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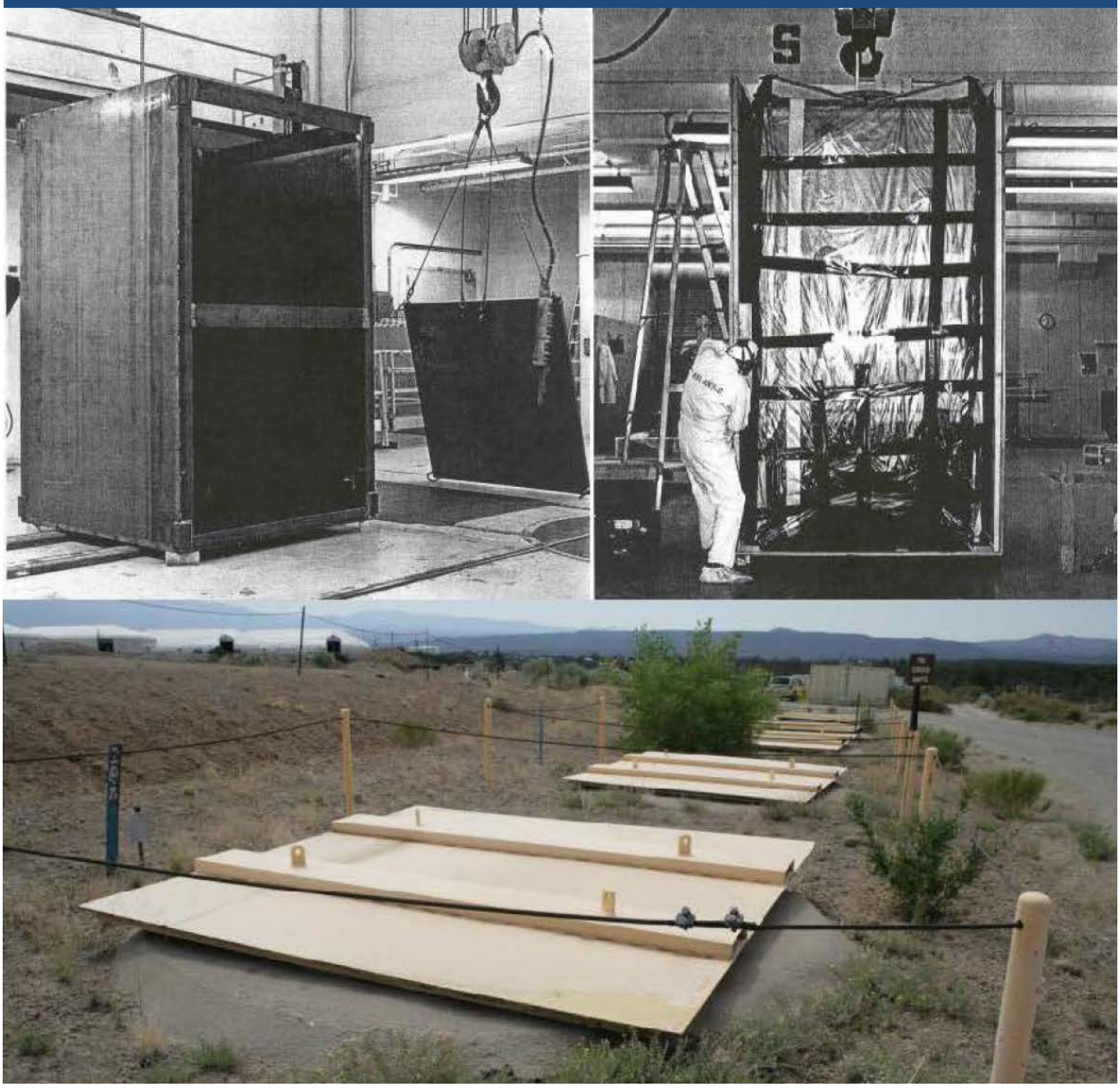

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Hot Cell Liners Category of Transuranic Waste Stored Below Ground within Area G

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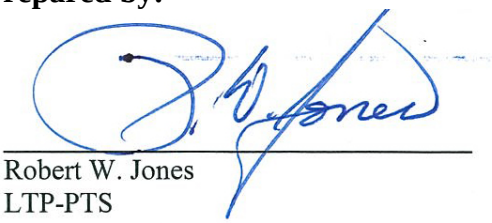

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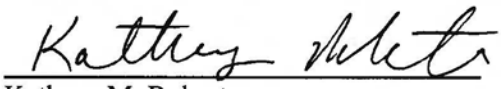

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Abbreviations and Acronyms

AEC	Atomic Energy Commission
Am-241	americium-241
Ba-127	barium-127
BG	below ground
CCP	Central Characterization Project
CMP	corrugated metal pipe
CMR	Chemistry and Metallurgical Research Facility (Building 3-29)
Consent Order	New Mexico Environment Department Compliance Order on Consent
Cs-137	cesium-137
EPA	U.S. Environmental Protection Agency
Eu-155	europium-155
FGE	plutonium-239 fissile gram equivalents
ft	feet
FY	fiscal year
gal	gallon
HSE-1	Health Physics Group
HSE-7	Waste Management Group
HSE-8	Environmental Protection Group
HWN	Hazardous Waste Number
LANL	Los Alamos National Laboratory
m^3	cubic meters
MAR	material at risk
MDA	Material Disposal Area
MFP	mixed fission products
mrem/hr	millirem per hour
nCi/g	nanocuries per gram
NEPA	National Environmental Policy Act
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
PE-Ci	plutonium-239 equivalent curies
Pm-147	promethium-147
Pu-238	plutonium-238
Pu-239	plutonium-239
Pu-240	plutonium-240
Pu-241	plutonium-241
Pu-242	plutonium-242
RH	remote handled
Rh-106	rhodium-106
RSWD	Radioactive Solid Waste Disposal Record

Ru-106	ruthenium-106
Sb-125	antimony-125
Sr-90	strontium-90
TA	Technical Area
Te-125	tellurium-125
TWSR	TRU Waste Storage Record
TRU	transuranic (elements with atomic number greater than 92)
U-233	uranium-233
U-234	uranium-234
U-235	uranium-235
U-236	uranium-236
VOC	volatile organic compounds
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
WPF	Waste Profile Form
Y-90	yttrium-90

1. Executive Summary

A large wildfire called the Las Conchas Fire burned large areas near Los Alamos National Laboratory (LANL) in 2011 and heightened public concern and news media attention over transuranic (TRU) waste stored at LANL's Technical Area 54 (TA-54) Area G waste management facility. The removal of TRU waste from Area G had been placed at a lower priority in budget decisions for environmental cleanup at LANL because TRU waste removal is not included in the March 2005 *Compliance Order on Consent* (Reference 1) that is the primary regulatory driver for environmental cleanup at LANL. The Consent Order is an agreement between LANL and the New Mexico Environment Department (NMED) that contains specific requirements and schedules for cleaning up historical contamination at the LANL site. After the Las Conchas Fire, discussions were held by the U.S. Department of Energy (DOE) with the NMED on accelerating TRU waste removal from LANL and disposing it at the Waste Isolation Pilot Plant (WIPP).

In January 2012, the DOE National Nuclear Security Administration (DOE/NNSA) and the NMED announced the issuance of the *Framework Agreement: Realignment of Environmental Priorities* (Framework Agreement) (Reference 2). The Framework Agreement is a non-binding agreement that outlines DOE/NNSA commitments to further accelerate TRU waste disposition at LANL. Commitments under the Framework Agreement related to TRU waste include a commitment to develop by December 31, 2012, a schedule with pacing milestones for disposition of below-ground (BG) TRU waste requiring retrieval at Area G based on project funding profiles.

Within the schedule for disposition of BG TRU waste submitted to the NMED in December 2012, the DOE/NNSA committed to disposition of six BG categories of TRU waste no later than September 30, 2018. These six categories were identified as (1) Pit 9; (2) Trenches A-D; (3) Corrugated Metal Pipes (CMPs); (4) Hot Cell Liners; (5) Tritium Packages; and (6) the 17th Remote-Handled (RH) Canister. For a seventh BG category that may require retrieval, the 33 Shafts, DOE/NNSA will complete (1) a determination as to whether this category contains TRU waste that requires retrieval; and (2) to the extent necessary, its decision process under the National Environmental Policy Act (NEPA) regarding retrieval, by no later than September 30, 2015.

As the result of a fire in an underground salt haul truck and radiological release that occurred in February 2014, the WIPP repository is shut down and is not accepting any waste shipments. A recovery plan is currently being developed but a date for resumption of waste shipments to WIPP has not been established. Preliminary guidance provided to LANL by the DOE/NNSA Los Alamos Field Office for an updated Life-Cycle Baseline for work funded by DOE Environmental Management was to assume that shipments from LANL to WIPP will resume in October 2016. Based on that assumption and expected budget targets, removal of the six categories of BG TRU would not be completed until approximately March 2021.

Detailed planning has begun on retrieval and processing of the first six categories of below-ground TRU waste, with the CMPs, Trenches A-D, Pit 9, and Hot Cell Liners as the categories to be retrieved and processed for disposition first. Because the CMPs present less of a challenge in terms of both retrieval and processing, it is likely retrieval and processing will begin with the CMPs category and retrieval will begin on containers in Trenches A-D, Pit 9, and Hot Cell Liners shafts as the CMPs are processed.

The Hot Cell Liners waste category consists of five decommissioned stainless steel alpha-containment boxes that were removed from hot cells in Wing 9 of the Chemistry and Metallurgy Research (CMR) Facility, wrapped in 3- or 4.5-mil-thick plastic, and each placed into a steel box. Each steel box is approximately six feet by six feet by ten feet (6 ft x 6 ft x 10 ft), and is fitted with lifting lugs at each corner of the top of the box so that each is readily retrievable. These boxes, because of their relatively high dose rates, were placed into five vertical shafts, 302 through 306, located in the south-central portion of Area G. The shafts are approximately eight feet in diameter and twenty-two feet deep. They are lined with corrugated metal pipe

and the bottoms are open and filled with gravel to facilitate drainage. Shaft covers were fabricated from ¼ inch steel with lifting rings and incorporated forklift guides for easy handling. The boxes were placed into the shafts on December 5, 1991.

