

REMOVAL REPORT
FOR
WEBSTER-GULF NUCLEAR INDUSTRIES, INC.
202 WEST MEDICAL CENTER BOULEVARD
WEBSTER, HARRIS COUNTY, TEXAS

Prepared for

U.S. Environmental Protection Agency Region 6
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EXECUTIVE SUMMARY

From October 2001 to February 2004, the Superfund Technical Assessment and Response Team (START-2) was tasked by On-scene Coordinator (OSC) Greg Fife of the Region 6 U.S. Environmental Protection Agency Response and Prevention Branch (EPA-RPB) to respond to the Webster-Gulf Nuclear Industries, Inc (GNI) site, located at 202 West Medical Center Boulevard, Webster, Harris County, Texas in October 2001. Historically, the facility prepared radiation sources for the medical and oil field industries. In 1983, an inadvertent breach of a 3-curie americium-beryllium source prompted an extensive investigation and facility survey by the Texas Department of Health Bureau of Radiation Control (TDH-BRC). The facility ceased production in 1991 and is currently in bankruptcy proceedings.

From October 2001 to February 2004, the EPA, START-2, the U.S. Army Corps of Engineers (USACE), and the USACE Rapid Response contractor completed the cataloging and surveying of the facility radioactive sources, the demolition and transportation of three contaminated buildings located on-site, and the final removal assessment and soil removal. The survey identified and cataloged 272 radioactive sources and an additional 181 containers of radioactive materials, including drums, bags, manufacturing equipment, office items and debris identified during the initial cataloging phase. The USACE Rapid Response contractor, Shaw Environmental Inc. (SHAW), reported transporting radioactive debris and source materials, including greater than “Class C” waste (GTCC) of americium 241 and cesium 137, to eight disposal or storage facilities via 181 shipments.

Under the direction of the original Technical Direction Document (TDD) 06-01-10-0010 and subsequent amendments, EPA-RPB tasked START-2 to provide removal oversight during the operational period of the project. Details of START-2 activities follows this page, and all appendices are provided as separate portable document format (PDF) files.

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The EPA Task Monitor did not provide final approval of this report prior to the completion date of the work assignment. Therefore, Weston Solutions, Inc. has submitted this report absent the Task Monitor's approval.

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1. INTRODUCTION

The Superfund Technical Assessment and Response Team (START-2) was tasked by the U.S. Environmental Protection Agency (EPA) Region 6 Response and Prevention Branch (RPB), under Contract Number 68-W-01-005 and Technical Direction Document (TDD) No. 06-01-10-0010 and Amendments A through L (see Appendix R) to perform oversight, sampling, and site managerial tasks during the removal activities at the Webster-Gulf Nuclear Inc. (GNI) site. The Webster GNI site is located in Webster, Harris County, Texas, at 202 West Medical Center Boulevard. The facility is located in the middle of a medical complex neighboring a residential area. On 18 October 2001, START-2 initiated oversight activity at the Webster GNI site and completed final removal oversight activities on 2 February 2004. START-2 has prepared this Final Removal Report to describe the technical scope of work that was completed. All appendices are provided as a separate portable document format (PDF) file.

The geographic center of the site is Latitude 29.54250° North and Longitude 95.12458° West, as determined using a hand-held global positioning system (GPS) receiver operated in autonomous mode. The reading was based on the North American Datum-83 (NAD-83) with an estimated circular error of +/- 15 meters.

2. PURPOSE AND SCOPE

The purpose of the removal action was to identify and catalog the radioactive sources and items inside three buildings located at the facility, to determine the extent of the contamination, and to properly transport and dispose of the debris and contaminated soils generated and excavated on-site.

The scope of work defined in the TDD includes documentation, sampling, and technical assistance. START-2 was specifically tasked to conduct secondary air monitoring, to maintain a site logbook, to monitor containment and cleanup actions, to procure laboratory services as needed, to digitize photographic documentation, and to review site records and technical documents. Additionally, START-2 was tasked to coordinate with the EPA Office of Indoor Air and Radiation (EPA-ORIA) on Health and Safety and sampling strategies, with the Federal On-scene Coordinator (FOSC) Greg Fife, and with the U.S. Army Corps of Engineers (USACE) on-site representative.

3. SITE BACKGROUND

The following is a brief description of the site location, background information, and site description.

The Webster GNI site is located in Webster, Harris County, Texas, at 202 West Medical Center Boulevard. The facility is located in the middle of a medical complex neighboring a residential area. An area map, aerial photograph, and site plan are included in Appendices A, B, and C respectively.

The Webster GNI facility was owned and operated by Gulf Nuclear Industries and prepared radiation sources and tracers for the medical and oil field industries. Isotopes processed at the facility included, but were not limited to, americium 241, cesium 137, cobalt 60, iridium, iodine, and neutron sources. In 1983, an inadvertent breach of a 3-curie americium-beryllium source prompted an extensive investigation and facility survey by the Texas Department of Health—Bureau of Radiation Control (TDH-BRC).

The Webster GNI facility ceased production in 1991 and is currently in bankruptcy proceedings. The EPA has completed a categorization and site survey of radiation sources and contamination, site demolition activities, and final removal cleanup activities of site contamination of alpha, beta, gamma, and neutron sources of radiation.

4. ACTIONS TAKEN

Removal activities at the Webster GNI site commenced on 18 October 2001 and terminated upon project completion 2 February 2004. EPA-RPB Region 6; START-2; EPA-ORIA; USACE; Rapid Response contractor Shaw Environmental Inc. (SHAW); TDH-BRC; various SHAW subcontractors, including U.S. Ecology; and the final soil removal contractor, Earth Tech were involved during various project activities.

