAL GROUP, INC.

September 7, 2000

Department of Environmental Protection 59-17 Junction Boulevard, 8th Floor Corona, NY 11368-5107

RE: St. Albans V.A. Care Facility 179th Street and Linden Boulevard, Queens, NY 11425 (Request For Variance)



Dear Sir/Madam.

The scope of work is to remove approximately 175 square feet of VAT from the basement of the above referenced facility following attachment FV.

ACM ABATEMENT SCHEDULE TABLE

| Location | Material Description | Quantity | Procedure |
|----------------------|-------------------------|-----------------|-----------|
| Basement - Lab Areas | VAT | 175 Square Feet | FV Method |

Taylor Environmental Group, Inc. is requesting approval for a variance from Title 15. Chapter 1, Rules of the City of New York to comply with the following sections in order to utilize this procedure:

Section 1-41(d) No Post Abatement Air Clearance.

Section 1-81 (j) No pre-cleaning of the work area(s)

Because the floor is going to be abated

Section 1-81 (m) Partial Plasticization of the work area(s)

Because we are utilizing the FV Method for the floor tile

Section 1-91 (c) Static negative air pressure of less than 0.02 inch water column

Because we are utilizing the FV Method, therefore only negative air pressure ventilation shall be provided to allow make up air into the work area to reduce heat stress to workers.

Section 1-91 (g) Less than four air volume changes per hour

Because while utilizing the FV Method only make up air is required.

Section 1-102 (b) Not to fully saturate VAT with amended water

Because prior to actual removal the floor tiles shall be blanketed and wetted with a minimum of 1-3" coating of foam and shall be maintained until material is bagged.

70.4

Section 1-112 (d) & 1-112 (e) No 1st and 2nd settling period and no 2nd and 3rd cleaning

Because the material being removed is non-friable and therefore minimal fibers will be released and also there will be 1-3" of foam blanketed over the material to ensure minimal fiber release

Removal Procedures

- 1. All electricity will be shut down within the containment.
- 2. All movable objects will be removed from the containment,
- 3. A full decon will be attached to the containment.
- 4. The work area will be sealed off with isolation barriers and all windows; openings and floor penetrations will be sealed off with two layers of 6-Mil Poly Sheeting.
- 5. A single layer of 6-Mil Poly will extend four feet up the wall to act as a splashguard inside the work area.
- 6. Negative air pressure shall be set up.
- 7. Prior to actual removal the floor tile will be blanketed with 3" of foam and maintained until all material is bagged.
- 8. The removal will be done by manual methods.
- 9. All waste bags removed from the work area will be Hepa vacuumed and wet wiped.
- 10. After the work area has been allowed to dry the consultant will give a visual inspection.
- 11. Consultant will perform final clearance air monitoring.
- 12. When final air clearance has been achieved, the work area will be demobilized.

Should you have any questions, or need further information, please call the undersigned at (516) 358-2955.

Sincerely yours,

George Paylor Laboratory Director

Taylor Environmental Group, Inc.

ATTACHMENT FV PROCEDURES FOR USE OF FOAM OR SIMILAR VISCOUS LIQUID IN REMOVAL OF POTENTIALLY FRIABLE VINYL ASBESTOS TILE (VAT) IN NEW YORK CITY

VARIANCE APPLICATION

OCT-10-2000 16:50

Applicant shall apply to NYC DEP for a variance from Title 15, Chapter 1, of the Rules of the City of New York Sections: 1-41(d), 1-81(j), 1-81(m); 1-91(e), 1-91(g); 1-102(b); 1-112(d) and 1-112(e). NOTE: The applicant shall comply with all other applicable sections of Title 15, Chapter 1, Rules of the City of New York (15 RÇNY).

B) ACCEPTABLE FOAM OR VISCOUS LIGHT

- Shall be non-toxic and not require special respiratory protection for handling. i.
- Shall coat and wer the VAT material, and remain wer through the bagging process. 2.
- 3. Shall leave an identifiable colored residue when it dissipates.
- 4. Shall not require special disposal.

C) PERSONAL PROTECTION

- Appropriate personal protective equipment shall be worn.
- Persons entering the work area shall be provided with waterproof well-tractioned and correctly-fitting rubber boots. 2.

D) . BACKGROUND CONDITIONS

The design of the abatement job must incorporate consideration for preventing flooding to the underfloor, ducts, chases, or other structures or components beneath the work area or adjacent to it.

E) MINIMUM REMOVAL PROCEDURES

- The electric power and the HVAC system in the work area shall be shut down and isolated as per 15 RCNY § 1-81(c), § 1-81(f), § 1-81(k) and § 1-81(l).
- 2. All movable objects shall be removed from the floor tiles.
- 3. The work area shall be scaled off with isolation barriers as par § 1-81(k) and § 1-81(l).
- 4. All penetrations in and along the floor shall be sealed.
- Baseboards and wall surfaces up to a minimum height of four feet above the floor shall be covered with a layer of 6-S. mil plastic sheeting.
- The decontamination enclosure systems shall be attached to the work area. 6.
- 7_ Negative air pressure ventilation shall be provided to allow make-up air into the work area, and the air outlet from the work area shall be at or near the floor level. (Reasons - a) to reduce heat stress to workers, b) to hasten drying of the work area.) Provide a back-up system.
- Prior to actual removal, the floor tiles shall be blanketed and wetted with a minimum 1"-3" coating of the acceptable 8. foam or viscous liquid which shall be maintained for the duration of the removal until the material is bagged.
- Manual methods of removal are recommended; however, if hand power tools are used to drill, cut into, or otherwise 9. disturb the VAT, the power tools shall be equipped with HEPA filtered local exhaust ventilation and operated to prevent potential fiber release; additionally, precautions shall be taken by raising the plasticization of the walls to a minimum height of six feet.
- Clean-up procedures shall involve removal and bagging of 10.
 - the vinyl asbestos tile material (VAT) a)
 - p) visible accumulations of asbestos containing waste
 - ¢) all traces of foam or similar viscous liquid
 - dì excess liquid
 - debris; and shall be followed by a thorough wet cleaning. e)
- All tools shall be wet cleaned and HEPA vacuumed and then removed from the work area upon completion of work. 11.

- 12. The work area shall be allowed to dry completely before a visual inspection is conducted. The visual inspection, to be performed by the independent third party air monitoring flom/consultant, shall confirm the absence in the work area of
 - a) ACM or ACW bags or debris, and
 - b) Excess foam or other viscous liquid.

NOTE: If the work area fails visual inspection, the work area shall undergo another wet cleaning until it passes the visual inspection.

- 13. After the work area passes a visual inspection, the plastic barriers along the walls shall be removed; <u>NOT the isolation barriers</u>.
- 14. Subsequently, a thorough HEPA-vacuuming of the work area shall be performed.
- 15. Isolation barriers may be removed when it has been determined that no further air quality monitoring is required,

F) AIR MONITORING

1. Daily continuous air sampling, outside but in the vicinity of the work area and inside the work area, shall be conducted in accordance with 15 RCNY § 1-41 and § 1-42.

OPTION A (TO BE USED FOR FACILITIES FOR HEALTH CARE, CHILD CARE & SCHOOLS)

- 2. If any air sample(s) outside the work area exceed 0.01 f/cc or the background level, whichever is greater, then work shall stop; the equipment and the integrity of the barriers shall be checked and the problem shall be corrected prior to resuming abatement activities.
- Clearance air monitoring shall be conducted in accordance with 15 RCNY § 1-43, § 1-44 and § 1-45 after step E) 14
 has been completed (see above). The isolation barriers shall NOT be removed until air clearance is successful.

OPTION B (MINIMUM AIR MONITORING/CLEARANCE REQUIREMENTS FOR OTHER FACILITIES)

- 4. a) If any air sample(s) outside the work area exceed 0.01 f/cc or the background level, whichever is greater, then work shall stop, the equipment and the integrity of the barriers shall be checked and the problem shall be corrected prior to resuming abatement activities.
 - b) If any air sample(s) within the work area exceed 0.01 f/cc or the background level, whichever is greater, then work shall stop, equipment and barriers shall be checked and methods shall be altered to reduce airborne fiber concentrations.
- If fiber concentrations inside the work area during abatement did not exceed 0.01 f/cc or the background level, whichever is greater, then final air clearance samples need not be taken.

G) GENERAL PROVISIONS

A copy of the approval, the corresponding notification, and this procedure shall be posted conspicuously at the entrance to the work area.

NOTE: A conservative approach has been used in the design of this protocol to provide as much relief as possible while maintaining adequate measures to safeguard health and safety.

The Department of Environmental Protection will consider additional variances in conjunction with this application.