The approximate volume of these five boxes is 51 cubic meters (m^3) or 2.1% of the total BG volume of TRU waste that may require retrieval. The hot cell liners were decontaminated remotely before they were removed and the five containers have a total of approximately 0.6 plutonium-239 (Pu-239) equivalent curies (PE-Ci) or 0.0005% of the total Material at Risk (MAR) of the BG TRU waste that may require retrieval. The primary radionuclides identified in the Hot Cell Liners category are plutonium-239 (Pu-239), plutonium-241 (Pu-241), uranium-234 (U-234), uranium-235 (U-235), and mixed fission products (MFP).

While the five box containers are currently classified as TRU waste, historical documentation provided by the waste generator indicates four of the five Hot Cell Liners are low level waste (LLW) and the fifth one close to the limit for TRU waste. Radioassays were performed on each of the five containers in March 2014 to better determine whether the five containers should be managed as TRU waste or LLW. The resulting analysis of each radioassay showed that the five containers assayed less than the limit for TRU waste and should be reclassified to LLW. Reclassification of the containers to LLW may provide the option of leaving these containers in place (i.e. belowground) as well as the option of retrieving the containers and shipping the containers off the LANL site for disposition. This assumes that the waste generator's certification that the containers have no hazardous constituents is confirmed, and that approval for disposition of the containers as LLW at LANL can be obtained. A decision to retrieve and disposition the containers off-site as either LLW or MLLW will require characterization and verification that the containers meet the proposed off-site facility's waste acceptance criteria.

This report summarizes available information on the origin, configuration, and composition of the waste containers within the Hot Cell Liners category; their physical and radiological characteristics; the results of the radioassays; and the justification to reclassify the five containers as LLW rather than TRU waste.

2. Introduction

2.1 Purpose and Introduction

Purpose of Report. This report presents a general description of categories of TRU waste in below-ground storage configurations at LANL TA-54 Material Disposal Area (MDA) G (the below-ground portion of Area G), with a detailed description of the Hot Cell Liners category of BG TRU waste. The report is intended to support work packages or statements of work for subcontracting task orders for disposition of the waste containers in the Hot Cell Liners shafts. Information is presented on the historic source of the waste stored in the Hot Cell Liners shafts, the configuration of the containers stored in Hot Cell Liners shafts, and characteristics of the Hot Cell Liners waste category.

Framework Agreement. A large wildfire called the Las Conchas Fire burned more than 150,000 acres south and west of LANL in late June and July 2011. The fire came within about 3.5 miles of TA-54, Area G, which is the primary location where LANL manages solid radioactive waste, and heightened public concern and news media attention on TRU waste storage at Area G. Following the fire, New Mexico Governor Susana Martinez asked the DOE to provide sufficient funding for cleanup of defense legacy wastes from LANL and for TRU waste disposal at WIPP.

The primary regulatory driver for environmental cleanup at LANL is the *Compliance Order on Consent* (Consent Order), a 2005 agreement between LANL and the NMED that contains specific requirements and schedules for cleaning up historical contamination of the LANL site, and has a final deliverable date of December 2015 (Reference 1). The Consent Order does not address requirements and deliverables for removing TRU waste from the LANL site, which placed TRU waste removal at a lower priority in budget decisions. Removal of TRU waste stored above ground at Area G and below ground in pits, shafts, and trenches within MDA G is required before a remedy for cleanup of MDA G can be implemented under the Consent Order. After the Las Conchas Fire, discussions were held with the NMED on accelerating TRU waste removal from LANL.

In January 2012, the DOE/NNSA and the NMED announced issuance of the *Framework Agreement: Realignment of Environmental Priorities* (Framework Agreement). The Framework Agreement is a non-binding agreement that outlines DOE/NNSA commitments to further accelerate TRU waste disposition at LANL (Reference 2). Commitments under the Framework Agreement related to TRU waste include:

- Removal of all non-cemented above-ground TRU waste stored at Area G as of October 1, 2011, by no later than June 30, 2014. This inventory was defined as 3,706 cubic meters (m^3) of material;
- Removal of all newly-generated TRU waste received in Area G during FYs 2012 and 2013 by December 31, 2014;
- Based on projected funding profiles, develop by December 31, 2012, a schedule with pacing milestones for disposition of below-ground TRU waste requiring retrieval at Area G; and
- Removal of the above-ground cemented TRU waste in an efficient and effective manner protective of human health and safety of workers and the public.

Within the schedule for disposition of below-ground TRU waste submitted to the NMED in December 2012, the DOE/NNSA determined that there are seven below-ground waste unit categories within MDA G that potentially contain TRU waste that may require retrieval (Reference 3). These seven categories were identified as (1) Pit 9; (2) Trenches A-D; (3) Corrugated Metal Pipes; (4) Hot Cell Liners; (5) Tritium Packages; (6) the 17th RH Canister; and (7) the 33 Shafts. The seven categories have an approximate total volume of 2,399 m^3 and approximate radioactive MAR of 110,751 PE-Ci. Of these seven categories, approximately 99.86% of the waste volume and approximately 99.9% of the MAR is

contained within the first six categories. For the remaining category, the 33 Shafts (which have a total approximate volume of 3.4 m^3 and total MAR of 97 PE-Ci), the DOE/NNSA concluded that additional evaluation is warranted.

The DOE/NNSA committed to disposition the below-ground TRU waste in the first six categories no later than September 30, 2018. For the 33 Shafts, DOE/NNSA will complete (1) a determination as to whether this category contains TRU waste that requires retrieval; and (2) to the extent necessary, its decision process under NEPA regarding retrieval, by no later than September 30, 2015. As the result of a fire in an underground salt haul truck and radiological release that occurred in February 2014, the WIPP repository is shut down and is not accepting any waste shipments. A recovery plan is currently being developed but a date for resumption of waste shipments to WIPP has not been established. Preliminary guidance provided to LANL by the DOE/NNSA Los Alamos Field Office for an updated Life-Cycle Baseline for work funded by DOE Environmental Management was to assume that shipments from LANL to WIPP will resume in October 2016. Based on that assumption and expected budget targets, removal of the six categories of BG TRU would not be completed until approximately March 2021.

2.2 Background

Historical Perspective. Radioactive waste has been generated at LANL since the 1940's during research and development activities for nuclear weapons, nuclear reactors, and plutonium science. Historically, radioactive waste was buried in shallow landfills at LANL called MDAs. MDA G at TA-54 (below-ground portion of Area G) first received radioactive waste in 1957 and has served as the primary radioactive solid waste management facility at LANL since 1959 (Reference 4). Figure 1 shows a high-level aerial photograph of TA-54 Area G and location of Area G on a map of LANL technical areas and the surrounding area. MDA G underlies most of the portion of Area G shown in the aerial photograph.

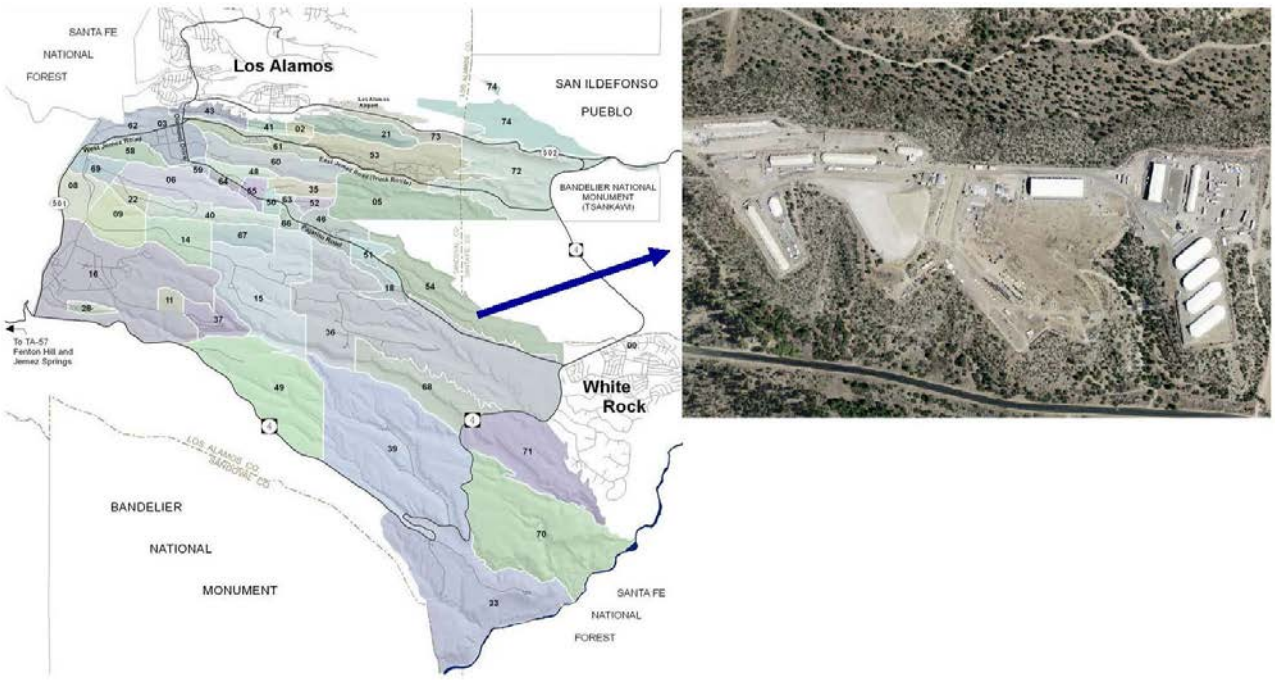

Figure 1. Location and Aerial Photo of TA-54 Area G

In 1970, the Atomic Energy Commission (AEC) issued Immediate Action Directive 0511-21 that directed AEC sites to segregate wastes with "known or detectable concentrations of transuranium nuclides" and that such wastes be "packaged and buried in such a fashion that they can be readily retrievable as contamination-free packages within an interim period of 20 years; beyond that period retrievability should continue to be possible" (Reference 5). This waste was to be stored for disposition in a future deep geologic repository (ultimately, WIPP).