Table 4-1

Table of Primary Actions

Primary Action	Start Date	Ending Date	Site Personnel
Initial Emergency Response	10/18/2001	10/21/2001	4
Document Scanning	1/2/2002	1/21/2002	6
Site Survey and Catalog	2/7/2002	5/16/2002	21
Transportation and Demolition	5/16/2002	5/10/2003	38
State Document Scan and Transfer	6/25/2002	6/27/2002	4
Soil Assessment	6/2/2003	6/13/2003	7
Final Soil Removal	10/8/2003	2/2/2004	14

4.1 INITIAL ACTIONS

On 18 October 2001, OSC Greg Fife of the Region 6 EPA-RPB tasked START-2 to respond to the Webster GNI site and to provide oversight for installation of a perimeter fence around three buildings at the facility and the parking lot area. Concern for the facility and the surrounding public was prompted by heightened security awareness resulting from the events of 11 September 2001 and by the ease of access to the facility by the general public. On 2 January 2002, EPA-RPB Region 6 further tasked START-2 under TDD No. 06-01-12-0030 to investigate, identify, and initiate scanning operations of documents still contained inside the three buildings designated for removal. The scanning operations were conducted in Level C personal protective equipment (PPE) with full-faced respirators due to an increased risk of air-borne radioactive contamination inside the facility. START-2 scanned documents into PDF

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files using two electronic scanners, placed inside the contaminated facility and connected to computers contained in a clean area via universal serial bus (USB) cables. START-2 downloaded the scanned data daily to compact disc (CD) to save a non-contaminated record of the scanned data. Additionally, START-2 salvaged the two scanners and returned them to EPA as a reusable asset. Under the guidance of FOSC Greg Fife, START-2 identified, scanned, and cataloged 257 documents totaling 5,158 pieces of paper that met the guidelines of the TDD. START-2 completed operations on 21 January 2002 and delivered the final CDs to the EPA Cost Recovery Office. Refer to Appendix D and E for a copy of the Scanned Documents Report.

4.2 CATALOG AND SURVEY OF THE SITE

From 7 January 2002 through 16 May 2002, EPA-RPG Region 6 initiated activities to catalog and survey the Webster GNI site. Through an interagency agreement, USACE, with the Rapid Response contractor SHAW Environmental Inc. (SHAW), acted as prime contractor for all activities on-site. U.S. Ecology, a subcontractor to SHAW, performed the cataloging and surveying and found the original report from the U.S. Bankruptcy Court (Appendix F) to be inaccurate in stating the presence of 12 radioactive sources on-site. They documented 272 identified and cataloged radioactive sources and another 181 radioactive items, drums, bags of debris found in the initial cataloging phase (Appendix G). Subsection 4.3.2 provides more detailed descriptions of the cataloged items.

The survey showed high levels of alpha, beta, gamma, and neutron radiation/contamination found in and around the facility. Additional findings of the survey showed that the site had 47 rooms, offices, and laboratories segregated within the buildings and 25 down holes, not 4 as reported in the bankruptcy documents. The 25 down holes had depths of 4 to 8 feet below ground surface. In addition to the unknown down holes, there were two hidden rooms and false walls that were discovered to contain extremely contaminated materials. Isotopic identification by U.S. Ecology showed that radioactive cesium, americium, radium, and cobalt were the primary isotopes found at the site, but europium, gadolinium, silver, plutonium, strontium, and many other isotopes were found in quantity.

The site survey showed that the bankruptcy report was also inaccurate as to the extent of the alpha/beta contamination levels within the facility. The original report stated that contamination levels ranged from 3,000 counts per minute (cpm) to 400,000 cpm for alpha radiation. Original dose rates were shown to range from 250 microRoentgen per hour ($\mu\text{R/hr}$) to 5,000 $\mu\text{R/hr}$ with natural background in City of Webster, Texas, being 15 $\mu\text{R/hr}$. Actual contamination and dose levels during the survey were measured at 300,000 cpm on air induction ports up to 200,000,000 disintegrations per minute (dpm) on the floors of the facility for alpha contamination. Dose rates were found to be dangerously high in several areas and measured up to 1,000 roentgen equivalent man per hour (Rem/hr) under a cesium oven that held hidden cesium 137 sources (see Figure 4-1). To add to the dose hazards, three neutron radiation fields were found within the facility. The neutron fields ranged from 5 Rem/hr to 25 Rem/hr dose level and were attributed to the production of americium/beryllium sources by Webster GNI.

A copy of the Source Log prepared by U.S. Ecology and provided to USACE is presented in Appendix G.

EPA-RPB Region 6 tasked START-2 under TDD 06-01-10-0010 to monitor the dose rates at the perimeter and to collect perimeter and duplicate air samples for public safety with primary environmental monitoring responsibilities remaining with USACE. The START-2 results of perimeter surveys and random air sample analysis are provided in Appendices H and I.

4.3 SOURCES

Over 400 identified radioactive items were found and cataloged as sealed sources and unsealed (open) sources and items during project activities at the site. The following paragraphs describe the sources cataloged at the site.

4.3.1 Sealed Sources

There were 272 sealed sources identified, quantified, photographed, and packaged for disposal at the Webster GNI site. The sources were found in pigs, in the debris of the glove-boxes, in

storage cabinets, in coffee cups, on the floor, buried in sand inside the facility, in the americium-beryllium powder, and in the facility walls.