TRU/JM 6/98

SEP-18-2000 00:19

NYCDEP BANHM ASBILEAD TRU

718 595 3648 P.01

Mr. Rajappan Radhakrishnan, Director NYC Department of Environmental Protection Bureau of Air, Noisa and Hazardous Materials Asbestos and Lead Control Program 59-17 Junction Boulevard - 8th Floor Elements NY, 11373

| Elmhurst, N.Y. 11373 | | A |
|--|--|--|
| Attn: KARYN BRUN | | Date: Dept 18, 2000 |
| Premise Address: 179 th | Street & Linday | Boulevaid, ST. Albans VA. Cace For |
| Re: VAR# 1476 Q.N. | | PRIM BROWN |
| Dear Mr. Radhakrishnan: | | · |
| procedures/conditions that she address and which pertain to | ili apply during relevant work on t the Department's written approva | titions of working including the applicable special the asbestos project at the above noted premise or facility at (Form V2) based specifically upon all the documents |
| comprising this application for of Title 15, Chapter 1, Rules of | a Variance (as filed on <u>Sept</u> if the City of New York listed belo | ow. |
| Method of Abatement: Remov | al of VAT using foom. | |
| Amount: 1354 | ast- | Type: VAT |
| Location(s): Saxen | unit - Lab Are | es |
| silinitary (127) | | |
| Section 1-81(j) | No pre-cleaning of the work a | rea(s). |
| Section 1-81(m) | Parilal plasticization of the wo | ork area(s). |
| Section 1-91(C) | Static negetive air pressure al | fless than 0.02 inch water column. |
| Section 1-91(9) | Less than four air volume cha | inges per nour. |
| Section 1-102(b) | Not to fully saturate VAT with | and no 2nd and 3rd cleaning. |
| Section 1-112(d) & 1-112(e) | WO 12t SUG SUG SOMME PARIOR | Taile in Tile and and chanting. |
| We shall comply with Attachm | ent FV. | |
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| , | | |
| · | | |
| liems 1 through 8 of DEP/ALC | CP Form G shall be complied with | n also. |
| | | |
| | | Applicant/Owner signature |

(ACP/TRU FAX#: (718) 595-3648)

FORM V4. JM 8/98



| | DE | THE CITY OF NEW YORK DEPARTMENT OF EI JOEL A. MIELE, SR., RE. Commissioner | IVIRONMENTAL PROTECTION |
|------------|--------------------------------|---|--|
| (A) (A) | WHEN THE | THE REPORT OF THE PARTY OF THE | ROBERT C. AVALTRONI Deputy Commissioner |
| | NE (718) 7 18) 595- | | Bureau of Air, Noise, & Hazardous Malerials |
| | | 2 | Date: Dept 13, 2000 |
| To: | (fl | lorge Taylor | Ret VAR# 1476QNOO |
| | , y | 0 | TRU/BN# 620 GN 60 |
| • | | | Facility Address: 1794 St. & Juden Blood. |
| , B | . | | I albans V. A Care Tarilla |
| IJcar. | Applicant | | Duae. |
| | This F | Fam VI is <u>NOT</u> an approval. | 9 |
| ł. | V | Your Variance Application has been delivered to I CANCELLATION may occur as a result of the T | DEP for consideration. Please note that <u>DENIAL</u> or echnical/Regulatory and/or Pre-Abatement Inspection(s). |
| 2. | | An agreed Pre-Abatement Inspection has been sch | • • |
| | A. | Day: Mon. Tue. | 311 1 |
| | | Time: 10:00 am 12:00p.m. 2:00 p | Wed. Thur. Fri. |
| | | Date: | m. Other: |
| | È. | Applicant/Representative at the Facility_ | RECEIVED |
| • | C. | TATE A PURE | © SEP 1 3 2000 |
| NOTE | | | (CI) |
| USEAN | 1. | time of the pre-abatement inspection. If you fail to | as affected by this variance application will be accessible at the do this, the inspection will not occur and delay will result. |
| 3. | | _ Item 2 could not be scheduled by you at this time: | YOU ARE REQUIRED TO ARRANGE FOR ITEM 2 within |
| 4. | / | A pre-abatement inspection was not deemed to he a | BOSSISTO at this time but you will be alight to prove a con- |
| | | during or after the technical review of your applicational approvals. | don, requires a pre-abatement inspection to be arranged pending |
| 5 . | | The non-variance phase of the asbestos work mu | st start on the date indicated on ACP7. |
| IMPO | RTANT: | <u>.</u> | |
| .1. | COMM | EMENT ACTIVITIES THAT ARE THE SUBJECT OF AENCE PRIOR TO RECEIPT BY YOU OF THE DE CATION (via Form V2 or V3: Paxed to you or picket | OF YOUR VARIANCE APPLICATION SHALL NOT P/ALCP/TRU <u>WRITTEN APPROVAL</u> OF YOUR I-up by you). |
| 2, | A CHA VARIA | ance application, when an asbestos co | 1/18 - |
| | | Signed | DHP/AI/CP/Technical Review Unit |
| jm xe: | File | 59-17 Junction Boulevard, 11th Hoor, | Corona, New York 11368-5107 |

12163581780 90.9

Pile

XO:

TAYLOR ENVIRONMENTAL

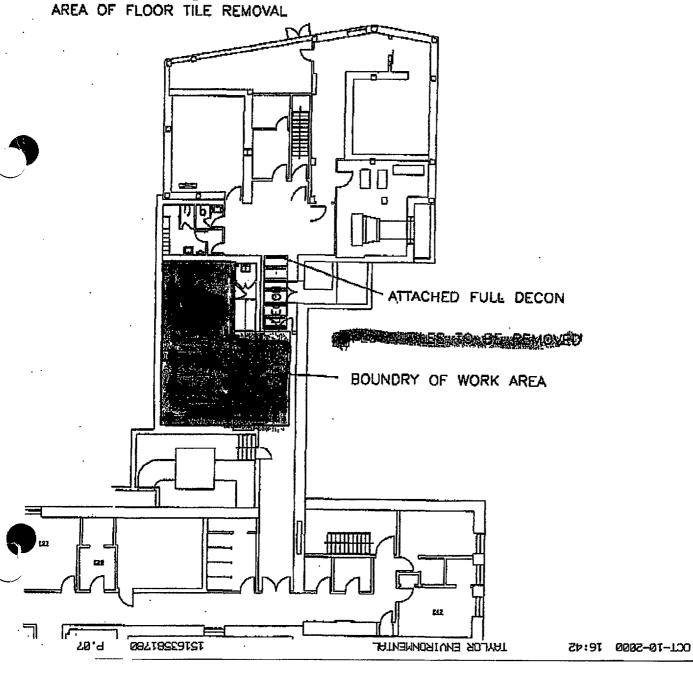
OC1-10-5000 16:42

Form V1 9/99

TAYLOR ENVIRONMENTAL GROUP, INC.

ST. ALBANS V.A. CARE FACILITY 179 STREET AND LINDEN BOULEVARD, QUEENS NY

BASEMENT LAB AREA





STATE OF NEW YORK - DEPARTMENT OF LABOR DIVISION OF SAFETY AND HEALTH License and Certificate Unit BUILDING 12, STATE CAMPUS ALBANY, NY 12240

ASBESTOS HANDLING LICENSE

RESTRICTED LICENSE - NO ASBESTOS REMOVAL PERMITTED

LICENSE NUMBER 399-0633

DATE OF ISSUE 6/30/00

EXPIRATION DATE: 3,31/01

Contractor:

Taylor Environmental Group, Inc.

Address:

130A Jericho Turnpike Floral Park, NY 11001

Duly Authorized Representative: George Taylor

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. The licensee verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Richard Cucolo, Director FOR THE COMMISSIONER OF LABOR

DOSH 432 (1-98)

CITY OF NEW YORK

| FOR OFFICE | LOSE UNLY |
|--------------|----------------|
| Variance # | 19716608 6 |
| Fee Paid | <u> </u> |
| Notification | # : 13 / 15 CC |

| DEPARTMENT OF ENVIRONMENTAL PROTECTION | |
|--|--|
| DIVISION OF ENVIRONMENTAL ENFORCEMENT | |
| 59-17 Junction Blvd., 8th Floor, Corona, NY 11368-5107 | |