The segregation limit for TRU waste was changed in 1973 with issuance of the *Atomic Energy Commission Manual*, Chapter 0511, "*Radioactive Waste Management*" to material contaminated with certain alpha-emitting radionuclides and activity greater than10 nanocuries per gram (nCi/g) for plutonium-239 (Pu-239) and U-233. Both Pu-238 and plutonium-241 (Pu-241) were excluded unless indicated by Pu-239 impurities or when required by local burial criteria (LANL established a segregation limit for Pu-238 of 100 nCi/g). The value of 10 nCi/g was derived from the upper range of concentrations of radium-226 in the earth and was "subject to modification based on long-term studies of nuclide migration in soil" (Reference 6). In September 1982, DOE issued DOE Order 5820.1, *Management of Transuranic Contaminated Material*, which defined "TRU contaminated material" as "alpha-emitting radionuclides of atomic number greater than 92 and half-lives greater than 20 years in concentrations greater than 100 nCi/g" (Reference 7). The term "TRU waste" was defined as TRU contaminated material which has been declared as having no significant economic value or use.

This definition was essentially retained by DOE Manual 435.1, *Radioactive Waste Management Manual* (Reference 8), issued in July 1999 under DOE Order 435.1, *Radioactive Waste Management*, which stated:

> "Transuranic waste is radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for:
>
> (1) High-level radioactive waste;
>
> (2) Waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations; or
>
> (3) Waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61."

This definition of TRU waste is still applicable today, and in practice has been consistent since 1982. Waste segregated before that time may be determined not to be TRU waste under the current definition because it may have concentrations of alpha-emitting TRU isotopes with half-lives greater than 20 years that are less than 100 nCi/g or may contain radionuclides such as U-233 that are no longer included in the definition of TRU waste.

Like a number of DOE sites, LANL initially developed storage configurations for TRU waste that involved placing the waste containers in trenches, pits, and shafts that were excavated into the ground surface (Reference 4). LANL also began storing TRU waste in large fabric-covered storage domes in 1985 (white structures in the aerial photograph in Figure 1). By the time that WIPP opened in 1999, LANL had built up an inventory of about 9,100 m^3 of TRU waste at Area G, with about 2,416 m^3 stored below ground in trenches, pits, and shafts and about 6,700 m^3 stored above ground (Reference 9).

TRU Waste Disposition. Through August 24, 2014, LANL has shipped a total of 6,848 m^3 of TRU waste to WIPP or to temporary storage at the Waste Control Specialists, LLC site. Some TRU waste containers shipped to Idaho National Laboratory for characterization or size reduction and repackaging are also included. A total of 1,394 m^3 of TRU waste that was reclassified to MLLW after radioassay showed TRU isotope concentrations less than 100 nCi/g has also been shipped off-site to commercial facilities for treatment and disposal at the Nevada National Security Site (NNSS) or commercial MLLW

disposal facilities. Total disposition of TRU waste through August 24, 2014, was 8,501 m^3. There is not a one-to-one correlation between TRU waste volumes shipped to WIPP, or reclassified and shipped as MLLW, and inventory reduction because some containers were over-packed into standard waste boxes or repackaged into multiple drums because of their high activity.

Although the focus of shipments of TRU waste from LANL to WIPP has been on TRU waste stored above ground, LANL retrieved and shipped below-ground RH waste in 16 shafts (Shafts 236-243 and 246-253) with a total volume of about 17 m^3 to WIPP in 2009. All other waste segregated and stored below ground as TRU waste remains below ground.

Below-Ground TRU Waste. Figure 2 presents a high-level aerial photograph of Area G with locations of the seven remaining below-ground waste unit categories. These locations are shaded in red and labels identify the seven waste unit categories.

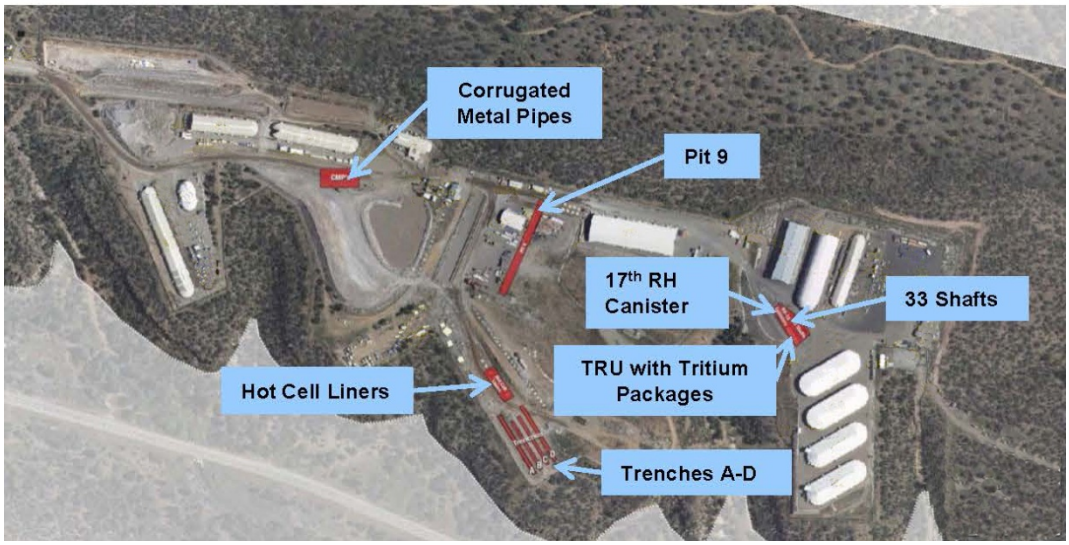

Figure 2. Aerial Photo of Area G with Below-Ground TRU Waste Storage Areas Shaded in Red

Table 1 presents a summary of the seven TRU waste unit categories stored below-ground at MDA G. The row of the table that provides information on the Hot Cell Liners category is highlighted in yellow. The table provides a general description of each category, the approximate volume of each category and the percentage each category makes up of the total volume of the seven below-ground categories, and the approximate MAR of each category and the percentage each category makes up of the total MAR of the seven below-ground categories. The first six categories (Pit 9, Trenches A-D, CMPs, Hot Cell Liners, Tritium Packages, and 17th RH Canister) were scheduled to be retrieved and dispositioned in the FY 2015 to FY 2018 period under the schedule submitted under the Framework Agreement. These categories make up 99.84% of the total volume and 99.92% of the total MAR of the seven categories. The 33 shafts make up only 0.14% of the total volume and 0.09% of the total MAR of the seven below-grade categories.

Records of waste generated 30 to 40 years ago are not always complete or consistent, and some differences in container numbers for Trenches A-D and Pit 9 have been identified as records were reviewed in detail. The Hot Cell Liners waste category makes up about 2.1% of the total volume of potential TRU waste required to be retrieved from below ground, but only about 0.0005% of the total activity of TRU waste to be retrieved from below ground.

TABLE 1
Overview of Below-Ground TRU Waste Categories

Category	General Description	Approximate Volume (m^3)	Percentage Total Volume	Approximate MAR (PE-Ci)	Percentage Total MAR
Trenches A-D	Approx. 710 30-gal. drums in 4 trenches	335	14.0	93,870	84.8
Pit 9	Approx. 3,882 55-gal., 30-gal. and 85-gal. drums, 191 fiberglass-reinforced plywood boxes, and 6 other containers	1,560	65.0	6,019	5.4
Corrugated Metal Pipes (CMPs) above Pit 29	158 CMP, each ~ 30 in. diameter x 20 ft. long	442	18.4	10,775	9.7
Hot Cell Liners (RH Waste)	5 Shafts with glovebox liners from hot cells, each in a steel box 6 ft. x 6 ft. x 10 ft. long (Shafts 302-306)	51	2.1	0.6	0.0005
Tritium Packages	4 tritium packages, each containing 3 55-gal. drums, and one tritium package with 3 30-gal drums or small tank (Shafts 262-266)	6.7	0.3	8	0.01
17th RH Canister	Canister containing 3 55-gal. drums (Shaft 235)	1	0.04	1.5	0.001
33 Shafts (RH Waste)	32 lined shafts with pipes containing 1 or 2 gal. cans of hot-cell debris; 1 shaft with reactor vessel (Shafts 200-232)	3.4	0.14	97	0.09
Total		2,399	100%	110,771	100%

It is important to note that the volumes shown in the table are not the volumes that will be certified and shipped to WIPP. Some containers in the waste unit categories may be determined to be LLW or MLLW that would not be dispositioned at WIPP. Some containers with high MAR such as those in the Trenches A-D waste category are expected to be repackaged and produce a number of daughter drums, while other containers such as the oversize boxes in Pit 9 are expected to result in a much smaller volume that will be shipped to WIPP.

The values shown for MAR are also expected to change as containers are retrieved and processed for disposition. The Environmental Protection Agency (EPA) approved assay methods used for WIPP characterization may produce different values than the historical methods used by the waste generators during the period when the containers in these waste categories were generated.

Figure 3 presents LANL's planned TRU waste disposition timeline for all TRU waste stored at Area G based on the schedule contained in the EM Lifecycle Baseline submittal on June 30, 2014 (Reference 10). This schedule was constrained by specific budget targets for TRU waste disposition and the assumption that LANL will resume shipments to WIPP at the start of FY 2017 (October 2016). This timeline may change as a more certain date for resumption of shipments to WIPP is identified, by changes in budget targets for TRU waste disposition, and other factors such as the priority of LANL shipments to WIPP relative to other DOE sites.