The sources were produced for various industries including oil exploration, medical, petrochemical, and research and development and varied in type, size, and dose.

All of the sources were categorized as either needle (Figure 4-2), encapsulated source (Figures 4-3 and 4-6), check-source or disc (Figure 4-4), or as a liquid or baked tracer (Figure 4-5). Source sizes ranged from a few millimeters in length and diameter up to 2 inches in length and 0.25 inch in diameter. Finally, the dose rates from the sources, as reported by U.S. Ecology (Appendix G) measured from the $\mu\text{R/hr}$ up to 1000 Rem/hr depending on the source.

Figure 4-1

Four Sources Under Cesium Oven

(Ranging from 400 Rem to ~1,000 Rem)



Figure 4-2

Package of Radium Needles



Figure 4-3

Encapsulated Source

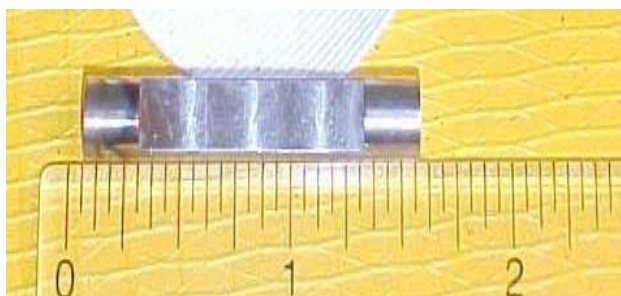


Figure 4-4

Check Source Discs



Figure 4-5

Iridium 192



Figure 4-6

Encapsulated Sources



4.3.2 Unsealed (Open) Sources and Items

During the initial cataloging and survey period many items were identified as being radioactive or radioactively contaminated. Many of these items were original to the site and ranged from incomplete produced sources to contaminated equipment and debris. However, once the surveying work began, so too did the generation of contaminated PPE and other debris generated largely from entering the severely contaminated rooms, crawl spaces, and production rooms. As reported in the U.S. Ecology Source Logs (Appendix G), Table 4-2, provided below, summaries the radioactively contaminated items cataloged during this operational phase of the project.

Table 4-2**Unsealed Sources and Items**

Quantity	Description
55	Bags of trash
30	Bags debris (wood, door knobs)
24	Bags ppe
20	Bags machine parts
11	Production ovens
9	30-gallon drums miscellaneous office items
8	1-gallon paint cans miscellaneous equipment production pieces
7	55-gallon drums of miscellaneous production equipment and pieces
6	Production tools
4	Pieces piping
3	Source pigs
2	Disposal tanks
2	Filing cabinets

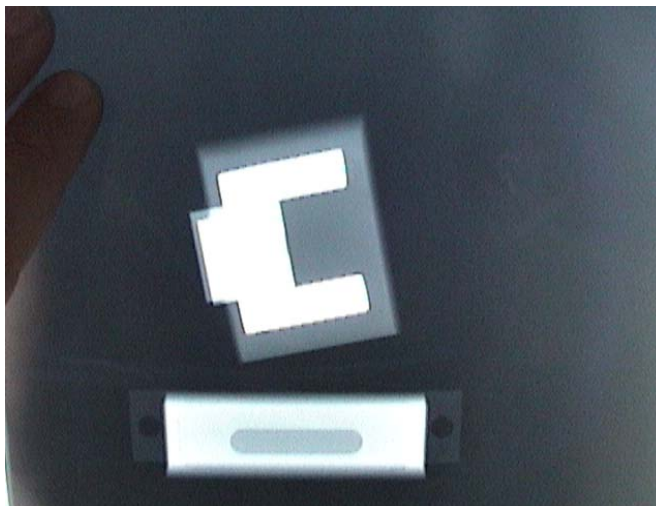
4.3.3 Source Recovery

EPA in cooperation with the Nuclear Regulatory Commission (NRC) and Los Alamos National Laboratory (LANL) utilized the Off-site Source Recovery (OSR) Project to dispose of americium 241 (Am241) and plutonium 238 (Pu238) sealed sources. The OSR was a cost effective and safe way to identify and recover those sources for which no disposal option exists now. Through this partnership, EPA reduced the risk to public health, safety, and the environment by removing the radioactive sources to prevent diversion for improper use.

Each source recovered by OSR for EPA underwent individual extensive X-ray radiography individually at the site to ensure that source integrity was established before transportation and disposal occurred by LANL. Figure 4-7 illustrates an example of the X-ray radiography.

Figure 4-7

Radiography Negative of a Source



4.4 DEMOLITION AND TRANSPORTATION

From 16 May 2002 through 10 May 2003, SHAW demolished, packaged, and began shipping waste and debris from the facility (Appendix J). During this phase, SHAW shipped 1,592,711 pounds of radioactive debris to Envirocare contaminated with 24,126.172 milli-Curies and 13 identified isotopes (Table 4-5).

4.4.1 Greater than “Class C”

Greater-Than-Class-C radioactive waste (GTCC) is waste generated by licensees of the U.S. Nuclear Regulatory Commission (NRC). The waste has concentrations of certain radionuclides above the Class C limits as stated in 10 *Code of Federal Register* (CFR) 61.55. GTCC waste is considered a form of low-level radioactive waste (LLW). There are four classes of LLW in ascending order of hazard: Class A, B, C, and GTCC.

In terms of hazard, Class A LLW is intended to be safe after 100 years, Class B after 300 years, and Class C after 500 years. These LLWs are typically disposed of in shallow land burial sites; however, because of its high hazard, GTCC waste is not typically disposed of in shallow land burial sites or commingled with Class A, B, and C LLW.