ASBESTOS VARIANCE APPLICATION

| ONLY TYPEWRITTEN APPLIC | ATIONS SHALL BE ACCEPTED | |
|--|---|---|
| ADDRESS 179th Street & Linden Bo | 80RO | Queens ZIP 11425 |
| Type of PremiseHealth Care Facilit | | # 12406 Lot # 100 |
| I. APPLICANT | • | |
| A. (CHECK ALL THAT APPLY) Contractor GCons | ulioni (1 Auros (| 3 Other |
| Taylor Environmental Group | o. Inc. | Other 516 358-2955 |
| | | #() |
| Address130A Jericho Turnpike | CITY Ploral Pa | TRATEZIP |
| . REGULATIONS SECTION(S) FOR WHICH VARIANC | E IS REQUESTED | |
| Identify applicable Sub-Section(s) of the relevant NYC DE | P or NYS DOL (ICR56) Asbes | tos Control Regulations |
| 1-87(j), 1-81(m), 1-91(c), 1-102(| | |
| 1.91(5) (8) | | |
| | | |
| SEVEN DAY WAIVER FEE | | and the second second |
| A. Square Feet + B. [From Line 25 of ACP7 form] | inear Feet = C | Total Feet (Add A 4 B) |
| D. Circle Applicable Fees Below | | |
| If IV. C. Less than 5000 Total Feet - pay \$300; If IV. | | |
| AMOUNT OF ACM INVOLVED IN VARIANCE REQUE | EST (OTHER THAN SEVEN | DASWAISER, 13 2000 |
| A. Affected Floors | | は、一人は一人 |
| B. Combine Amounts (Square Feet + Linear Feet) Amount for all affected floors. | for each affected Floor. | Then Sum the Combined |
| Total Combined Amount of A | 175 | Feet |
| FEE SCHEDULE FOR ITEM V (OTHER THAN SEVEN | | , , , , , |
| TE SOMEOGE FOR MEIN A GOLDEN LUMM SEAEM | | |
| | If Total Feet I | n Item V. B. is |
| First Sub-Section (Other than 7-Day Waiver) | \$400 | 5000 feet or more \$600 |
| Each Additional Sub-Section | \$200 | \$300 |
| MAXIMUM FEES * | \$1200 | \$1800. |
| FEE PAYMENT | | |
| • | | 4 600 00 |
| Combined Applicable Fees From Item IV D + Item VI | То | tal Fees \$ |
| NOTE: Maximum fee applicable to each category. If S | Seven Day Walver is used f | or a project of EDDD East or |
| more and additional variances are also reques | sted but on floors with a Co | ombined Total of less than |
| 5000 Feet, the maximum application fee is \$ | 1800, but actual payment | would be \$1300. |
| REASONS FOR REQUEST AND DESCRIPTION FOR | PROPOSED ACTION (Att | ach 8½ x 11 Sheets) |
| See Note Attached | , | |
| , | · · · · · · · · · · · · · · · · · · · | |
| | | |
| 200 | | |
| Dept of Veterans Affairs | B. George | |
| Print Tame of Owner | Print Name | of Applicant |
| Signature of Owner Date | / Signature of Application | MARICE |
| Organical Common Date | Signature of Applican | Date |
| : 1 Submit this application together with the Asbestos Insp | ection Report (ACP7) and appro | oriate feels) |
| 2 Make Check Payable to NYC DEPARTMENT OF ENVIRO | NMENTAL PROTECTION | |
| 3 Application for variances must be made to the Departm 4 Work SHALL NOT commence prior to approval of this a | ent at least two weeks prior to t pplicat ~ "otherwise applicant i | he commencement of work. s subject to violation. |
| 5 Attachment(s) shall be submitted in DUPLICATE. | Y 1 | • |

100000

NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION

ASBESTOS INSPLICTION REPORT

OR OFFICE PURP SECONLY

ONLY TYPEWRITTEN ICATIONS WILL

NOTE: ASBESTOS INSPECTION REPORT SHALL BE SUBMITTED TO NYC DEP NOT LESS THAN ONE WEEK IN ADVANCE OF START OF THE WORK (ABATEMENT ACTIVITIES)

| 1. FACILITY | ZIP CODE 44.55 |
|--|--|
| 2. ADDRESS 179th Street and Linden Boulevard Queen | 4. LOT#100 |
| AKA St. Albans V.A. Care Pacility 3. BLOCK 12406 | 4. 101 # |
| 5. *TYPE OF FACILITY Health Care Facility | |
| NAME OF BUILDING | . 1 |
| 6. APPROXIMATE AGE OF BUILDING ATTURO PRINTS OF THE STATE | , . |
| 7. DESCRIPTION OF PROPOSED WORK ACM Removal Only (e.g. Removal only (e | terations, ACM Removal only) |
| II. BUILDING OWNER | |
| 8. NAME Dept. of Veterage Affairs FOR THIS PROJECT Re | nie Monteleone |
| 10. TEL: # (718) 526-1000 x8550 FAX# (718) 298-8563 | 710 |
| 11. ADDRESS 179th St. & Linden Blvd. CITY Queens | STATE NY ZIP 11425 |
| III. GENERAL CONTRACTOR | : |
| 12 NAME Stone & Webster Engineering Corp. TEL# (617) | 589-2087 |
| IV. ASBESTOS ABATEMENT CONTRACTOR 14 CONTACT PERSON | مر ا |
| 3. NAME Franklin Env. Services FOR THIS PROJECT Rob | T088 |
| 15. FEDERAL EMPLOYER IDENTIFICATION # 042619121 | |
| 16. TEL # (508) 384-6151 FAX # (508) 384-6028 | 02093 |
| 17. ADDRESS 185 Industrial Road CITY Wrontham | STATE MA ZIP 02931 |
| V. THIRD PARTY AIR MONITOR | |
| 18. NAME Taylor Environmental Group, Inch 19. TEL. # (516) | • |
| 20. ADDRESS 130A Jaricho Toke. CHY Floral Park | STATE NY ZIP 11001 |
| VI. LABORATORY FOR SAMPLE ANALYSIS | |
| : 21. NAME O'Brien & Gere Laboratory | 10155 |
| VII.ASBESTOS PORTION OF PREMISES BEING ABATED/ALTERED/DEMOLISHED | • |
| 23. ASBESTOS COVERED STRUCTURE(S) BEING WORKED ON Floor Tiles (Boller, Cellings, Pipes, Storage Tanks, Pienu | m Ducts, Decking, Ceiling Tiles, etc.) |
| : 24.STARTING DATE FOR THIS PORTION OF WORK. 9 / 25 / 00 PROJECTED COMPL | ETIONDATE 10 , 25 , 00 |
| | WEEKENDS . IX WEEKDAYS |
| ASBESTOS WORK SCHEDULE IN DAY EVENING NIGHT (12am-8am) 25. TOTAL AMOUNT OF ASBESTOS CONTAINING MATERIAL (ACM) WHICH IS FRIABLE, OF ASBESTOS CONTAINING MATERIAL (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) WHICH (ACM) | *** |
| ABATEMENTVALUEDATIONOLIMOETRO | LINEAR FEET ON PIPE |
| 26. ASBESTOS HAULER NYS DEC | to and a |
| 26. ASBESTOS ANOLEN NYS DEC PERMIT # PA-025 TEL.# | 508 384-6151 |
| DISPOSAL SITE(S) Invitocare Industries, Clive, Utah | - • • • |
| Distory our (o) But 1 to Guil of Tricing Crack | |
| 27. FILING FEE SCHEDULE | FILING FEE IS |
| ** FOR PROJECT DISTURBING: ************************************ | \$1200 |
| 1000 Linear Feet or more or 1000 Square Feet or more of friable ACM At least 260 Linear Feet and less than 1000 Linear Feet or | \$ 2000 |
| At least 160 Square Feet and less than 1000 Square Feet of Iriable ACM | ECEIVED \$800 |
| | \$400 |
| More than 25 Linear Feet and less than 100 Linear Feet of friable ACM | ESTOPALIA \$200 |
| More than 10 Square Feet and less than 50 Chrole appropriate Filing Fee and write it in item 19 Complete this report and submit it to: | RUGRAM IFUR Any apple to: NYC Department of Buildings. |
| A) The NYC Buildings Department with application for perform and mining set. Crieck should be specified by the report and submit to: | |
| If no Dept. of Buildings permit is required complete this report and south to the NYC B) The NYC DEP Asbestos Control Program with filling fee. Check should be made payable to NYC. | Department of Environmental Protection. |
| * Type of Facility - Hospital, Theater, Warehouse, Commercial Office Spar Apartment Building, ACM - Asbestos Containing Material means Material Containing Greater Than 1% Asbestos | |
| | at and the lab |
| Form Handling Do not detach any sheets, insert carbon paper between the 4 pages and complete this side, told this sheet over the perforation so that all original entries are made on the white page. Reverse the carbon paper approver the perforation so that all original entries are made on the white page. | or opriately. 2/94 |

| | | ASBESTOS INSPLATION | REPO | RT (c | con't.) Page 2 of |
|----------------------------------|---|---|--|-------------------------|---|
| (a) [D] | Glovebag | ck all appropriate boxes) b) | . — | Enclosu Tent | ure g) 🗌 Clean up |
| a) 🔲 d) 🗀 | Demolition | a (Item a through e requires filing of b) Boiler Replacement c) Fire proofling Replacement estos Abatement | | | C Department of Buildings) or Replacement |
| 30. | · ' LO | CATIONS WHERE SUBJECT ABATE | MENT T | AKING | PLACE |
| Actual Floor(s) | DESCRIBE SECTION OF FLOOR (e.g. entire, east wing, room #; boiler room lobby, etc.) | AFFECTED SURFACES CONTAINING FRIABLE ACM (e.g. Pipe lagging, celling, plenum ducts, storage tanks, decking, etc.) | SQUARE | INT OF LE ACM | DESCRIPTION OF WORK BEING PERFORM (e.g. running cable, installing fire sprinklers, removing and replacing bollers, etc.) |
| Bsmt. | Lab Area | Floor Tiles/Mastic | 175 | FEET | Asbestos Abatement |
| *** | 7 | : 11 | 5.47 | | 1 .1 .1 |
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| 1.03.1 12 | | "Jacob Postok — 19 | | · | |
| | | | | | Attach additional sheet if necessary |
| Taylor Fox | Print Neme of Air Monitor Signature Queen | iliai willi rederal, State and NYC law: | vices | ulations | applicable to asbestos related work. Taylor Environmental Group, Inc. Print Name of Applicant Otymanure Plate |
| 32. Authorizatindepende Departm | ent of Veterans by Name of Owner ransportation and Disposal | Affairs Signstone | eler | gulations 20 d by the | S/3//QO byte NYC Department of Sanitation (LL 70/85) |
| *** | | lification(s) of information provided reported immediately in writing di NYC Department of Environments Asbestos Control Progra 59-17 Junction Blyd., 8th F Corona, NY, 11368-5107 | i on this rectly to il Protect am | form st | nali be |