Under this timeline, retrieval of the CMP category of BG waste would begin at the end of FY 2015, and retrieval and processing of CMPs would continue in FY 2016. Shipments of TRU waste from the CMPs category would begin with resumption of shipments of TRU waste from LANL at the start of FY 2017. Retrieval and processing of other BG categories except the 33 Shafts category would begin later in FY 2017. The Hot Cell Liners category is included within the Other Shafts timelines in the figure, with

retrieval and processing beginning near the end of FY 2017 and continuing through FY 2018 and into FY 2019. Shipments of the Pit 9 category of BG TRU waste would be completed in mid FY 2021. This figure assumes that a decision will be made to retrieve and process the 33 Shafts category of TRU waste, and shipping of this category would be completed at the end of FY 2022.

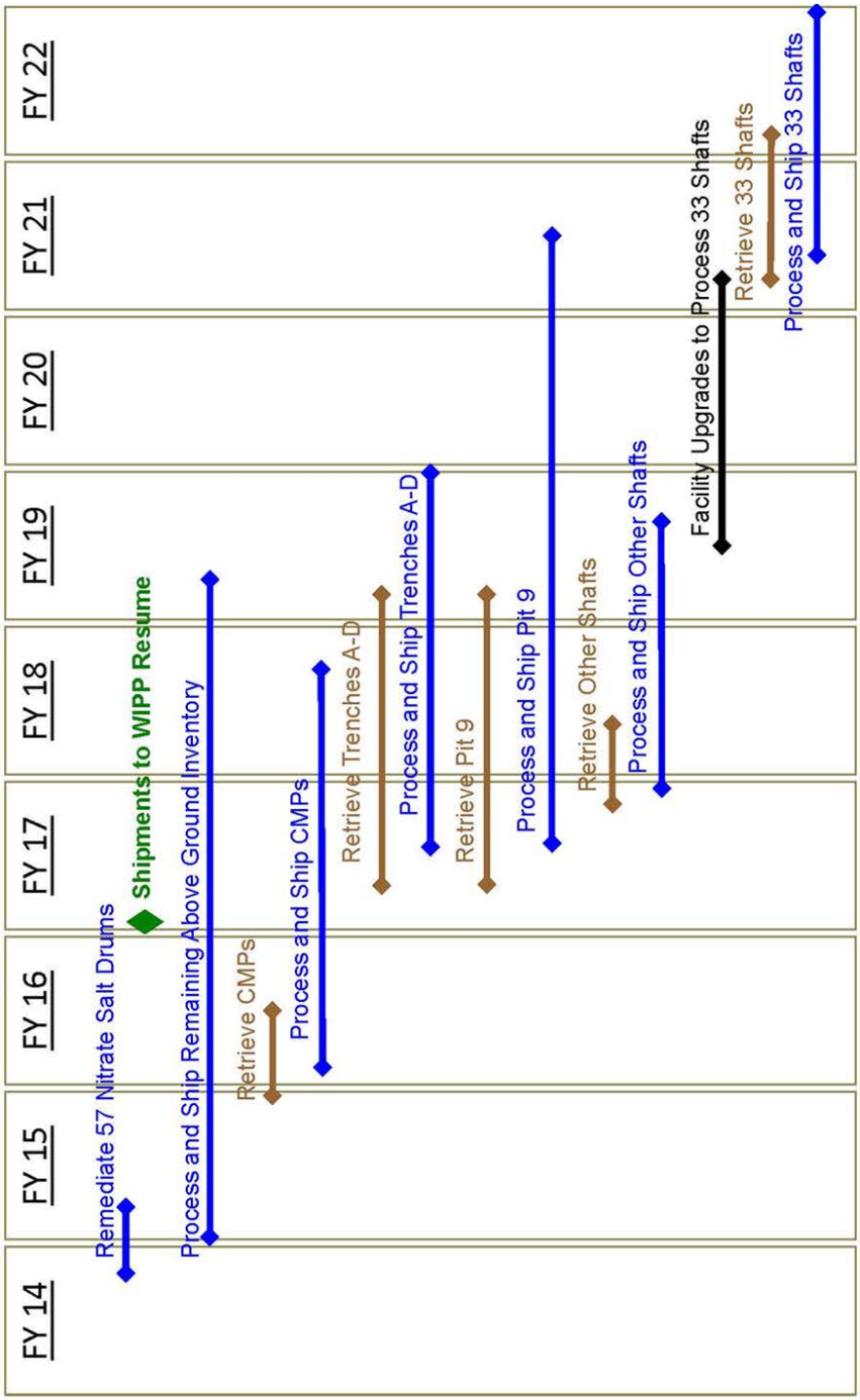

Figure 3. TRU Waste Disposition Timeline under Lifecycle Baseline Submittal of June 2014

3. Origin of Hot Cell Liners Waste

The waste contained within the five metal containers in the five Hot Cell Liners shafts consists of five stainless steel alpha-contaminated hot cell liners removed from Hot Cells 2, 4, 9, 13, and 14 during decommissioning activities in Wing 9 of the CMR Facility (TA-3, Building SM-39). The hot cells had been used for the preparation of irradiated reactor fuel samples for remote metallurgical testing and examination. The hot cell liners waste was generated by the Materials Research and Processing Science (MST-5) Group.

Each of the five hot cell liners was wrapped in either 3- or 4.5-mil-thick plastic and placed into a 6 ft x 6 ft x 6 ft steel box. Blocking was added to limit shifting during transportation and storage. The legs of some of the glovebox hot cell liners may have been removed. The five containers were placed into the Hot Cell Liners shafts on December 5, 1991, based on the disposal log book for shafts that received waste from August 1978 to December 1991 (Reference 11). Pages from the log book related to the hot cell liners are provided in Appendix A to this report.

Figure 4 (from Reference 12) shows a photograph of a typical hot cell liner, which was constructed of stainless steel (top and walls 1/8 inch thick and floor 1/4 inch thick). Dimensions of the hot cell liners or "alpha containment boxes" were 5 1/2 ft square and 11-ft high with the legs. The boxes were painted inside with glossy white radiation-resistant paint before they were installed to aid in illumination, provide contrast, and ease decontamination. Holes were provided in the box walls for glove ports, windows, manipulators, transfer ports, and lighting. The alpha containment boxes were ventilated by a low-flow air system and had provisions for removal of liquid waste. Hot cell liners were installed and removed from the hot cells by removing ceiling blocks over the hot cells.

Figure 4. Typical Hot Cell Liner

All equipment, materials, and waste were removed from the hot cells and the hot cell liners were remotely decontaminated to the extent possible before they were removed from the hot cells. Figure 5 shows a photograph (from Reference 13) of a hot cell liner wrapped in plastic as it was being removed from a hot cell in Wing 9 of the CMR Facility.

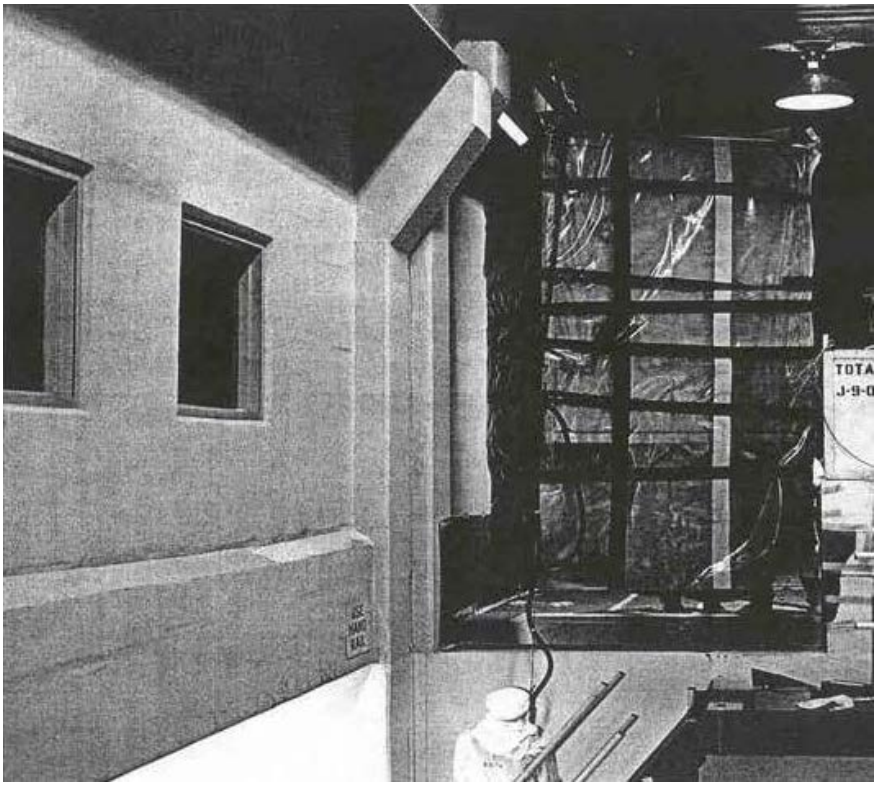

Figure 5. Removing Hot Cell Liner from Hot Cell

4. Configuration of Waste in Hot Cell Liners Shafts

4.1 Shaft Construction and Configuration of Waste Containers in Shafts

The five Hot Cell Liners shafts, designated as Shafts 302 through 306, are located in the south-central portion of Area G as shown in Figure 2 on Page 6. The shafts are oriented northwest-southeast as shown in Figure 6 (from Reference 13) and are located northwest of Trenches A-D (blue rectangles at bottom of figure).