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Most forms of GTCC waste are generated by routine operations at nuclear power plant fuel research facilities and by manufacturers of radiopharmaceuticals and sealed sources. Future GTCC waste is expected to be generated by the decommissioning of nuclear power reactors. Examples of GTCC waste include activated metal hardware (e.g., nuclear power reactor control rods), spent fuel disassembly hardware, ion exchange resins, filters, evaporator residues, sealed sources that are used in medical and industrial applications, moisture and density gauges, and contaminated trash. The types of radionuclides that are considered high enough in concentrations to be classified as GTCC waste include Transuranic for the isotope Am241 and secondary waste stream for cesium 137.

The final disposal options for GTCC further compounds the problem of dealing with the waste stream. Currently, there is not a long-term commercial storage facility available in the United States that can accept the 22,215.3 pounds of GTCC identified at the Webster GNI site. Yucca Mountain, Nevada, is expected to be the eventual final disposal facility that will handle GTCC waste when it opens in 2010. Until then, EPA has placed the GTCC waste in the Waste Control Specialists (WCS) facility, a temporary long-term storage facility in Andrews, Texas.

Total shipments of GTCC wastes are found in Table 4-3.

4.4.2 Shipment Summary

Table 4-3 summarizes all waste shipments during the demolition and transportation phase of the site including GTCC. A summary of all transported soils and concrete is found in Appendix K.

Table 4-3
Summation of Waste Shipment

Disposal Site	Waste Stream	Shipments	Quantity Shipped	Curies Shipped
Barnwell	Class C/ Cesium Sources	16		401.173 Ci Cs137
Brazoria County	Construction Debris	29	645 cubic yards	
Envirocare Utah	Construction Debris	81	1636 cubic yards	24,126.17 mCi See Table 4-3
Envirocare Utah	Soil	3	43 cubic yards	
Envirocare Utah	Oversized lead	4	1007 cubic feet	
Envirocare Utah	Oversized Debris	9	20 cubic yards	
Envirocare Utah	Oversized Glove Boxes	1	NA	
LANL/ Los Alamos N.M.	Am241	1	3 Drums	38.35 Ci Am241 0.15 Ci Plutonium
NSSI/ Houston	Am241/Pu238	2	2 Drums	
SET Environmental	Chemical Hazardous Waste	20	1384 pounds	
U.S. Ecology / Hanford	Radium Needles	1	5 Drums	146.67 Ci Radium
WCS	GTCC	14	22,215.3 pounds	93.345 Ci Am241 & 401.173 Ci Cs137
Total Shipments		181		

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Table 4-4
Shipment Curie Tracking

Tracking #	mCi Am	mCi Cs	Weight (lbs.)	Destination	Date
WCS-1		14,008.000	10	Barnwell	11/14/2002
GN001		6,502.000	2,215	Barnwell	11/8/2002
GN002		5,000.000	2,128	Barnwell	11/15/2002
GN003	1,780.000	7.000	2,247	WCS	11/6/2002
GN004	904.000	9.047	2,456	WCS	11/12/2002
GN005		1,500.000	1,354	Barnwell	12/6/2002
GN006		24,500.000	1,268	Barnwell	12/13/2002
GN007		3,975.000	1,270	Barnwell	
GN008		4,650.000	1,320	Barnwell	
GN009	5,190.000	76.250	2,353	WCS	12/5/2002
GN010		59,000.000	9,310	Barnwell	12/7/2002
GN011		7,325.000	958	Barnwell	1/29/2003
GN012		22,833.000	1,410	Barnwell	*
GN013		3,940.000	1,170	Barnwell	*
GN014		9,850.000	528	Barnwell	1/9/2003
GN015		28,317.000	12,000	Barnwell	12/19/2002
GN016	3,558.380	0.030	2,085	WCS	12/10/2002
GN017	9,712.703	17.600	2,598	WCS	12/14/2002
GN018		3,648.000	1,040	Barnwell	*
GN019		7,300.000	1,250	Barnwell	*
GN020		4,215.000	1,200	Barnwell	*
GN024	20,800.000	0.000	132	WCS	1/23/2003
GN025	2,777.297	15.300	115	WCS	1/17/2003
GN026		20,500.000	1,250	Barnwell	2/7/2003
GN027	365.900	4.982	2,730	WCS	2/12/2003
GN028	1,628.400	8,976.900	958	WCS	2/27/2003
GN029	300.100	3,594.000	1,218	WCS	3/4/2003
GN030		6,640.000	1,390	Barnwell	*
GN032	3,628.000	10,902.000	2,709	WCS	4/3/2003
GN033	25,020.000	68,270.000		WCS	4/28/2003
GN034	1,628.000	19,593.000	4,600	WCS	4/9/2003

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Table 4-4 (Continued)
Shipment Curie Tracking

Tracking #	mCi Am	mCi Cs	Weight (lbs.)	Destination	Date
GN035	10,256.000		1,325	WCS	4/14/2003
GN036		34,230.000	14,500	Barnwell	4/25/2003
GN037	5,796.000	8,374.000		WCS	4/22/2003
IP-2		13,400.000	23,800	Barnwell	**
Total mCi	93,344.780	401,173.109	494,518		
Total Ci	93.345	401.173			