THE PIECEMEAL CARRYING OUT OF AN ATION TO AVOID COVERAGE BY A STANDARD THAT APPLIES ONLY TO OPERATIO, S OF A LARGER SIZE IS A VIOLATION

FORM ACP 7

ONLY TYPEWRITTEN APPLICATIONS WILL BE ACCEPTED

DEPARTMENT OF ENVIRONMENTAL PROTECTION

| Page 1 | of <u>2:12</u> | <u> </u> |
|--------|----------------|----------|

| | | DJECT |
|--|--|-------|

| THIS FORM IS TO BE COMPLETED IF THERE IS NO FRIABLE ASBESTOS CONTAINING MATERIAL PRESENT OR IF THE TOTAL AMOUNT OF FRIABLE ASBESTOS CONTAINING MATERIAL IS 10 SQUAFEET OR LESS, OR 25 LINEAR FEET OR LESS, OR IF NORMALLY NONFRIABLE ACM (AS PER 40 C | 1 |
|---|----|
| PRESENT OF IF THE TOTAL AMOUNT OF FRIABLE ASSESTOS CONTAINING MATERIAL IS 10 SOUR | AL |
| PART 61.141) IS PRESENT IN ANY AMOUNT. | FR |

| FOR OFFICE P | URPOSES ONLY |
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| 14P 90 | 69011UC |
| NYC Buildings De | pl. Application No. |
| ACP5 Fee | |
| NYC Dept. of Envi | ronmental Protection |

| | 1.141) IS PRESENT IN ANY AMOUNT. | · . | | ental Protection |
|---|---|--|---------------------------------------|---------------------------|
| 2. FACILITY A | ADDRESS 179th St. & Linden Bo | oulevard BORO Queens | ZIP CODE 114 | 25 |
| | t. Albans V.A. Care Facility | 3. BLOCK # 12406 | 4. LOT # | 100 |
| 5. BUILDING | OWNER Department of Veterans | Affairs TEL #(718) | 526-1000 | x8550 |
| 6. ADDRESS | 170th of & Linden Rouleva | | ZIP CODE 114 | 25 |
| 7, CONTACT | PERSONErnie Monteleone | 8. TEL. #(718) 52 | 6-1 <u>0</u> 00 x8 | 550 |
| | | oval of Floor Tiles, Mastic a | nd Transi | te |
| | | | | <u></u> |
| 10. ESTIMATE | ED START DATE 10/18/00 ESTIMATED O | COMPLETION DATE 11/1/00 OF THE E | NTIRE SCOPE | OF WORK. |
| | Daharania IIIVIT OONDHOTED ARIAG | SBESTOS INVESTIGATION ON 9/19/00 IN | ACCORDANCE | WITH THE |
| PROCEDURE | A Ashesias Investigator S REQUIRED BY THE NYC DEP ASBESTOS | CONTROL PROGRAM REGULATIONS AND | DECLARE TH | AT AT SAID |
| FACILITY A | ADDRESS, THE s to be demolished are free of any asbestos con | taining material (ACM) | | • |
| | s to be demolished contain 10 square feet or les on forces may make friable: all ACM shall be | to a complete and for the state of friends ACM or of the | ormally nonfriab or the NYC DE | le ACM that P Asbestos |
| — | ions ive surfaces of relevant structure(s) affected by nonfriable ACM that alteration or plumbing repe | an alteration or plumbing repair are free of a | ny friable ACM | and free of |
| | ive surfaces of relevant structure(s) affected by a if friable ACM or of normally nonfriable ACM that | a altaration or altembina repair contain 10 sautare | feet or less or 2 able: removal as | 5 linear feet in b. |
| 🖸 e. normali | y nonfriable ACM shall be disturbed/removed | in accordance with the NYS DOL ICR 56 of | r the NYC DE | P Asbestos |
| ☐ f. friable A | CM and/or normally nonfriable ACM will NOT be | a disturbed during alteration/plumbing repair/mod | lification/renova | itión: |
| Friable / | | BESTOS INVESTIGATION PERFORMED O | * 5 . | |
| STORY | DESCRIBE SECTION OF FLOOR | ALL FRIABLE SURFACING MATERIALS | NUMBER | ASBESTOS |
| | (e.g. entire, cast wing, room # | INCLUDING: FRIABLE ACM AND | OF SAMPLES | PRESENT |
| (include cellar | | I NORMALLY NONFRIABLE ACM | ANALYZED | |
| and basement | boiler room, lobby, etc.) | NORMALLY NONFRIABLE ACM | ANALYZED | YES NO |
| | boller room, lobby, etc.) Builing 90, Lab Area | Floor Tiles | 3 | YES NO |
| and basement | Builing 90, Lab Area Building 90, Lab Area | Floor Tiles Mastic | 3 6 | YES NO |
| Bsmt. | boller room, lobby, etc.) Builing 90, Lab Area | Floor Tiles Mastic (2) 11/2 | 3 | YES NO |
| Bsmt. | Builing 90, Lab Area Building 90, Lab Area | Floor Tiles Mastic Transite | 3 6 | YES NO |
| Bsmt. | Builing 90, Lab Area Building 90, Lab Area Building 90, Lab Area | Ploor Tiles Mastic Transite RECEIVED UCT 17 2000 | 3 6 | YES NO |
| Bamt. Bamt. Bamt. | boller room, lobby, etc.) Builing 90, Lab Area Building 90, Lab Area Building 90, Lab Area | Floor Tiles Mastic Transite RECEIVED UCT 17 2000 SANIMA TRUE | 3 6 | YES NO |
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| Bsmt. Bsmt. Bsmt. Bsmt. 14. ELAP:#_ 15. DATE(S) AND THAT | boller room, lobby, etc.) Builing 90, Lab Area Building 90, Lab Area Building 90, Lab Area LABORATORY THAT ANALYZED SAMPLES_ 10155 NYSDEPT OF HEALTH CERTIFICATION SAMPLES ANALYZED 9/21/00 | Ploor Tiles Mastic Transite UCT 17 2000 Signam of Tiles O'Brian and Gere theoratories Inc. 101343-0. US DEPT OF COMMERCE, N.I.S.T | 3 6 0 | YES NO |
| BSmt. BSmt. BSmt. BSmt. BSmt. 15. DATE(S) AND THAT 16. SIGN | Builing 90, Lab Area Building 90, Lab Area Building 90, Lab Area Building 90, Lab Area Building 90, Lab Area Building 90, Lab Area NVLAP# 10155 NYS DEPT. OF HEALTH CERTIFICATION NVLAP # NATURE OF NYC DEP CERTIFIED ASSESTOS INVESTIGATOR 107/03 NVC DEP ASSESTOS INVESTIGATOR CERTIFICATE NUMBER | Ploor Tiles Mastic Transite UCT 17 2000 O'Brian and Gere MONTAN O'Brian and Gere MONTAN OF THE RUE AND COMPLETE NYC DEP ASBESTOS | 3 6 0 | YES NO |
| BSmt. BSmt. BSmt. BSmt. 14. ELAP:#_ 15. DATE(S) AND THAT 16. SIGN | Builing 90, Lab Area Building 90, Lab Area Building 90, Lab Area Building 90, Lab Area Building 90, Lab Area LABORATORY THAT ANALYZED SAMPLES 10155 NYS DEPT. OF HEALTH CERTIFICATION NVLAP # | Mastic Transite RECEIVED UCT 1 7 2000 SANNIMA CO'Brian and Gere Modatories Inc 101343-0. US DEPT OF COMPLETE NYC DEP ASBESTOS STOS CONTAMINATED | 3 6 0 V OF NEW TOOR PETA | YES NO |

THE PIECEMEAL CARRYING OUT OF AN OPERATION TO AVOID COVERAGE BY A STANDARD THAT APPLIES ONLY TO OPERATIONS LARGER THAN A SPECIFIED SIZE IS A VIOLATION.

ACM = Asbestos Containing Material = Material Containing Greater than 1% Asbestos

ANY MODIFICATION OR VARIANCE FROM INFORMATION PROVIDED ON THIS FORM MUST BE REPORTED IMMEDIATELY IN WRITING DIRECTLY TO THE NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION ASBESTOS CONTROL PROGRAM / NYC DEPT. OF ENVIRONMENTAL PROTECTION, 59-17 JUNCTION BLVD. 8th FLOOR, ELMHURST, NEW YORK 11373-5107

AYLOR ENVIRONMENTAL GROUP, INC.

October 13, 2000

NYC Department of Environmental Protection Asbestos Control Program 59-17 Junction Boulevard Corona, NY 11368

Re: U.S. Army Corps Engineers, New York District, Project Contract No. D-002 (D.O. 0009)

St Albans VA Radiological Decontamination and Decommissioning of VAECC Bldg 90, Oueens, NY

Subject: Radiological concerns in conjunction with asbestos removal operations.