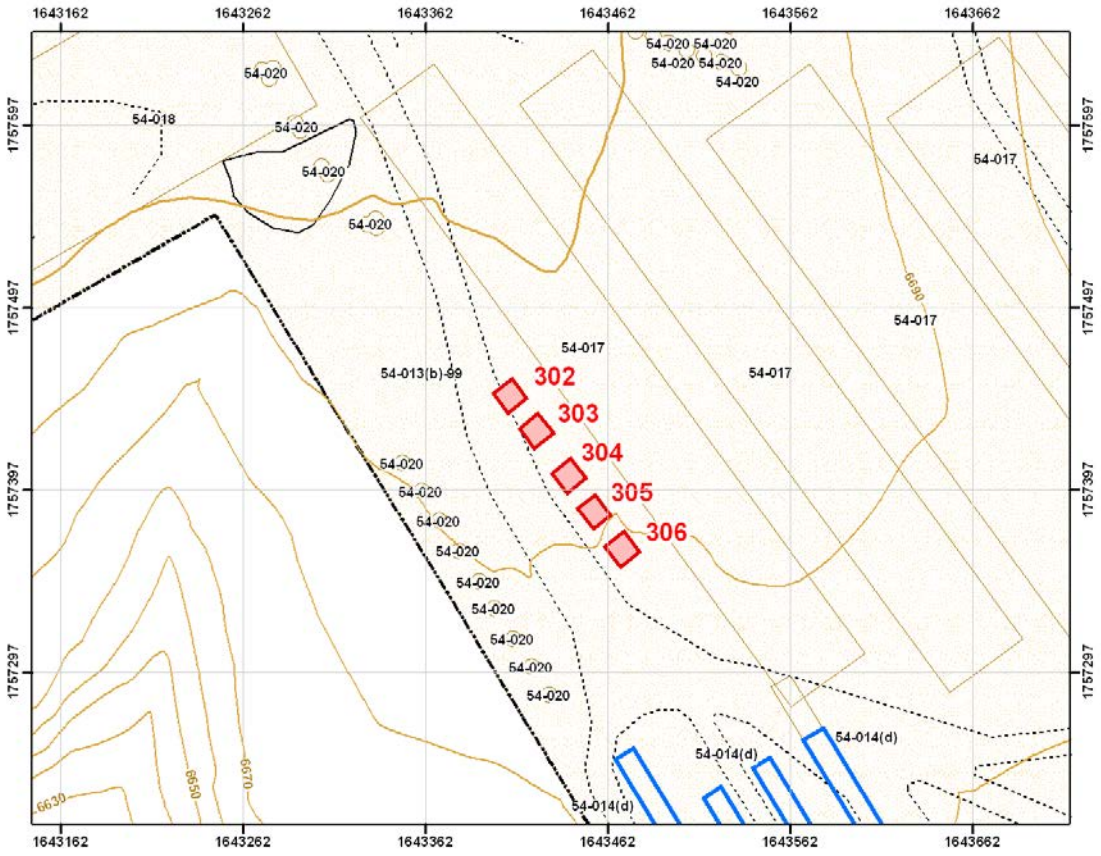

Figure 6. Hot Cell Liners Shafts Location and Orientation

Construction of the Hot Cell Liners Shafts. The shafts were constructed in the latter half of 1991 by boring vertical holes that were approximately ten ft in diameter and 22 ft deep (Reference 14). The bottoms of the shafts were filled with approximately one foot of gravel to facilitate drainage. The shafts were then lined with a 8-ft diameter by 22-ft long CMPs (1/4-inch thick) and the annular space between the vertical holes and the CMPs was filled with crushed tuff. The top of each CMP extended about 1 ft above the ground surface, and a domed concrete collar was placed around the top of each CMP. The shafts were covered with a 1/4 inch steel plate reinforced with angle iron that incorporated lifting lugs and forklift guides for ease of removal.

Configuration of Waste Containers in Shafts. Figure 7 is a sketch of the shaft configuration (which is not to scale), and Figure 8 is a close-up photo of the cover over Shaft 306 and the domed collar around the shaft. Lifting lugs and forklift guides on the cover are clearly visible in the photo. Each shaft contains one steel box that contains one hot cell liner. The steel boxes sit on gravel at the bottom of the shafts, and the tops of the boxes are about 12 ft from the top of the shafts. The boxes have lifting hooks at each corner of the top of the boxes.

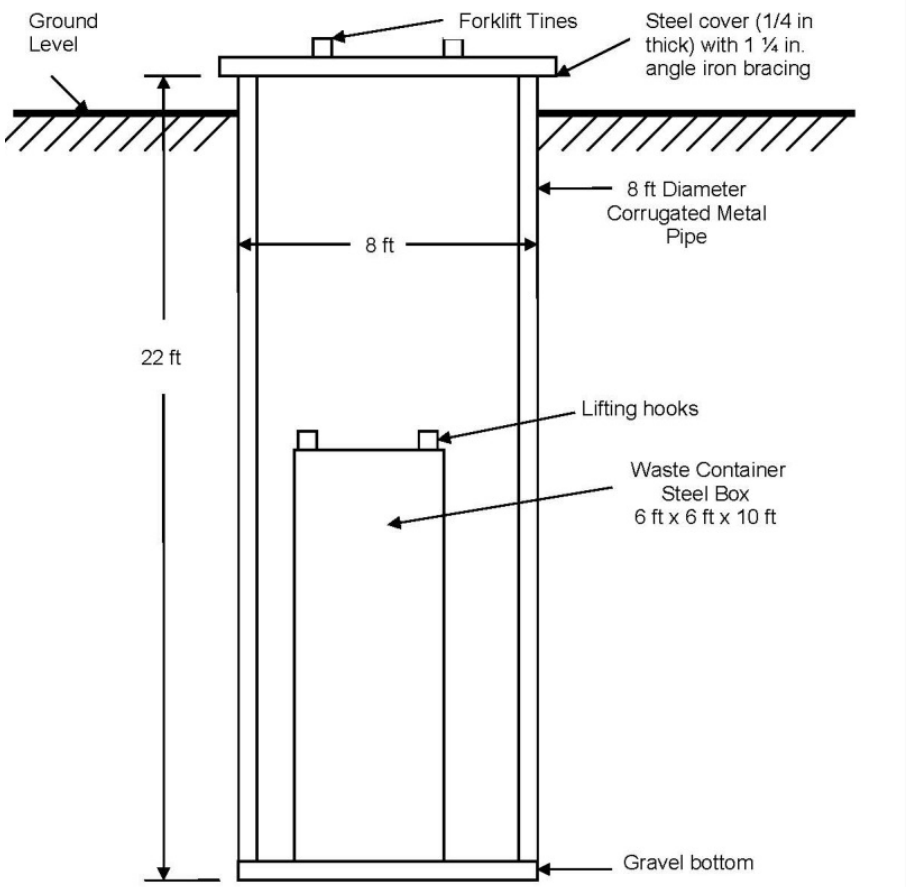

Figure 7. Sketch of Hot Cell Liners Shaft Configuration
(Not to Scale)

Figure 8. Shaft Cover and Domed Concrete Collar at Top of Shaft

Figure 9 shows an early photo of Shafts 302-306 as seen from the southwest, with shaft covers extending from the foreground at the right side of the photo and to near the center of the left side of the photo.

Figure 9. Early Photograph of Hot Cell Liners Shafts 302-306

4.2 Current Configuration of Hot Cell Liners Shafts

While the development of Area G has continued to evolve since 1991, the Hot Cell Liners shafts and the immediate surrounding area have essentially remained unchanged. Figure 10 is a photograph of the Hot Cell Liners Shafts taken in July 2013 looking from the northwest to the southeast.

Figure 10. The Hot Cell Liners Shafts in July 2013

5. Characteristics of Hot Cell Liners Waste

There are a number of sources of information on the characteristics of the waste containers within the five Hot Cell Liners shafts. The most readily accessible information is that contained within the LANL waste database, the Waste Compliance and Tracking System or WCATS. Historic TRU waste database information was electronically transferred to WCATS during 2013. Information contained in WCATS on the Hot Cell Liners waste is based primarily on the information from the Radioactive Solid Waste Disposal (RSWD) Records that were prepared by generators of the waste. For each waste package, the RSWD form recorded waste volume, gross weight, waste radioactive content in either grams or curies, waste matrix, waste generator, and waste disposal location and date. The form required the signature of the waste generator, the HSE-1 (Health Physics Group) area representative, group leader (as necessary), and the Waste Management Group (HSE-7) representative. The original RSWD forms for the five Hot Cell Liners waste containers were located in the Documents section of WCATS. These forms along with corresponding TRU Waste Storage Record (TWSR) forms and Waste Profile Request Form, also retrieved from WCATS as reports, are attached as appendices to this report. Appendix B provides the information for Waste Package S910321 placed in Shaft 302; Appendix C provides the information for Waste Package S910322 placed in Shaft 303; Appendix D provides the information for Waste Package S912719 placed in Shaft 304; Appendix E provides the information for Waste Package S912717 placed in Shaft 305; and Appendix F provides the information for Waste Package S910327 placed in Shaft 306.

Attachments to some RSWD forms include narrative information on operations in the hot cell while the hot cell liner was in place, radiation measurements and calculations used to estimate radioisotopes, and size and weight of the hot cell liners and boxes that contain the hot cell liners.

5.1 Physical Characteristics

Type and Size of Waste Containers. The waste containers are steel boxes approximately 6 ft x 6 ft x 10 ft specially designed and built to hold the decommissioned stainless steel alpha-containment boxes (hot cell liners) for transportation to and storage at TA-54 Area G. The containers are non-standard packages and apparently had no formal design review. A May 1991 memorandum (Reference 15) states that "the metal containers are, at best, strong tight packaging, but have not been tested." The steel boxes have lifting lugs at each corner of the top of the box to facilitate ready emplacement and retrieval. Figure 11 shows photographs of a steel box used to contain one of the hot cell liners. The photo on the left shows the box with the top in place and cables attached to the lifting lugs. The photo on the right shows the box with the top steel panel removed.