*Sea/Land - Date to be determined

**IP-2 - Date to be determined

Table 4-5

Shipment Curie Tracking - Envirocare

Container ID	Shipment Date	Destination	Am241 mCi	Cs137 mCi	Co60 mCi	Eu152 mCi	Eu154 mCi	Eu155 mCi	Ir192 mCi	Sr90 mCi	Ag108 mCi	H3 mCi	Ni63 mCi	DU mCi	Ra226 mCi	Shipper	Wt (Pounds)
025267	19-Feb-03	Envirocare	1.48	41.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	22,900
274033A	07-Apr-03	Envirocare	0.05	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,380
274094	10-Feb-03	Envirocare	0.21	4.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,920
274094A	04-Apr-03	Envirocare	0.90	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	29,620
274096B	20-Feb-03	Envirocare	40.00	484.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	21,240
274102A	21-Feb-03	Envirocare	9.10	81.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	19,040
274103	07-Apr-03	Envirocare	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	35,260
274104	13-Feb-03	Envirocare	0.60	3.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	12,420
274107	12-Feb-03	Envirocare	28.10	55.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	25,160
274108A	11-Feb-03	Envirocare	5.40	40.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,240
274113A	19-Feb-03	Envirocare	2.83	45.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	24,320
274273A	11-Feb-03	Envirocare	5.30	56.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.40	USEPA	19,600
274383	25-Feb-03	Envirocare	3.33	13.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	8,640
274394	13-Feb-03	Envirocare	6.08	49.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	15,640
274395	29-Jan-03	Envirocare	10.46	81.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,450
274395A	20-Feb-03	Envirocare	4.50	47.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	25,440
274396	12-Feb-03	Envirocare	13.98	93.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	USEPA	20,720
274624	10-Feb-03	Envirocare	1.10	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	14,740
274631B	10-Feb-03	Envirocare	0.00	33.99	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	15,260
274631C	04-Apr-03	Envirocare	0.13	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,460
274638	10-Feb-03	Envirocare	3.18	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	9,700
278932	03-Feb-03	Envirocare	24.72	82.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.40	USEPA	22,220
278932A	20-Feb-03	Envirocare	6.90	61.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	20,160
3104010001	12-Dec-02	Envirocare	4.03	239.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	19,923
4038020001	24-Jul-02	Envirocare	0.00	40.50	0.34	0.01	9.70	0.01	0.00	13.50	0.02	3.00	0.00	16.30	0.00	USEPA	13,940
4038020002	24-Jul-02	Envirocare	0.00	31.50	0.09	0.02	66.70	0.00	0.07	10.50	0.10	0.01	0.00	0.00	0.00	USEPA	7,200
4038020003	16-Aug-02	Envirocare	35.60	356.00	56.30	35.60	89.00	2,610.00	2,610.00	56.30	107.00	1,480.00	130.00	219.00	0.00	USEPA	14,880
4038020004	16-Aug-02	Envirocare	3.20	42.20	0.08	0.12	615.00	7,530.00	0.31	42.00	0.93	0.03	0.00	0.00	0.00	USEPA	14,320
4038020005	20-Sep-02	Envirocare	1.50	13.05	0.10	0.06	203.06	956.69	0.21	31.97	0.30	0.03	0.00	0.00	0.00	USEPA	30,200
4038020006	24-Sep-02	Envirocare	14.90	13.00	0.10	0.06	203.00	957.00	0.00	32.00	0.00	0.03	0.00	0.00	0.00	USEPA	18,970
4038020007	01-Oct-02	Envirocare	0.15	13.10	0.10	0.94	73.10	43.00	0.00	7.43	0.03	0.06	0.00	0.00	0.00	USEPA	8,230
4038020008	14-Nov-02	Envirocare	0.14	60.16	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Shaw	7,960

Table 4-5 (Continued)

Shipment Curie Tracking - Envirocare

Container ID	Shipment Date	Destination	Am241 mCi	Cs137 mCi	Co60 mCi	Eu152 mCi	Eu154 mCi	Eu155 mCi	Ir192 mCi	Sr90 mCi	Ag108 mCi	H3 mCi	Ni63 mCi	DU mCi	Ra226 mCi	Shipper	Wt (Pounds)
4038020009	18-Nov-02	Envirocare	2.70	3.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Shaw	3,500
4038020010	20-Nov-02	Envirocare	27.00	3.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Shaw	10,000
4038020011	17-Dec-02	Envirocare	30.30	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		13,370
4038020012	09-Jan-03	Envirocare	18.10	225.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,580
4038020013	15-Jan-03	Envirocare	1.81	232.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	7,900
4038020014	15-Jan-03	Envirocare	1.81	214.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	7,600
4038020015	17-Jan-03	Envirocare	1.81	107.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	11,630
4038020016	20-Jan-03	Envirocare	5.44	17.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	20,000
4038020017	23-Jan-03	Envirocare	7.56	99.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	5,120
4038020018	23-Jan-03	Envirocare	21.32	167.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	5,900
4038070001	19-Dec-02	Envirocare	17.10	14.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	24,400
4038070002	10-Jan-03	Envirocare	24.50	205.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,580
4038070003	17-Jan-03	Envirocare	0.25	68.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,260
4038070004	20-Jan-03	Envirocare	14.23	23.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	26,460
4038070005	23-Jan-03	Envirocare	26.16	232.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	22,600
790F	04-Feb-03	Envirocare	14.47	16.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,600
B790F	13-Feb-03	Envirocare	3.16	36.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56	USEPA	11,400
BKRU012601	21-Feb-03	Envirocare	3.30	27.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	19,400
BKRU012979	01-Mar-03	Envirocare	5.80	81.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	18,840
BKRU026436	20-Feb-03	Envirocare	10.90	53.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,620
BKRU026458	19-Feb-03	Envirocare	78.42	123.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	22,980
R25980AL	19-Feb-03	Envirocare	3.16	82.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	21,480
R2673ML	20-Feb-03	Envirocare	7.10	34.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,019
R25980AL	19-Feb-03	Envirocare	3.16	82.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	21,480
R2673ML	20-Feb-03	Envirocare	7.10	34.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,019
274108B	09-Apr-03	Envirocare	0.58	21.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,100
274385	10-Apr-03	Envirocare	0.00	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,160
274001	10-Apr-03	Envirocare	0.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	26,120
274383A	11-Apr-03	Envirocare	0.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	41,900
274624A	14-Apr-03	Envirocare	0.60	17.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	25,720
274097A	14-Apr-03	Envirocare	0.00	15.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	21,840
274388	14-Apr-03	Envirocare	5.80	13.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	18,600