To Whom it May Concern:

As per your request the following is a summary of radiological and asbestos safety procedures being utilized at the above mentioned site:

- Strontium-90 is the only isotope of concern. (Ref: USACE work plan page 4-2)
- Asbestos containing materials shall be removed in accordance with NYC Title 15 (Ref: USACE work plan page B-2)
- Personal Protection Equipment (PPE) shall be worn by all workers. PPE includes
 double coveralls, cotton glove liners, rubber gloves, plastic booties, rubber
 overshoes, hood, tape all seams and full face air purifying respirators with
 HEPA/activated carbon combination filters. (Ref: USACE work plan page B-2)
- Asbestos waste shall be treated as radioactive waste, and in addition placed in Dot (17-H) type 55 gallon drums. Labeling will consists of identifying contents, physical properties and type of waste. Dot labeling/placarding will be identified and affixed to the containers for subsequent off site disposal. (Ref: USACE work plan page A-5)
- All project personnel shall have been trained in such subjects as general site
 features and hazards, alarm signals and evacuation. Respirator training is
 required for all individuals who wear respirators. Fundamentals of radiation
 protection is required for all workers. All personnel who enter the work area
 shall be trained in accordance with 29 CFR 1910.120. All personnel shall have
 current performance based radiation worker training in accordance with 10 CFR
 19 and state and license requirements.
- All asbestos workers will have current asbestos worker training certification in accordance with NYC Title 15 and site and license requirements. (Ref: USACE work plan page 4-4)

Personal skin decontamination (for radiation contamination) will take place in a
designated decontamination area prior to asbestos decontamination area. Water
shall only be used as a decontamination agent for asbestos; no radiological
contamination concerns will be present during asbestos decontamination process.
(Ref: USACE work plan page A-7)

• All contaminated liquid will be solidified and disposed of as radioactive solid waste. (Ref: USACE work plan page A-9)

Please feel free to contact site at 718-298-8613 with any further concerns regarding:

U.S. Army Corps Engineers, New York District, Project Contract No.

DACW33-97-D-002 (D.O. 0009)

St Albans VA Radiological Decontamination and Decommissioning of VAECC Bldg 90, Queens, NY

Marc A. Bianco

Stone & Webster Engineering USACE Site Safety Manager

George Taylor

Taylor Environmental

Project Manager

Submitted:

U.S. Army Corps Engineers, New York District, Project Contract No.

DACW33-97-D-002 (D.O. 0009) Work Plan

St Albans VA Radiological Decontamination and Decommissioning of

VAECC Bldg 90, Queens, NY

cc: Mark Kucera U.S. Army Corps Engineers, New York District, Project Manager John Devine: Stone & Webster Engineering, New York Office Project Manager Marc Bianco:Stone & Webster Engineering, Corporate Office, Boston MA, Site Safety Manager



YLOR ENVIRONMENTAL GROUP, INC.

October 11, 2000

NYC Department of Environmental Protection Asbestos Control Program 59-17 Junction Boulevard Corona, NY 11368

RE: St. Albans VA Care Facility

Variance Request: Removal of Wall Transite Panels using Modified Tent Procedures Location: 179th Street and Linden Boulevard, Queens, NY 11425

To Whom It May Concern:

Attached, please find an ACP-9 requesting a variance to perform asbestos removal procedures as noted above.

This variance is being requested due to the practical difficulties, and in Taylor Environmental Group, Inc.'s ("TEG") opinion, unnecessary hardship of carrying out certain provisions set forth in Title 15 Chapter 1.

Project Description: Removal of ACM transite panels from the basement laboratory.

The portions of the Department of Environmental Protection, Asbestos Control Program Rules and Regulations for which a variance petition is being applied for are as follows:

Section 1-81 (m): Partial plasticization of the work area

Section 1-82 (a): No attached workers decontamination enclosure system

Section 1-91 (c): Static Negative air pressure of less than 0.02 inch per water column.

Reason Procedures as described above cannot be used:

The established practices for transite panel removal using full compliance with previously mentioned subdivision would delay the performance of the project for which a strict time frame must be met.

Taylor Environmental Group, Inc. proposes the following alternative abatement procedures:

- 1. All proposed work areas and contiguous spaces will be regulated to allow only certified asbestos workers and authorized visitors to enter the work area.
- 2. A remote decontamination unit will be built outside the work areas, in accordance with Title 15 paragraph 1-82.
- 3. A remote decontamination unit will be constructed in the basement to accommodate removal as per NYC DEP Attachment D.

Variance Application Letter Page 1

- 4. Tents will be fully framed with 2"x3" wood or metal studs spaced not more 36" on center vertically around all sides. All tents will be lined with 2 layers of 6-mil plastic sheeting. An airlock having a least 3 feet length between the two curtained doorways will be constructed at the entrance to each and every tent.
- 5. Men will enter the tent double suited with all protective equipment. After completion of the removal, while they are exiting, the outer suit will be taken off in the air lock then they will HEPA vacuum themselves and proceed to the remote decontamination unit.
- 6. After ACM removal is completed and bagged, the bagged waste will be HEPA vacuumed then wet cleaned and transferred outside the air lock to its final transfer to waste container or to a holding area.
- 7. If at any time there is a breach and/or visible emissions are detected outside the tent TEG will properly control the source of the emission and identify it in the log. The dust resulting from the fugitive emissions will be HEPA vacuumed, then wet-cleaned until all evidence is removed. TEG will restore the integrity of the tent.

The work areas and the estimated quantity for each is as follows:

| Floor | Area | Quantity | Method |
|----------|------------|-----------------|---------------|
| Basement | Laboratory | 100 Square Feet | Attachment TM |

Enclosed for your review are Attachment TM and Attachment D, the previously filed Asbestos Inspection Report (ACP-7), The Asbestos Variance Application (ACP-9) and plans for all work areas denoting locations of material and decontamination enclosure.

With the exception of the previously mentioned, TEG wills strictly adhere to all requirements of Rules of New York City Title 15 Chapter 1, State and Federal regulations.

Thank you for your consideration of this variance request. If you have any questions or require furthers information, please do not hesitate to call me at 1-516-358-2955.

Sincerely

George Taylor

Laboratory Director

TAYLOR ENVIRONMENTAL GROUP, INC.

MYC DEP ASBESTOS CONTROL PROGRAM

| var# | | _ |
|------|--|---|
|------|--|---|

ATTACHMENT D REMOTE WORKER DECONTAMINATION UNIT

APPLIES TO VARIANCE FROM TITLE 15, CHAPTER 1; RULES OF THE CITY OF NEW YORK SECTIONS 1-82(a) AND 1-83(a)* {15 RCNY \$ 1-82(a) AND \$ 1-83(a)*}.

- The remote worker decontamination unit shall be constructed outside the work area, in accordance with 15 RCNY § 1-82, and attached to individual glovebag work areas (or tents) or common space leading to individual work areas.
- The remote worker decontamination unit shall consist of, at least, a shower room, and a clean room separated from each other by an airlock and from the glovebag work area.
- 3. In addition to the shower heads, the shower room shall be provided with a flexible hose for equipment and waste decontamination.
- 4. The remote holding area for the asbestos containing waste shall comply with Title 16, Chapter 8, Rules of the City of New York (16RCNY 8 ET SEQ.)
- 5. The decontamination unit shall be maintained in accordance with 15 RCNY § 1-94 (except subsection b).
 - All asbestos handlers shall wear two disposable suits, including gloves, hood and footwear, and appropriate respiratory equipment, after removing street clothes in the clean room.
- 7. After the ACM removal and bagging {refer 15 RCNY § 1-105(c)15}, the bagged waste shall be HEPA-vacuumed then wet cleaned and transferred outside the glovebag work area (or tent) for double bagging, storage and disposal.
- 8. Each worker, before leaving the glovebag work area (or tent), shall clean the outside of the respirators and outer protecting clothing by wet cleaning and/or HEPA vacuuming. The outer disposable suit shall be removed in the work area and the workers shall then proceed to the shower room. The inner disposable suit and respirator shall be washed thoroughly before removing and prior to aggressive shower.
- The decontamination system shall be in place for the entire duration of the abatement activities.
- 10. The following additional conditions must be complied with in order to re-use an attached decontamination enclosure system(s) as a remote decontamination unit.
 - Final air clearance must be achieved in the full containment area to which the decontamination enclosure system(s) is attached.
 - ii) The decontamination enclosure system(s) shall be re-plasticized in accordance with 15 RCNY § 1-82.
 - *Required for projects disturbing 1,000 or more linear feet.

NOTE: This attachment may be revised at any time by the Department.