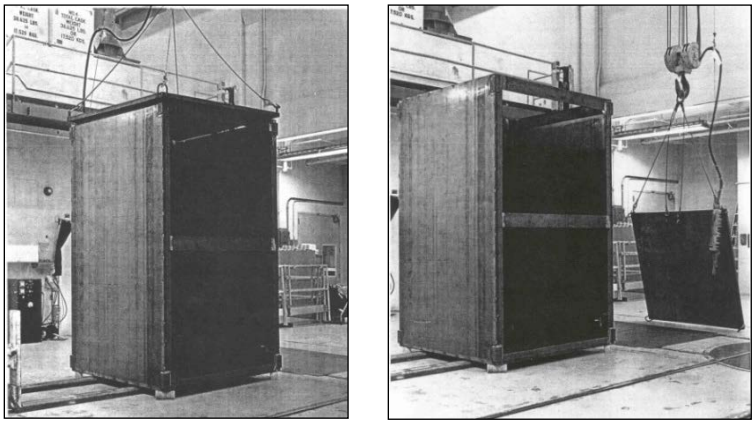

Figure 11. Steel Box used to Contain Hot Cell Liners

Contents of Waste Containers. Each of the five containers contains a single decommissioned stainless steel hot cell liner, similar in configuration to a glovebox. The two hot cell liners placed into the waste containers with Waste Package ID Numbers S910327 and S912717 were described in the narrative attached to the RSWD forms as having dimensions of 65 inches by 65 inches by eight ft tall (Appendices E and F). The others likely have the same or nearly the same dimensions.

Table 2 summarizes the physical characteristics of the five Hot Cell Liners containers. Dimensions and volumes of all of the containers that hold the hot cell liners are exactly the same. Gross weights of the boxes range from approximately 5,400 to 6,200 pounds, and net weights of the hot cell liners waste range from 3,800 to 4,600 pounds. Net weights for waste within each box shown in the waste profile were based on a tare weight for the steel box of 1,600 pounds.

TABLE 2
Waste Container Physical Characteristics

Shaft #	Waste Package or Container ID #	Retrievable Serial Number	Gross Weight (pounds)	Net Weight of Waste (pounds)	Container Dimensions (feet)	Container Volume (m^3)
302	S910321	B19844	5,800	4,200	6 x 6 x10	10.2
303	S910322	019960	6,200	4,600	6 x 6 x10	10.2
304	S912719	B19455	5,600	4,000	6 x 6 x10	10.2
305	S912717	B19525	5,400	3,800	6 x 6 x10	10.2
306	S910327	019366	5,400	3,800	6 x 6 x10	10.2
Totals			28,450	20,400		51.0

Packaging of Waste Containers. Available information indicates the hot cell liners/gloveboxes may have been consolidated by cutting their legs off for packaging into the steel boxes. While no information exists on the status of the legs, it is assumed they were placed inside the liners/boxes. The liners/boxes were wrapped in plastic sheeting before being placed into the steel container. The RSWD forms for the waste packages indicate that three of the hot cell liners were wrapped with one layer of either 3-mil or 4.5 mil plastic, and two of the hot cell liners were wrapped in two layers of 3-mil plastic. Blocking was added to diminish shifting during transport and storage, but no information was located on composition of the blocking material. Figure 12 shows a photograph of a wrapped hot cell liner being placed into a steel box container. Presence of a worker in the photograph provides good perspective on the size of the hot cell liners and the box containers that hold them.

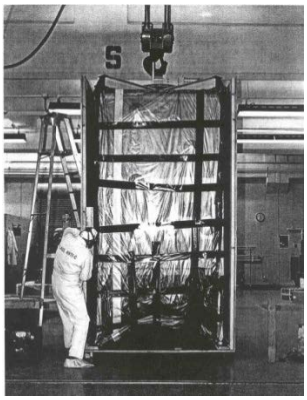

Figure 12. Placement of Hot Cell Liner inside Steel Box Container

5.2 *Radiological Characteristics*

Available Information on Radiological Content of Containers and External Radiation Dose of Containers. The WCATS database provides radionuclide content for each of the five hot cell liners containers based on the RSWD and Waste Profile Request forms provided by the waste generator in 1991. The RSWD forms for the hot cell liners list amounts of nuclear Material Types U38 (approximately 93% uranium-235 or U-235) and PU55 (approximately 84% Pu-239) and estimates of a number of mixed fission products (MFP) isotopes. The WCATS database calculates quantities of a large number of specific isotopes, as well as PE-Ci and Pu-239 fissile gram equivalents (Pu-239 FGE).

Primary radionuclides listed in the WCATS database for the hot cell liners containers consist of Pu-239, Pu-241, U234, and U-235. Other radionuclides listed include americium-241 (Am-241), antimony-125 (Sb-125), barium-137 (Ba-127), cesium-137 (Cs-137), europium-155 (Eu-155), Pu-238, Pu-240, Pu-242, promethium-147 (Pm-147), rhodium-106 (Rh-106), ruthenium-106 (Ru-106), strontium-90 (Sr-90), tellurium-125 (Te-125),U-236, U-238, and yttrium-90 (Y-90).

Three of the RSWD forms for the hot cell liners include a narrative that explains the dose measurements and calculations used in the analysis to estimate quantities of plutonium, uranium, and MFP isotopes reported on the RSWD forms. The MFP isotopes other than Cs-137 were based on a dose measurement that was believed to be primarily due to Cs-137. Table 3 provides a summary of the radiological characteristics of the five Hot Cell Liners waste containers based on information provided by the waste generator in 1991. The hot cell liners were decontaminated remotely “as well as possible” before they were removed and the PE-Ci and Pu-239 quantities are relatively low. Radiation dose measured at the surface of the containers, primarily due to contamination by MFP, was relatively high at the time that the hot cell liners were removed but declined rapidly with distance from the container as seen in the column for radiation dose at one meter. The radiation dose resulting from MFP contamination should be considerably lower today because of the relatively short half-life of the primary MFP isotopes. Totals for PE-Ci and Pu-239 in the table are somewhat higher than the sum of the individual container quantities due to rounding of the values for each container.

TABLE 3
Hot Cell Liners Radiological Characteristics

Shaft Number	Waste Package Number	Retrievable Serial Number	Number of Containers	PE-Ci	Pu-239 FGE	TRU Alpha Concentration (nCi/g)	Radiation at Contact with Surface (mR/hr)	Radiation at 1 meter (mR/hr)
302	S910321	B19844	1	0.05	1.1	23.3	200	32
303	S910322	019960	1	0.15	3.3	53.2	700	120
304	S912719	B19455	1	0.10	2.3	51.4	600	70
305	S912717	B19525	1	0.22	4.9	110.3	800	90
306	S910327	019366	1	0.11	2.5	57.3	650	50
TOTALS			5	0.64	14.2			

A 2005 review of data for the hot cell liners (Reference 16) includes calculations for decay of the radioisotopes reported in the WCATS database for each hot cell liner to the year 2009. These calculations were based on use of an Oak Ridge National Laboratory computer code. Dose rates at contact of the container were also calculated as decayed to 2009. The calculated decayed dose rates were about 35% lower than the initial measured dose rates for three of the hot cell liners containers, but were considerably higher than the initial measured dose rates for two of the containers. This result was not explained in the narrative of the report.

A 2006 inspection and field study of Shafts 302-306 measured surface radiation dose on the top and each side of each of the hot cell liner boxes at several depths from the top of the shafts. These measurements all indicated doses $\leq$ 200 mrem/hour (Reference 13).

Transuranic or TRU waste is defined in the WIPP Waste Acceptance Criteria (Reference 17) as waste contaminated with alpha-emitting transuranic radionuclides (those with atomic number greater than 92) that have half-lives greater than 20 years at concentrations equal to or greater than 100 nanocuries per gram (nCi/g). The weight of the waste for this determination is the weight of the material placed into the payload container (i.e., the net weight of the container) (Reference 17). Calculations on the concentration of alpha-emitting TRU isotopes with half-lives greater than 20 years for the hot cell liners containers are included in Table 3 using container net weights and radiological data in the WCATS TWSR reports for Am-241, Pu-238, Pu-239, and Pu-240 (which were based on radiological content of the containers provided by the waste generator). These calculations show that four of the five containers do not meet this definition and should be considered LLW while the fifth one does and would be considered TRU waste if the steel box is considered to be the payload container. However, the steel boxes are not WIPP-approved containers and are not qualified as Type A containers. They will need to be overpacked into a qualified Type A container for transport. Therefore, gross weight of the current containers hot cell liners and steel boxes) should be considered in the concentration of alpha-emitting TRU isotopes and all five containers would be calculated to have less than TRU levels of contamination under this approach.

Radioassays were performed on each of the five hot cell liners containers stored in Shafts 302-306 during March 2014 to determine/verify/validate whether the containers should be considered LLW or TRU waste per the above definition. The results of these radioassays are shown in Table 4. The Radioassay Data Sheets for the containers are also attached as Appendix G to this report. Weights used in the calculations in the Radioassay Data Sheets include the weights of the steel boxes that hold the hot cell liners as discussed above.

TABLE 4
March 2014 Radioassay Results

Shaft #	Waste Package or Container ID #	TRU Alpha (nCi/g)
302	S910321	14.1
303	S910322	39.6
304	S912719	29.7
305	S912717	92.9
306	S910327	33.4

The results of the calculations for each radioassay show that all five containers assayed less than the limit for TRU waste (which is $\geq$ 100 nCi/g of alpha-emitting transuranic radionuclides with half-lives of 20 years or greater), and thus should be reclassified to be LLW rather than TRU waste.

5.3 Chemical Characteristics

The 1991 Waste Profile Request Form for the hot cell liners waste stream that was attached to the RSWD forms included a certification by the waste generator that the hot cell liners contained no hazardous constituents. The form shows that the waste contains none of a list of 10 specific heavy metals (including arsenic, barium, chromium, lead, mercury, nickel, and selenium) and 21 specific organic compounds (including benzene, carbon tetrachloride, chlorobenzene, chloroform, methyl ethyl ketone, and nitrobenzene), and that there are no other hazardous constituents in the waste. The evaluation was based on knowledge of process. The Waste Profile Request form was also reviewed and the Waste Classification determined to be TRU waste (not hazardous or mixed waste) by a hazardous waste specialist from the LANL Environmental Protection Group (HSE-8).