THIS DOCUMENT WAS PREPARED BY WESTON SOLUTIONS, INC., EXPRESSLY FOR EPA. IT SHALL NOT BE RELEASED OR DISCLOSED IN WHOLE OR IN PART WITHOUT THE EXPRESS, WRITTEN PERMISSION OF EPA.

Table 4-5 (Continued)

Shipment Curie Tracking - Envirocare

Container ID	Shipment Date	Destination	Am241 mCi	Cs137 mCi	Co60 mCi	Eu152 mCi	Eu154 mCi	Eu155 mCi	Ir192 mCi	Sr90 mCi	Ag108 mCi	H3 mCi	Ni63 mCi	DU mCi	Ra226 mCi	Shipper	Wt (Pounds)
274123	14-Apr-03	Envirocare	3.40	4.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	21,160
KRU012979A	14-Apr-03	Envirocare	0.00	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	30,720
RO 274104A	14-Apr-03	Envirocare	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	15,020
BKRU012534	14-Apr-03	Envirocare	0.00	172.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	34,440
274399	14-Apr-03	Envirocare	0.00	13.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,760
BKRU025766	14-Apr-03	Envirocare	6.10	9.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	20,900
BKRU012645	15-Apr-03	Envirocare	0.34	227.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	34280
BKRU025842	15-Apr-03	Envirocare	0.34	7.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	28520
274033	07-Apr-03	Envirocare	0.04	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31380
BKRU025188	16-Apr-03	Envirocare	0.34	90.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	33620
BKRU012626	16-Apr-03	Envirocare	0.34	2.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	32600
BKRU012714	16-Apr-03	Envirocare	0.34	3.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31980
025267	19-Feb-03	Envirocare	1.48	41.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	22,900
274033A	07-Apr-03	Envirocare	0.05	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,380
274094	10-Feb-03	Envirocare	0.21	4.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,920
274094A	04-Apr-03	Envirocare	0.90	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	29,620
274096B	20-Feb-03	Envirocare	40.00	484.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	21,240
274102A	21-Feb-03	Envirocare	9.10	81.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	19,040
274103	07-Apr-03	Envirocare	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	35,260
274104	13-Feb-03	Envirocare	0.60	3.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	12,420
274107	12-Feb-03	Envirocare	28.10	55.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	25,160
274108A	11-Feb-03	Envirocare	5.40	40.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,240
274113A	19-Feb-03	Envirocare	2.83	45.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	24,320
274273A	11-Feb-03	Envirocare	5.30	56.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.40	USEPA	19,600
274383	25-Feb-03	Envirocare	3.33	13.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	8,640
274394	13-Feb-03	Envirocare	6.08	49.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	15,640
274395	29-Jan-03	Envirocare	10.46	81.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,450
274395A	20-Feb-03	Envirocare	4.50	47.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	25,440
274396	12-Feb-03	Envirocare	13.98	93.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	USEPA	20,720
274624	10-Feb-03	Envirocare	1.10	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	14,740
274631B	10-Feb-03	Envirocare	0.00	33.99	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	15,260
274631C	04-Apr-03	Envirocare	0.13	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,460

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Table 4-5 (Continued)