TRU/JM 6/98

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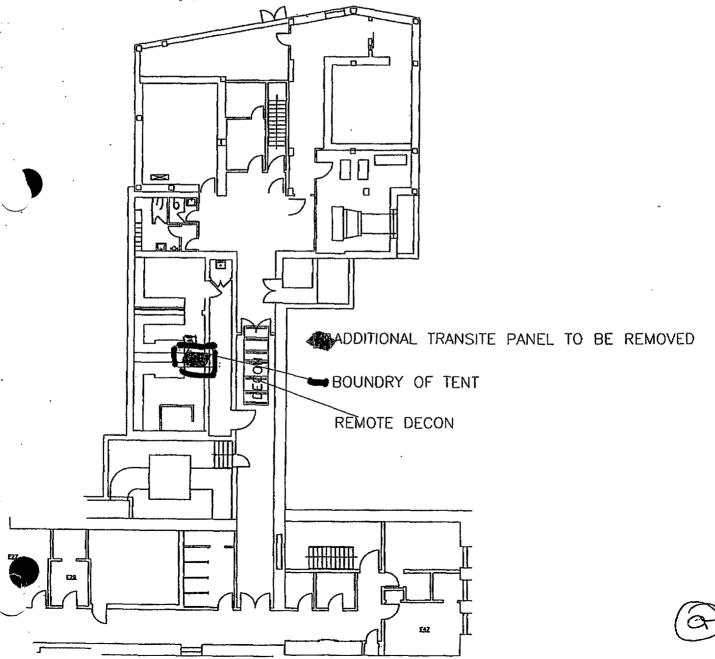
ATTACHMENT TM REQUIREMENTS FOR MODIFIED TENT PROCEDURES (FOR GROSS ABATEMENT) APPLIES TO VARIANCES FROM TITLE 15, CHAPTER 1, RULES OF THE CITY OF NEW YORK, SECTIONS 1-81(m) AND 1-91© {15 RCNY § 1-81(m) AND § 1-91(c)}

- 1. All tent enclosures and contiguous spaces within a radius of 10 feet shall be roped off and regulated to allow only certified workers and authorized visitors to enter.
- 2. 15 RCNY § 1-106 shall be complied with except that
 - I. all tents shall be lined with 2 layers of plastic sheeting (6-mil thickness at a minimum);
 - ii. the amounts of ACM that may be abated in each modified tent shall **NOT EXCEED**(a) 160 square feet, or (b) 260 linear feet, or © 160 combined feet (square plus linear).
 - the total amount of ACM that may be abated at any one time in several modified tents shall NOT EXCEED 1,000 combined square feet plus linear feet.
- 3. All modified tents shall be fully framed (including horizontally across the top, if applicable) with 2x3 (minimum) wood or metal stude spaced not more than 36 inch center-to-center vertically around all sides (except at the entry/exit which shall not exceed 36 inch width); and
- 4. A minimum of one air volume change per 15 minutes through each modified tent shall be maintained.
- 5. An <u>airlock</u> having at least 3 feet length between the two curtained doorways shall be constructed at the entrance to each and every tent if the decontamination unit is <u>not</u> attached to the tents, and
- 6. If a decontamination unit is <u>not</u> attached to each tent, <u>located within each airlock</u> there shall be extra clean and uncontaminated disposable protective suits (e.g. Tyveks), and one such clean suit shall be worn by each worker in the airlock, immediately after removal of the outer suit as per 15 RCNY § 1-106(k), before each worker exits any airlock.
- 7. Any decontamination unit that is <u>not</u> attached to a tent (i.e. that is <u>remote</u> from a tent) shall be constructed in compliance with the requirements of Attachment D.
- 8. Decontamination units that <u>are</u> attached to tents shall comprise <u>at least</u> a shower room and a clean room, with one curtained doorway separating them, and with a second curtained doorway separating the tent from the shower room.
- 9. After the ACM removal and bagging [refer 15 RCNY § 1-106(f) and (g)], the bagged waste shall be HEPA-vacuumed then wet cleaned and transferred into the airlock or into the shower room (as per Items 5 and 8 above respectively) for double bagging, and thereafter the double-bagged waste shall be transferred outside the airlock or outside the clean room for its final transfer to storage in a holding area and/or to legal means of disposal.
- 10. If the integrity of the tent is compromised and/or visible emissions are detected outside the tent and/or levels exceed 0.01 f/cc work shall stop and 15 RCNY § 1-45(a) shall be complied with immediately.
 - Variance Applications specifying these "Requirements for Modified Tent Procedures" as the alternative abatement methods shall not be approved for any work place for which full containment is deemed by the Department to be feasible.

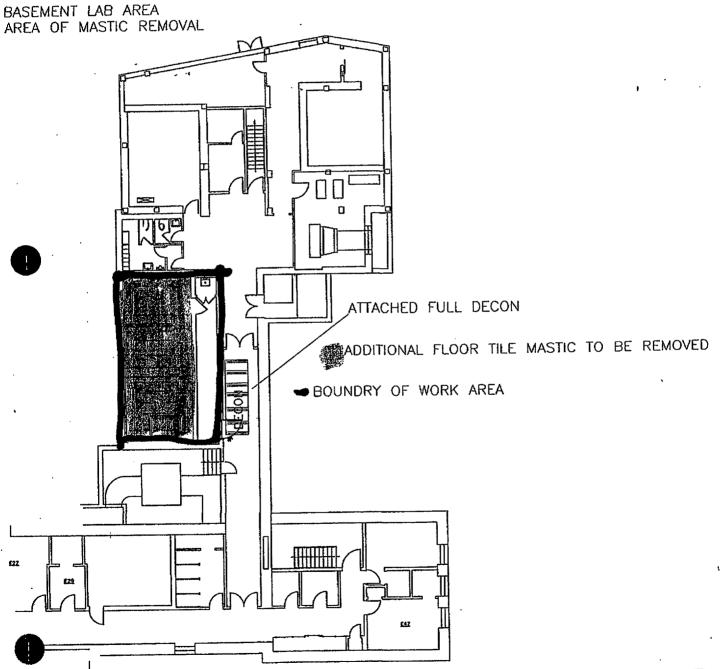
TRU/JM 6/98

ST. ALBANS V.A. CARE FACILITY 179 STREET AND LINDEN BOULEVARD, QUEENS NY

BASEMENT LAB AREA AREA OF TRANSITE PANEL REMOVAL



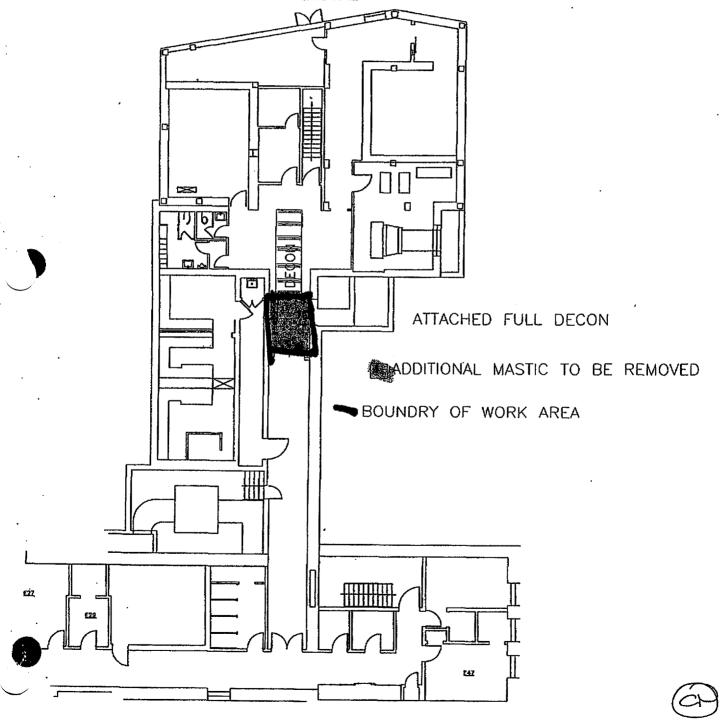
ST. ALBANS V.A. CARE FACILITY 179 STREET AND LINDEN BOULEVARD, QUEENS NY





ST. ALBANS V.A. CARE FACILITY 179 STREET AND LINDEN BOULEVARD, QUEENS NY

BASEMENT OUTSIDE LAB AREA ADDITIONAL AREA OF MASTIC REMOVAL



NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION

ASBESTOS CONTROL PROGRAM

PRICATIONS SHALL
LE ACCEPTED

59-17 JUNCTION BLVD., 8th FLOOR, CORONA, NEW YORK 11368

AMENDMENT FORM - FOR FORM ACP 7

| FOR OFFICIAL USE |
|--------------------|
| Fee (If Any) \$ |
| Amendment# |
| Info Only: Yes No |