Waste removed from the hot cells during decommissioning was also identified as non-hazardous by the waste generator, but was assigned a number of EPA Hazardous Waste Numbers (HWNs) during the Acceptable Knowledge (AK) review by the Central Characterization Project (Reference 18). This waste stream was identified as Waste Stream LA-MHD03.002, and was packaged into 16 RH canisters that were shipped to WIPP in 2009. To assign EPA HWNs, AK sources including CMR procedures, personnel interviews, reports, container packaging and shipping documentation, and material safety data sheets for commercial products noted in the AK record were reviewed. A detailed listing of material and chemical inputs was developed and specific EPA HWNs were identified for many specific chemicals and materials. These EPA HWNs were "conservatively assigned for compounds used in the hot cells due to the lack of analytical evidence quantifying the concentration of RCRA toxic constituents in the waste matrix or the identification of the use of listed solvents in the hot cell area" (Reference 18). The detailed listing of material and chemical inputs indicates that paint strippers/removers/ thinners were used for decontamination of alpha containment boxes at some point during operation of the hot cells, but that Fantastic cleaner was used for hot cell cleaning and decontamination of the alpha containment boxes during D&D. Common ingredients of paint strippers/removers/ thinners include acetone, butanol, benzene, methylene chloride, toluene, methanol, methyl ethyl ketone, and isopropanol (Reference 18).

6. Retrieval and Processing Hot Cell Liners Waste

As discussed above, the recent assay of the containers that hold the hot cell liners provided results that all five of the containers are contaminated with levels of TRU isotopes below 100 nCi/g. Under the WIPP Waste Acceptance Criteria (WAC) (Reference 17), these containers would not be eligible for disposition at WIPP if contamination is less than100 nCi/g of alpha-emitting TRU isotopes with half lives greater than 20 years. The containers should be reclassified to LLW (if confirmed as non-hazardous) or MLLW. If determined to be non-hazardous, this raises the question of whether or not the containers that hold the hot cell liners require retrieval from Shafts 302-306. Options to disposition the containers in Shafts 302-306 without retrieval and retrieving the containers from the shafts with disposition off the LANL site are discussed below.

6.1 Disposition of Hot Cell Liners Without Retrieval

One of the commitments in the January 2012 Framework Agreement between DOE/NNSA and the NMED (Reference 2) states: "Based on projected funding profiles, DOE/NNSA will develop by December 31, 2012, a schedule, including pacing milestones, for disposition of the below-ground TRU requiring retrieval at Area G."

The *Schedule for Disposition of Below-Ground Transuranic Requiring Retrieval* (Reference 3) that was submitted to the NMED on December 10, 2012, under the Framework Agreement states in part:

- "DOE/NNSA has determined that there are seven below-ground waste unit categories within Area G that potentially contain TRU waste *that may require retrieval* (emphasis added)."
- ". . . , but some of this waste volume may later be determined to be low-level waste (LLW) that would not require retrieval."
- "The schedule and pacing milestones assume that the waste volumes determined to be LLW will not be removed, but will be considered to be dispositioned for the purpose of the schedule and pacing milestones above."

Based on these provisions, it does not appear that the Framework Agreement and schedule submitted under the Framework Agreement would require retrieval if the hot cell liners containers are reclassified as LLW. However, there are other issues that must be addressed for a determination that the hot cell liners containers should not be retrieved and can remain in Shafts 302-306. These issues include whether there is sufficient information for a definitive determination that the containers do not contain hazardous waste, whether the containers meet the LANL Waste Acceptance Criteria (WAC) for LLW, and whether DOE/NNSA would approve leaving the containers in place. Shafts 302-306 are not currently authorized for LLW disposal because the DOE-approved Performance Assessment/Composite Analysis does not include the waste in these shafts since it was identified as retrievably-stored TRU waste (Reference 19).

As discussed above, the Waste Profile Form for the hot cell liners waste stream included a certification by the waste generator in 1991 that there were no hazardous constituents in the waste and the waste classification was determined to be TRU waste and not hazardous or mixed waste. This determination that the waste contains no hazardous constituents was based on knowledge of process rather than sampling and analysis, and needs to be confirmed as sufficient if the containers are to be disposed at Area G because LANL is not permitted to dispose of hazardous or mixed waste at Area G. Also as discussed above, the waste generated during decommissioning of the hot cells was conservatively assigned a number of EPA HWNs by the CCP based on identification of materials and chemicals used in and around the hot cells.

Based on the available information, it appears likely that the containers that hold the hot cell waste do not meet the Section 3.1.1 requirement in the LANL WAC for LLW (Reference 20) that the "void space within the waste or the waste package must not exceed 10%." It appears that the hot cell liners are empty and the void space in the container would be considerably greater than 10%. It may be possible to meet this requirement by filling the

void space within the hot cells with cement grout, or obtain an exception to this requirement by grouting of the containers in the shafts or use of some other treatment to minimize future subsidence of the area above the shafts.

Disposal of the hot cell liners containers in Shafts 302-306 is also currently excluded from the Area G LLW Performance Assessment/Composite Analysis inventory because the containers were expected to be retrieved. A Supplement Analysis and approval by DOE/NNSA would be required to address this issue. Finally, there may be other state or federal requirements to fulfill before a decision to leave the hot cell liners in Shafts 302-306 could be final.

6.2 Retrieval of Hot Cell Liners and Disposition Off the LANL Site

The other option is to retrieve the containers that hold the hot cell liners from Shafts 302-306 and disposition the containers at an approved location off the LANL site, either as LLW or MLLW. The option of disposing of the containers as LLW at another site at LANL (other than Shafts 302-306) was not considered because LANL is scheduled to exhaust all other currently available LLW disposal capacity during FY 2014.

Retrieval of the five containers from Shafts 302-306, although involving a critical lift, should be straight-forward and consist primarily of removing the steel cover from the shafts, lifting the steel containers that hold the hot cell liners from the shafts using the lifting hooks on the boxes with a crane, and placing the hot cell liners boxes in a staging area. The containers would then be moved to above-ground storage and processing for disposition. There is some concern for tritium exposure during removal because there is a tritium plume in the soil in the vicinity of Shafts 302-306 (Reference 13).

A 2006 inspection of the containers stored in Shafts 302-306 (Reference 13) showed:

- There was no standing water in the bottom of the shafts;
- The hot cell liners containers (boxes) were in good condition
- Welded seams had no visible rust and were intact;
- Lifting hooks on the boxes were in good condition with no visible signs of deterioration; and
- Smears of the box surfaces showed radiation contamination was within limits for free release.

Air and swipe sampling conducted during the 2006 inspection (Reference 13) showed that:

- Tritium air concentrations exceeded the recommended action level of 20 microcuries per cubic meter ($\mu Ci/m^3$) three of the seven days in the field with measured values between 7 - 150 $\mu Ci/m^3$. However, the authors concluded that the tritium air concentrations detected by the tritium air monitoring instruments were likely reported higher than the true tritium concentration in the air because weather conditions may have caused radon emissions from the soil to be measured as tritium by the instruments that were used;
  - Air sampling results indicated concentrations for the lower explosive limit, volatile organic compounds (VOCs), carbon monoxide, and hydrogen sulfide concentrations were all below action levels. SUMMA® canister results further confirmed VOCs were below action levels. The report concluded that there was no explosive hazard or any concern for exposure to VOCs, carbon monoxide, or hydrogen sulfide;
  - Oxygen levels were normal;
  - Airborne levels of radionuclides were less than the Derived Air Concentration limits, and therefore respiratory protection would not be needed to conduct retrieval operations at Shafts 302-306;
  - There was no removable radiological contamination on the hot cell liners;
  - There was no detected tritium activity in any of the smears collected from the hot cell liners; and.
  - Dose rates on the exterior surface of the steel boxes were less than WIPP acceptance criteria for contact handled waste ($\leq$ 200 mrem/hour).

It has been approximately eight years since this inspection and sampling of the hot cell liner shafts, and a similar inspection and sampling campaign is highly recommended before retrieval is initiated. However, there is no reason to believe that the containers are not in good condition or that there will be major issues in retrieval based on the configuration of the shafts and the previous inspection and field study. Readiness activities may also be required.

There are two general options for final disposition of the hot cell liners containers off-site:

1. Off-site disposal as LLW at one of three LLW disposal sites in Utah, Texas, or Nevada provided the waste can be verified to meet the offsite facility's WAC, and there is a final determination that the waste contains no hazardous constituents. As discussed above, the 1991 LANL Waste Profile Form included a certification by the waste generator that there were no hazardous constituents, based on knowledge of process.
2. Offsite treatment for MLLW, if hazardous waste constituents exist or if there is a decision to conservatively assume that hazardous constituents may exist, followed by disposal. Once again, this assumes that the waste can be verified to meet the offsite facility's WAC.

Regardless which of the above options is chosen, the general process for disposition will include:

1. Characterization of the waste in accordance with the receiving facility's WAC. Characterization will define radiological constituents, radiation dose at the exterior surfaces of the boxes, hazardous waste constituents, and prohibited items (e.g., liquids, explosives, void spaces, etc.) Because Container S912717 is so close to the TRU waste concentration limit, it is recommended that this container be reassayed after removal from Shaft 305 to confirm that the concentration of alpha-emitting TRU isotopes with half-lives greater than 20 years is less than 100 nCi/g.
2. Consideration should be given to decontamination and surface-contaminated object characterization of the hot cell liner in Container S912717 to provide greater confidence that TRU alpha contamination is below the TRU waste limit. If the surface dose rates for any of the five boxes exceed 200 mrem/hour, it may be desirable to decontaminate the glove box liner so that the container can be managed as contact-handled waste.
3. Radiography or visual verification that there are no prohibited items within the hot cell liners.
4. Remediation (filling void space or size reduction to reduce void space, or addressing other issues) if required to meet the receiving facility's WAC.
5. Documentation of the characterization information on the receiving facility's Waste Profile Form (WPF) and submittal of the form for review and approval. If the waste is MLLW it may be necessary for the waste to be treated at one facility, and transported to another facility for final disposition. In this case, the goal would be to contract with the treatment facility to handle the whole process: treatment, transport to disposal facility, and disposal.
6. Obtaining approval of the WPF from the receiving facility.
7. Performing an independent verification of the waste characterization.
8. Packaging the waste for transportation and disposal.
9. Preparation of a disposal request with transportation information for the receiving facility's review and approval.
10. Obtaining approval of the disposal request.
11. Shipping the waste for disposal.