Shipment Curie Tracking - Envirocare

Container ID	Shipment Date	Destination	Am241 mCi	Cs137 mCi	Co60 mCi	Eu152 mCi	Eu154 mCi	Eu155 mCi	Ir192 mCi	Sr90 mCi	Ag108 mCi	H3 mCi	Ni63 mCi	DU mCi	Ra226 mCi	Shipper	Wt (Pounds)
274638	10-Feb-03	Envirocare	3.18	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	9,700
278932	03-Feb-03	Envirocare	24.72	82.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.40	USEPA	22,220
278932A	20-Feb-03	Envirocare	6.90	61.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	20,160
3104010001	12-Dec-02	Envirocare	4.03	239.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	19,923
4038020001	24-Jul-02	Envirocare	0.00	40.50	0.34	0.01	9.70	0.01	0.00	13.50	0.02	3.00	0.00	16.30	0.00	USEPA	13,940
4038020002	24-Jul-02	Envirocare	0.00	31.50	0.09	0.02	66.70	0.00	0.07	10.50	0.10	0.01	0.00	0.00	0.00	USEPA	7,200
4038020003	16-Aug-02	Envirocare	35.60	356.00	56.30	35.60	89.00	2,610.00	2,610.00	56.30	107.00	1,480.00	130.00	219.00	0.00	USEPA	14,880
4038020004	16-Aug-02	Envirocare	3.20	42.20	0.08	0.12	615.00	7,530.00	0.31	42.00	0.93	0.03	0.00	0.00	0.00	USEPA	14,320
4038020005	20-Sep-02	Envirocare	1.50	13.05	0.10	0.06	203.06	956.69	0.21	31.97	0.30	0.03	0.00	0.00	0.00	USEPA	30,200
4038020006	24-Sep-02	Envirocare	14.90	13.00	0.10	0.06	203.00	957.00	0.00	32.00	0.00	0.03	0.00	0.00	0.00	USEPA	18,970
4038020007	01-Oct-02	Envirocare	0.15	13.10	0.10	0.94	73.10	43.00	0.00	7.43	0.03	0.06	0.00	0.00	0.00	USEPA	8,230
4038020008	14-Nov-02	Envirocare	0.14	60.16	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Shaw	7,960
4038020009	18-Nov-02	Envirocare	2.70	3.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Shaw	3,500
4038020010	20-Nov-02	Envirocare	27.00	3.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Shaw	10,000
4038020011	17-Dec-02	Envirocare	30.30	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		13,370
4038020012	09-Jan-03	Envirocare	18.10	225.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,580
4038020013	15-Jan-03	Envirocare	1.81	232.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	7,900
4038020014	15-Jan-03	Envirocare	1.81	214.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	7,600
4038020015	17-Jan-03	Envirocare	1.81	107.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	11,630
4038020016	20-Jan-03	Envirocare	5.44	17.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	20,000
4038020017	23-Jan-03	Envirocare	7.56	99.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	5,120
4038020018	23-Jan-03	Envirocare	21.32	167.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	5,900
4038070001	19-Dec-02	Envirocare	17.10	14.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	24,400
4038070002	10-Jan-03	Envirocare	24.50	205.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	16,580
4038070003	17-Jan-03	Envirocare	0.25	68.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	27,260
4038070004	20-Jan-03	Envirocare	14.23	23.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	26,460
4038070005	23-Jan-03	Envirocare	26.16	232.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	22,600
790F	04-Feb-03	Envirocare	14.47	16.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	31,600
B790F	13-Feb-03	Envirocare	3.16	36.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56	USEPA	11,400
BKRU012601	21-Feb-03	Envirocare	3.30	27.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	USEPA	19,400
		Total mCi	582.747	5308.295	57.265	36.813	1259.560	12096.700	2610.596	193.696	108.376	1483.156	130.001	235.300	23.666		1,592,711
		Total Ci	0.583	5.308	0.057	0.037	1.260	12.097	2.611	0.194	0.108	1.483	0.130	0.235	0.024		

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4.5 SOIL REMOVAL ASSESSMENT

Recent site activity was from 2 June 2003 through 13 June 2003 when START-2 performed a post removal assessment of the site to determine the extent of any remaining radioactive soil contamination.

The Removal Assessment Report dated July 2003 includes details of surface and subsurface sampling, surface scanning with 3x3 sodium iodide radiation instruments, and the use of ground penetrating radar (GPR) to determine the extent of remaining contamination and ferrous anomalies. The final removal assessment report was used to determine a final volumetric quantity of soil to be removed from the site. Complete details of the soil removal assessment activities are presented in Appendix L of this report.

4.6 SOIL REMOVAL

The final soil removal action began on 8 October 2003 and ended 2 February 2004. During the final phase, the Emergency and Rapid Response Service (ERRS) contractor, Earth Tech, Inc. (Earth Tech), worked in conjunction with EPA-ORIA, TDH-BRC, and START-2 to complete daily soil surveys, on-site analysis of contaminated areas, and final transportation of all debris.

Earth Tech utilized the site grid, established in the Removal Assessment Report, to define the survey areas. With assistance from EPA-ORIA and START-2 personnel, the grid areas were surveyed using hand held radiation detection instrumentation for alpha and beta/gamma radiations. Areas of contamination that were determined to be above the criteria that TDH-BRC had established for cleanup were excavated by heavy equipment and then by hand tools for a more exact surgical removal of smaller areas of contamination. This excavation technique kept the quantity of soil removed to a minimum, thus, reducing the overall cost for transportation and disposal of the excavated soil and concrete. TDH-BRC collected soil samples from grid areas determined to be potentially below the cleanup criteria for analysis and confirmation of cleanup.

Soil removed from the site was initially put into a liner that filled a front-end loader bucket. Then the liner would be wrapped up and taped closed to reduce dust from spreading. The individual wraps were then placed into a lined rolloff container (see Figure 4-8).

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Figure 4-8

Lined Roll off with Individual Soil Wraps



Earth Tech reduced the amount of concrete that required off-site disposal at the Envirocare facility by scrabbling (Figure 4-9). The scrabbling technique chipped away contaminated surfaces of the concrete allowing Earth Tech to dispose of the non-contaminated concrete at a local Class D landfill.

Figure 4-9

Concrete Scrabbling



During the soil removal activities, Earth Tech removed an estimated 1,925,637 pounds of soil and concrete from the site. The estimated total weight is based on the running average weight

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per shipment times the total number of reported shipments. Earth Tech had not provided exact weights on the final 11 shipments at the time this report was prepared.

Appendix K presents the Earth Tech disposal records.

4.7 SAFETY

The on-site radioactive material posed a threat to public health resulting in the need for removal action. Loose radioactive material found in the abandoned buildings could have migrated outside the facility into surrounding areas, thereby endangering public health. EPA engaged safety measures to protect workers cleaning up the site, workers in nearby offices, and area residents.