| • | | | | | 4.550300 |
|--|----------------------|--------------------------|--------------------|-----------------|--------------------|
| CP7TRU/BN# 620QN00 DATE ACP | 7 WAS FILED_ | 9-13-00 | VARIANCE | # (IF ANY) | 1476QN00 |
| ACILITY ADDRESS 179th Street & Lind | len Blvd. | BORO_ | Queens | ZIP_ | 11425 |
| RIGINAL START DATE 9 / 25 / 00 | ORIGINAL | . COMPLETION DA | TE 10 /25 | /_00 | IN ACP 7, ITEM #24 |
| AS THIS ACP 7 AMENDED BEFORE (Y/N) N IF Y | YES GIVE DATE | (S) | | | |
| LEASE ENTER THE INFORMATION THAT IS BEING | <u>Changed,</u> in # | #13 - #30. SEE <u>C#</u> | <u>NUTION</u> BELO |)W | |
| ASBESTOS ABATEMENT CONTRACTOR | | 14. CONTACT P | ERSON | | • |
| 13. NAME | | _ FOR THIS PF | ROJECT | | |
| 15. FEDERAL EMPLOYER IDENTIFICATION # | | | | | |
| 16. TEL. # () | FAX # (|) | | | |
| 17. ADDRESS | | CITY | · | STATE | ZIP |
| . THIRD PARTY AIR MONITORING FIRM | | | | | |
| . 18. NAME | | 19. | TEL:#(| _) | 7117 |
| 20_ADDRESS | | CITY | | STATE | ZIP |
| VI. CORATORY FOR SAMPLE ANALYSIS | | | | | ĺ |
| 21. NAME | | 22. NYS DOH | ELAP# | | |
| VII. ASBESTOS PORTION OF PREMISES BEING ABA | TED/ALTERED | DEMOLISHED | | | • |
| 24. START DATE// SEE CA | UTION BELOW | COMPLETION D | ATE/ | | - |
| ASBESTOS WORK SCHEDULE X DAY (8am-5pm) | X EVENIN | G NIGH | r X WE | EKENDS | X WEEKDAYS |
| 25. EXTRA * ACM TO BE ABATED 725 Mastic | :& 100 Transi | SQUARE FEET, A | ND/OR | | LINEAR FEET |
| 30. ACTUAL FLOOR(S) WHERE EXTRA * ACM IS (FOR EACH FLOOR LIST ACM QUANTITY) | | | | | |
| OTHER CHANGES INCLUDING POSTPONEMENT OF | R CANCELLATION | ON (IF REQUIRED | ATTACH ADDIT | IONAL SHE | EETS) |
| 725 Square Feet of additional | | | | | |
| 100 Square Feet of transite to | | | | | |
| 31 / 32. NAME OF APPLICANT / OWNER | George T | aylor | TEL.# | 516-3 | 58-2955 |
| NAME OF COMPANY (IF ANY) Taylor En | vironmental | Group, Inc. | FAX# | <u>516–358-</u> | 1780 |
| ADDRESS 130A Jericho Turnpike | | CITY Flo | ral Park | STATE | NY ZIP 11001 |
| The state of the s | | | | | |
| | | 12 | | | 10-11-00 |
| | SIGNA | TURE OF APPLICA | NT / OWNER | ſ | DATE |

| 18. NAME | | 19. TEL.#(|) | |
|--|---------------------|----------------|----------------|--------------|
| 20. ADDRESS | CITY | | STATE | ZIP |
| . LABORATORY FOR SAMPLE ANALYSIS | | | | |
| 21 NAME | 22. N | YS DOH ELAP#_ | | |
| STOS PORTION OF PREMISES BEING ABATE | D/ALTERED/DEMOLISI | IED | | • |
| 24. START DATE SEE CAUTI | ION BELOW COMPLE | TION DATE | <u></u> | |
| ASBESTOS WORK SCHEDULE X DAY (8am-5pm) | EVENING (6pm-12am) | NIGHT X | WEEKENDS | X WEEKDAYS |
| 25. EXTRA * ACM TO BE ABATED 725 Mastic& | 100 Transibe UARE F | EET, AND/OR | • | LINEAR FEET |
| 30. ACTUAL FLOOR(S) WHERE EXTRA * ACM IS TO (FOR EACH FLOOR LIST ACM QUANTITY) | BE ABATED Baseme | ent - Lab A | reas | |
| THER CHANGES INCLUDING POSTPONEMENT OR CA | ANCELLATION (IF REQ | UIRED ATTACH A | DDITIONAL SHE | ETS) |
| 725 Square Feet of additional mag | stic to be rem | oved under | FV varianc | e. |
| 100 Square Feet of transite to be | e removed unde | r TM Varian | ce (pendir | ng approval) |
| 31 / 32. NAME OF APPLICANT / OWNERG | eorge Taylor | TEL.# | 516-35 | 8-2955 |
| NAME OF COMPANY (IF ANY) Taylor Environment | onmental Group,] | nc. FAX# | 516-358-1 | 780 |
| ADDRESS 130A Jericho Turnpike | | | | |
| ADDRESS 190A GETTERO TRITIPINE | CHY | FIOLAL PAIN | SIMIE | XI_ZIP_11001 |
| | | | 110 | 0–11–00 |
| | SIGNATURE OF A | | R DA | ATE |
| CAUTION | | | | |
| 1. ONLY THE BUILDING OWNER CAN AMEND | #13. #18 AND #21 | | | |
| 2. ORIGINAL APPLICANT OR BUILDING OWNE | ER IS RESPONSIBLE F | OR AMENDING AL | L OTHER ITEMS | 5. . |
| 3. A FIRST START DATE AMENDMENT MUST BI IN THE ACP 7 #24; A SECOND START DATE START DATE GIVEN IN THE FIRST AMENDI | AMENDMENT MUST B | | | |
| AMENDMENTS FOR ALL OTHER ITEMS MU AMENDED COMPLETION DATE. | ST BE FILED IMMEDIA | TELY AND PRIOR | TO THE ORIGIN | IAL OR |
| 5. NO MORE THAN <u>TWO</u> ACP 8 FORMS ARE P 24, 25 AND 30 IN FORM ACP 7. | ERMITTED TO BE FILE | D TO AMEND ANY | OR ALL OF # 13 | 3, 18, 21, |
| | | | | |

* ONLY THE EXTRA AMOUNT (NOT ACM ALREADY IN ITEM #25 & #30)

ACP FILE COPY

FORM ACP 8

2/94

| PREFERENCE | 914-332-7600 • 718-601-7756 • Fox: 914-332-5930 |
|------------|---|
|------------|---|

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL ENFORCEMENT

DIVISION OF ENVIRONMENTAL ENFORCEMENT 59-17 Junction Bivd., 8th Floor, Corona, NY 11368-5107

| FOR OFFICE USE ONLY | |
|---------------------|-----------|
| Variance # | \langle |
| Fee Paid | |
| Notification # | |

ASBESTOS VARIANCE APPLICATION

| ONLY TYDEW | RITTEN APPLICATIONS SI | HALL BE ACCEPTED |) | |
|---|---|---|---|--|
| PREMISE 179th Street & Linden | | | Oneens | ZIP11425 |
| Type of Premise Health Care | Facility | Block | #_12406 | Lot #100 |
| APPLICANT | | | | • |
| A. (CHECK ALL THAT APPLY) [] Contracto | r 🔯 Consultant | □ Owner | ☐ Other | |
| | | | | |
| B. Name Taylor Environmental Gr | | | | |
| Address 130A Jericho Turnpike | cr | ry Floral Park | STATE | NY ZIP 11001 |
| . REGULATIONS SECTION(S) FOR WHI | CH VARIANCE IS REI | DUESTED | | |
| | | | | |
| Identify applicable Sub-Section(s) of the re | levant NYC DEP or NYS | DOL (ICR56) Asb | estos Contro | ol Regulations |
| 4 04 (34) 4 00 (3) 4 04 (| c) | | | |
| 1-81 (M), 1-82 (A), 1-91 (| | | | |
| | | | | |
| 1-81 (M), 1-82 (A), 1-91 (| | · · · · · · · · · · · · · · · · · · · | | |
| | | <u> </u> | | |
| . SEVEN DAY WAIVER FEE | | | | |
| . SEVEN DAY WAIVER FEE A. Square Feet + B. | Linear Fe | | Tot | al Feet (Add A + E |
| . SEVEN DAY WAIVER FEE ASquare Feet + B (From Line 25 of A | Linear Fe | | Tot | al Feet (Add A + E |
| . SEVEN DAY WAIVER FEE ASquare Feet + B (From Line 25 of A) D. Circle Applicable Fees Below | Linear Fe | eet = C | | |
| ASquare Feet + B(From Line 25 of AD. Circle Applicable Fees Below If IV. C. Less than 5000 Total Feet - p. | Linear Fe CP7 form) ay \$300; If IV. C. 5000 | eet = C) Total Feet or m | iore - pay \$ | 400 |
| . SEVEN DAY WAIVER FEE ASquare Feet + B(From Line 25 of A D. Circle Applicable Fees Below If IV. C. Less than 5000 Total Feet - p. | Linear Fe CP7 form) ay \$300; If IV. C. 5000 | eet = C) Total Feet or m | iore - pay \$ | 400 |
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Combined Applicable Fees From Item IV D + Item VI

Total Fees \$_____

^{*}NOTE: Maximum fee applicable to each category. If Seven Day Waiver is used for a project of 5000 Feet or more and additional variances are also requested but on floors with a Combined Total of less than 5000 Feet, the maximum application fee is \$1800, but actual payment would be \$1300.