Beginning with the project kickoff meeting, EPA instructed that work would be conducted following applicable safety guidelines for industry and radiation work. The project team attended radiation worker training, discussed how to work under the principles of keeping dose exposures As Low As Reasonably Achievable (ALARA), and emphasized the need for daily safety briefings for all site personnel.

During the early stages of the cataloging and surveying operation, many safety controls were established by EPA and contractors. Contractors established work control zones within the perimeter of the site, daily perimeter fence survey with a goal of less than 1 milliroentgen (mR) dose rate for public safety, and proper training for the donning of PPE for Levels A through D (Figure 4-10 and 4-11). Additionally, contractors required workers to submit to a pre-work bioassay urinalysis and routine incident dependent bioassays, and a security clearance check. Once approved for work, the workers were provided thermoluminescent dosimeters (TLD) badges, including neutron TLD, electronic high radiation dosimeters, finger ring dosimeters, personal air samplers, and instruction on emergency procedures within the site. Furthermore, workers were given instruction on the proper entering and exiting procedures into the work zones via the decon/frisking line; workers were provided the appropriate instrumentation to use while working and/or decon frisking; and workers were provided daily briefings or radiation work plans (RWPs) to describe the days activities and allow for practice work sessions so that the exposure dose to the works could be kept to a minimum under the ALARA concept.

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Once the building demolition phase began, special adhering solutions designed to control the radioactive dust were misted, sprayed, and painted on surfaces. Temporary shielding walls were constructed to provide containment of individual rooms so that cleanup contractors could work in the contaminated structure. Lead and concrete barriers were constructed to protect the workers and the community while the most highly contaminated items were removed. The crews kept the material shielded, packaged, and placed on-site so that the perimeters were safe for the public. Moreover, the contractors utilized a proprietary decontamination process to reduce the GTCC waste and the amount of external exposure and the volume of actual radiation debris transported outside the facility for disposal (Figure 4-12).

EPA conducted secondary daily air sampling and monitoring to document the effectiveness of the engineering controls, established by the contractors, to contain the contamination. Gamma ray radiation monitoring was conducted several times each day at the site's perimeter. The analysis of EPA air samples was found to be well within acceptable levels, generally in the normal background range, as determined by EPA and START-2 health professionals.

Figure 4-10

Personnel Suited in Level A PPE



Figure 4-11

Personnel Suited In Level A PPE



Figure 4-12

ISOCS



4.8 COMMUNITY RELATIONS

EPA plans for community relations began with an internal pre-mobilization meeting held on 13 November 2001 where an EPA Region 6 Office of External Affairs assigned a Community Involvement Coordinator (CIC) to the project for the duration of the site activities. The first community contact occurred during a meeting held on 7 January 2002 with adjacent businesses, city officials, the local city police, and fire departments in Webster, Texas.

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After site work started on 21 January 2002, the CIC conducted 114 community interviews with citizens and business owners in the area and published two Gulf Nuclear fact sheets for the communities benefit (Appendix M). Additionally, over the 19 months of site activity, the CIC kept the City of Webster informed of events via 17 meetings with the City Manager of Webster, Texas.

4.9 LOCAL AND STATE AGENCY INVOLVEMENT

Interagency cooperation at Webster GNI involved the TDH-BRC and the City of Webster; each contributed to the success of the cleanup. Complete documentation of Interagency involvement and all other entities during field activities is found in Appendices N thru Q.

The Webster City Police Department provided armed site security and immediate on-call response during the duration of site activities. The police officers worked at night in 4-hour shifts covering the 12 hours that cleanup personnel were not on-site during the week, and the 24-hour security required on weekends when the site was closed.

The Police Department also actively participated in the site Health and Safety activities by sending a representative to the site pre-work brief and site specific radiation worker 1 and 2 trainings. Additionally, the officers were issued a TLD badge to monitor potential exposures to them.

The TDH-BRC actively participated in monitoring site activities at Webster GNI. Prior to release of the site, by the bankruptcy court for cleanup, TDH-BRC established an ongoing environmental TLD monitoring program at the perimeter fence lines of the facility. TDH-BRC established the monitoring devices to measure dose exposure to the public and the workers at the neighboring breast center clinic.

Additionally, TDH-BRC played an active role in monitoring site cleanup activities. In conjunction with EPA-ORIA, TDH-BRC collected random perimeter surveys; smear samples and soil samples to ensure the cleanup was effectively occurring.

The TDH-BRC final action was the confirmation soil sample collection and analysis during the soil removal phase of the project. Based on these sample results the cleanup criteria under the *Texas Administrative Code* (TAC) 25:1:289 was determined to have been met by TDH-BRC. Based on these sample results, TDH-BRC approved the site for occupational free release under the TAC on 23 December 2003.

5. APPENDICES

Appendix A	Area Map
Appendix B	Aerial Photograph
Appendix C	Site Plan
Appendix D	WESTON Document Scanning Report
Appendix E	WESTON Texas Department of Health Scan and Transfer Report
Appendix F	U.S. Bankruptcy Report
Appendix G	U.S. Ecology Source Log
Appendix H	WESTON Perimeter Surveys
Appendix I	WESTON Air Sample Results
Appendix J	Shaw Disposal Records
Appendix K	Earth Tech Disposal Records
Appendix L	Removal Assessment Report
Appendix M	Community Fact Sheets USEPA
Appendix N	USEPA POLREPS
Appendix O	Copy of Webster Logbooks
Appendix P	Digital Photo Tracker
Appendix Q	Miscellaneous Digital Site Photos
Appendix R	Copy of TDD and Amendments A through M