| REASONS FOR REQUEST AND DESCRIPTION FOR See Attached Sheets A. Dept of Veterans Affairs Print Marke of Owner Signature of Owner Date TE: 1 Submit this application together with the Asbestos inspection of the Department of Market Check Payable to NYC DEPARTMENT OF ENVIRO Application for variances must be made to the Department Work SHALL NOT commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not commence prior to approval of this application for variances must be made to the Department of Market Not c | B. Georgian Print Name Signature of Applicate Signature (ACP7) and approprint (ACP7) and approprint at least two weeks prior to | rge Taylor of Applicant Date opriate fee(s). |
|--|---|---|
| A. Dept of Veterans Affairs Print Marie of Owner | B. Geor | rge Taylor of Applicant |
| A. Dept of Veterans Affairs Print Marie of Owner | B. Geor | rge Taylor of Applicant |
| See Attached Sheets A. Dept. of Veterans Affairs | B. Geo | rge Taylor |
| See Attached Sheets A. Dept. of Veterans Affairs | B. Geo | rge Taylor |
| See Attached Sheets | | |
| | PROPOSED ACTION (At | tach 8½ x \$1 Sheets). |
| | PROPOSED ACTION (At | tach 8½ x \$1 Sheets). |
| | PROPOSED ACTION (At | tach 8½ x \$1 Sheets). |
| REASONS FOR REQUEST AND DESCRIPTION FOR | PROPOSED ACTION (At | tach 81/2 x 1/1 Sheets). |
| more and additional variances are also request 5000 Feet, the maximum application fee is \$1 | 300, but actual payment | |
| *NOTE: Maximum fee applicable to each category. If Se | | |
| Combined Applicable Fees From Item IV D + Item VI | To | otal Fees \$ |
| FEE PAYMENT | • | • |
| MAXIMUM FEES * | \$1200 | \$1800 |
| Each Additional Sub-Section | \$200 | \$300 |
| First Sub-Section (Other than 7-Day Waiver) | \$400 | \$600 |
| | Less than 5000 feet | |
| | If Total Feet i | n Item V. B. is |
| FEE SCHEDULE FOR ITEM V (OTHER THAN SEVEN D | AY WAIVER) | |
| Total Combined Amount of A | СМ | Feet |
| B. Combine Amounts (Square Feet + Linear Feet) for Amount for all affected floors: | | Then Sum the Combined |
| A. Affected Floors Basement | | The control of the Complete of |
| MOUNT OF ACM INVOLVED IN VARIANCE REQUES | T (OTHER THAN SEVEN | I DAY WAIVER) |
| | 0000 101011 001 01 111011 | s - µay \$400 |
| in iv. C. Less man bood total reet - pay \$300; if iv. C. | SURE LOTAL PART OF MORE | |
| D. Circle Applicable Fees Below If IV. C. Less than 5000 Total Feet - pay \$300; If IV. C. | 5000 Total Feet or more | |

AYLOR ENVIRONMENTAL GROUP, INC.

October 13, 2000

NYC Department of Environmental Protection Asbestos Control Program 59-17 Junction Boulevard Corona, NY 11368

Re: U.S. Army Corps Engineers, New York District, Project Contract No. DACW33-97-D-002 (D.O. 0009)
St Albans VA Radiological Decontamination and Decommissioning of VAECC
Bldg 90, Queens, NY

Subject: Radiological concerns in conjunction with asbestos removal operations.

To Whom it May Concern:

As per your request the following is a summary of radiological and asbestos safety procedures being utilized at the above mentioned site:

- Strontium-90 is the only isotope of concern. (Ref: USACE work plan page 4-2)
- Asbestos containing materials shall be removed in accordance with NYC Title 15 (Ref. USACE work plan page B-2)
- Personal Protection Equipment (PPE) shall be worn by all workers. PPE includes
 double coveralls, conton glove liners, rubber gloves, plastic booties, rubber
 overshoes, hood, tape all seams and full face air purifying respirators with
 HEPA/activated carbon combination filters. (Ref. USACE work plan page B-2)
- Asbestos waste shall be treated as radioactive waste, and in addition placed in Dot (17-H) type 55 gallon drums. Labeling will consists of identifying contents, physical properties and type of waste. Dot labeling/placarding will be identified and affixed to the containers for subsequent off site disposal. (Ref: USACE work plan page A-5)
- All project personnel shall have been trained in such subjects as general site features and hazards, alarm signals and evacuation. Respirator training is required for all individuals who wear respirators. Fundamentals of radiation protection is required for all workers. All personnel who enter the work area shall be trained in accordance with 29 CFR 1910.120. All personnel shall have current performance based radiation worker training in accordance with 10 CFR 19 and state and license requirements.
- All asbestos workers will have current asbestos worker training certification in accordance with NYC Title 15 and site and license requirements. (Ref: USACE work plan page 4-4)

TAYLOR ENVIRONMENTAL

OC1-17-2000 11:37

Personal skin decontamination (for radiation contamination) will take place in a designated decontamination area prior to asbestos decontamination area. Water shall only be used as a decommination agent for asbestos; no radiological contamination concerns will be present during asbestos decontamination process. (Ref. USACE work plan page A-7)

All contaminated liquid will be solidified and disposed of as radioactive solid

waste. (Ref: USACE work plan page A-9)

Please feel free to contact site at 718-298-8613 with any further concerns regarding:

U.S. Army Corps Engineers, New York District, Project Contract No.

DACW33-97-D-002 (D.O. 0009)

St Albans VA Radiological Decontamination and Decommissioning of VAECC Bidg 90, Queens, NY

Marc A. Bianco

Stone & Webster Engineering USACE Site Safety Manager

George Taylor

Taylor Environmental

Profeer Manager

Submitted:

U.S. Army Corps Engineers, New York District, Project Contract No.

DACW33-97-D-002 (D.O. 0009) Work Plan

St Albans VA Radiological Decontamination and Decommissioning of

VAECC Bidg 90, Queens, NY

Mark Kucera U.S. Army Corps Engineers, New York District, Project Manager cc: John Devine: Stone & Webster Engineering, New York Office Project Manager Marc Bianco: Stone & Webster Engineering, Corporate Office, Boston MA, Site Safety Manager



| | ONS WILL | | | AL PROTECTION | e Page to | 1_1 | |
|--|--|--|---|--|--|------------------------|--|
| BE ACC | CBT43 | NOT AN A | SBESTOS PRO | | SOA DEFICE PUR | | |
| NOTE: THIS PRESI PRESI PART | Form is to ent or if ti or less, of (1.141) is pr | BE COMPLETED IF THERE IS NO HE TOTAL AMOUNT OF FRABLE ASE 1 25 UNEAR PEET OR LESS, OR IF N ESENT IN ANY AMOUNT | Friable Assestos Jestos Containing P Jornally Nonfriabl | Containing Material Vaterial is 10 souare Le acm (As per 40 cpr | ACP5 Fee: 9 | Acodestaci (fe | |
| 2. FACILITY | ADDRESS, | 179th St. & Linden A | oulevard | BORO VUCENA | _ CODE _114 | 25 | |
| AKAS | it. Alba | ns V.A. Care Facility | 3.1 | BLOCK # 12406 | 4. LOT# | 100 | |
| 5. BUILDING OWNER Dopartment of Vetorane Afrairs TEL M(718) 526-1000 88550 | | | | | | | |
| 6 ADDRESS 179th St. & Linden Hoblevard STATE 57 COOF 11425 | | | | | | | |
| 7. CONTACT PERSON Exists (fonteleane 8. TEL #[719] 526-1(100 x8550 | | | | | | | |
| 9.D E 6CRIPT | TION OF EN | TIRE SCOPE OF WORK HEID | real of Floor | Tiles, Mastic | and Transi | te | |
| | | | | | | | |
| 10. ESTIMATED START DATE 10/19/09 ESTIMATED COMPLETION DATE 11/1/00 OF THE ENTIRE SCOPE OF WORK. | | | | | | | |
| 11. I STENDE PHETATER. HAVE CONDUCTED AN ASSESTOS INVESTIGATION ON 9/19/00 IN ACCORDANCE WITH THE | | | | | | | |
| PROCEDURES REQUIRED BY THE NYCIDER ASSESTOS CONTROL PROGRAM REQULATIONS AND DECLARE THAT AT SAID | | | | | | | |
| FACILITY ADDRESS, THE a. premises to be demolished are free of any aspessos contaming material (ACM) | | | | | | | |
| Lib. premises to be damplished contain 10 square feet or tess or 25 linear feet or less of triable ACM or of normally nonlinable ACM that dampliton forces may make frighte; all ACM shall be removed according to the NYS DOL ICR 58 or the NYC DEP Asbestos Regulations | | | | | | | |
| U.c. cumulative surfaces of relevant structure(a) affected by an attendion or plumbing repair are free of any frieble ACM and free of normally nontribite ACM that alteration of plumbing repair torces may make friable | | | | | | | |
| Did. cumulative surfaces of relevant structure(s) affected by an alteration or plumbing repair contain 10 square feet or less or 25 linear their or less of finable ACM or of normally nontriable ACM that affection or plumbing repair forces may make Mable: removal as in o | | | | | | | |
| The addressiv population ACM easiling distributions and in accordance with the NYC COLUMB SO of the NYC COLUMB Acharons | | | | | | | |
| Regulations: Sq. Ft. Operation of the disturbed during elteration/olymbing repair/might/callon/renovation | | | | | | | |
| Frishle ACM Sq Ft Lin Ft Nonlriable ACM Sq Ft COMPLETE AND THOROUGH ASSESTOS INVESTIGATION PERFORMED OF | | | | | | | |
| STORY | | | | | | | |
| | 1 25 | Creids service of a not | | Cincernia MATERIA | | 10750VA4 | |
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