Considerations in accomplishing the above process include:

1. Contracts for as needed treatment, as needed transportation, and disposal.
2. DOE approval to treat, store, and dispose at a non-DOE site. This is referred to as a DOE Order 435.1 exemption to the requirement that LLW generated at DOE facilities be preferentially treated, stored, and disposed at the site where the waste is generated (if practical), or at another DOE facility. The DOE *Radioactive Waste Management Manual* (Reference 8) allows for an exemption from this requirement

provided the use of a commercial facility for disposition of a specific waste stream is in the best interest of DOE. In order to ship LLW or MLLW to one of the commercial facilities, an exemption request for a waste stream would need to be approved by the Los Alamos Field Office with notification to DOE Headquarters, Office of the Assistant Secretary for Environment, Safety and Health.

7. References

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Appendix A

Disposal Log Book Pages Related to Hot Cell Liners

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(SHAFTS) 8/78 to 12/91 (3873)

T.R.U. HOT CELL STORAGE

SHAFT AND DATE RECEIVED	RSWD	GROUP	WPRF	WASTE ORGIN	WASTE TYPE	NUMBER OF PACKAGE	VOLUME	Fissile Amount	Accomulated Fissle Amount	~~HSE~~ EM-7 Rep.
12-05-91 SHAFT NO. 304	912719 BOX NO. 019455	MST-5	00538	TA-3	HOT CELL WASTE	S-S ALPHA Bx.	360.0F			A. Catanach
12-05-91 SHAFT NO. 302	910321 BOX NO. 19894	MST-5	00538	TA-3	HOT CELL WASTE	STAINLESS STEEL BOX	360.0F.			A. Catanach
12-05-91 SHAFT NO. 303	910322 BOX NO. 19960	MST-5	00538	TA-3	HOT CELL WASTE.	STAINLESS STEEL BOX	360.0F			A. Catanach
12-05-91 SHAFT NO. 305	912717 BOX NO. 19525	MST-5	00538	TA-3	HOT CELL WASTE	STAINLESS STEEL BOX	360.0F			A. Catanach
12-05-91 SHAFT NO. 306	910327	MST-5	00538	TA-3	HOT CELL WASTE.	STAINLESS STEEL BOX	360.0F			A. Catanach.

Appendix B

TRU Waste Storage Information,
Container S910321 Stored in Shaft 302

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TRU WASTE STORAGE RECORD

S910321

1. Generator's Pre-Use Visual Inspection

Purchase Order #	Inspected Items		
This container has been visually inspected according to approved procedures and has been found to be free of damage that would make it unsuitable for TRU waste packaging.	☐ Ring, Bolt, and Nut	☐ Chime	☐ Dents
	☐ Lid and Gasket	☐ Gouges	☐ Paint

Printed Name	Signature	Sig. Date	Oper. Date

2. Generator's Package Information

Group	Technical Area	Building	Cost Center	Program Code	Cost Account	Work Package
LTP-PTS	54	000000				

Additional Information

☐ DP ☐ Non-DP If Non-DP waste, attach DOE approval doc.

Container	Liner
☐ Steel Drum (55 gal.)	☑ None
☐ Pipe Overpack Type:	☐ 90 mil liner
☐ Steel Drum (85 gal Overpack)	☐ 125 mil liner
☐ Standard Waste Box	☐ Fiberboard Liner
☐ Standard Waste Box Overpack	**Internal Shielding**
☐ RH Canister	☑ None
☐ Other (Call TWCO)	Type / Thickness

Radionuclide Content

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Am-241	1.082E-002	0.000E+000	C
Cs-137	2.700E-001	0.000E+000	C
Pu-238	3.599E-003	0.000E+000	C
Pu-239	1.822E-002	0.000E+000	C
Pu-240	1.171E-002	0.000E+000	C
Pu-241	3.729E-001	0.000E+000	C
Pu-242	4.194E-006	0.000E+000	C
Ru-106	1.979E-003	0.000E+000	C

Filter Serial No.			
	01		
	02		

Waste Profile Number	53393 (WS ID 37017)
Gross Weight (lb.)	5.80E+003
Net Weight (lb.)	4.20E+003
Shipping Category	
LANL Waste Stream ID	TA-03-27
TRUCON Code	

Hazardous Materials

Name	EPA Code	Qty (g)

Date Closed (MM/DD/YY):

Accumulation Start Date (MM/DD/YY): 12/04/91

The data in this section were collected, and waste described herein was packaged and labeled according to approved procedures.

Printed Name	Signature	Date:

3. Generator Site Health Physics Information

	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Gamma Dose Rate (mrem/h) (contact)				
Neutron Dose Rate (mrem/h) (contact)				

Total Dose Rate (mrem/h) (contact)	
Total Dose Rate (mrem/h) (1 meter)	*The data in this section were collected according to approved procedures.*
Alpha Contamination (dpm/100cm2)	Printed Name / Date
Beta-Gamma Cont (dpm/100 cm2)	Signature

TRU WASTE STORAGE RECORD

S910321

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.	Printed Name	Date:
	Signature	

5. Preload Visual Inspection

This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and defects.	Printed Name	Date:

6. Receiving Site Health Physics Information

Gamma Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Neutron Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Total Dose Rate (mrem/h) (contact)	*The data in this section were collected according to approved procedures.*			
Total Dose Rate (mrem/h) (1 meter)				
Alpha Contamination (dpm/100cm2)	Printed Name			Date
Beta-Gamma Cont (dpm/100 cm2)	Signature			

7. Storage Site Information

Received by (Initials)	Date Received	**Original Storage Data**		
This waste package was visually inspected and found to be properly labeled and in good condition. It was accepted and inspected according to approved procedures.		Building Number	Layer	Row Number
		Column Number	Date Stacked (MM/DD/YY)	
Printed Name	Date:	Printed Name	Date:	
Signature		Signature		

8. Waste Acceptance Office

Intials/Date	WE Description

NCR Number	Intials/Date	NCR Description

9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Sr-90	2.468E-001	0.000E+000	C
U-234	9.022E-005	0.000E+000	C
U-235	2.817E-006	0.000E+000	C
U-236	3.715E-007	0.000E+000	C
U-238	2.604E-008	0.000E+000	C
Y-90	2.468E-001	0.000E+000	C

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials

Name	EPA Code	Qty (g)
No Additional Hazardous Materials		

CONTAINER PROFILE
S910321
T-TTRU-TEMP

WS ID: 37017
C ID: 791773
Opt ID: B19844
ACTIVE

GENERAL INFORMATION

Container ID:	791773		
Labeled ID:	S910321		
Optional ID:	B19844	**Status:**	ACTIVE
Chemical Barcode:		**Decommissioned:**	NO
Physical State:	SOLID	**Container Type:**	SC: Shield cask
Waste Stream ID:	37017	**Container Subtype:**	Remotely handled canister
Work Path:	T-TTRU-TEMP	**Origin Date:**	04-Dec-1991 12:00 am
Quantity (Univ):		**Accum Start Date:**	04-Dec-1991
Compactible:		**Closed Date:**	

Discard Matrix:

TID(s):

Gen Contact:

Insert By: WCATS APPLICATION (000000)

Waste Desc: GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume:	10.20 CM	**Gross Weight:**	5800.91 lb
Waste Volume:	NOT SPECIFIED	**Tare Weight:**	1600.00 lb
		Net Weight:	4200.91 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT302

CONTAINER PROFILE
S910321
T-TTRU-TEMP

WS ID: 37017
C ID: 791773
Opt ID: B19844
ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: **Year of Manuf:**

Lot No.: **Serial No:**

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: **Equiv. Comb. Matrix:**

Adeq. Ventilation: **Compliant Metal Cont.:** YES

Overpack (1 to 1): NO **Retrievable:** **BIR WS Code:** LA-RM14

Content Code:

COST CODES

Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
------	X77A	----	----	100.00			*SELECTION LIST*

EPA CODES

System Code	Hazardous Waste No.	Waste Description & Treatment Subcategory

RADIONUCLIDES

Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Active, Assay Page: 377206, Date: 12/04/1991, Derivation: Generator Entered Results (e.g., Offsite Assay)								
38	1.40E+000	g	0.00E+000	N				NONE
55	3.50E-001	g	0.00E+000	N				NONE
Am-241	1.08E-002	Ci	0.00E+000	Y			Y	
Cs-137	2.70E-001	Ci	0.00E+000	N			Y	
Pu-238	3.60E-003	Ci	0.00E+000	Y			Y	
Pu-239	1.82E-002	Ci	0.00E+000	Y			Y	
Pu-240	1.17E-002	Ci	0.00E+000	Y			Y	
Pu-241	3.73E-001	Ci	0.00E+000	Y			Y	
Pu-242	4.19E-006	Ci	0.00E+000	Y			Y	
Ru-106	1.98E-003	Ci	0.00E+000	N			Y	
Sr-90	2.47E-001	Ci	0.00E+000	N			Y	
U-234	9.02E-005	Ci	0.00E+000	Y			Y	
U-235	2.82E-006	Ci	0.00E+000	Y			Y	
U-236	3.71E-007	Ci	0.00E+000	Y			Y	
U-238	2.60E-008	Ci	0.00E+000	Y			Y	
Y-90	2.47E-001	Ci	0.00E+000	N			Y	

CONTAINER PROFILE
S910321
T-TTRU-TEMP

WS ID: 37017
C ID: 791773
Opt ID: B19844
ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g):	6.20768E+02	**DOTFissile Mat (g):**	1.60006E+00	
Alpha (nCi/g):	2.33281E+01	**Transport Index:**		
TRU Alpha (nCi/g):	2.32743E+01	**NRC Class:**	C	
Pu-239 FGE:	1.14069E+00	**DOT Type:**	B	
Pu-239 FGE [2U]:	1.14069E+00	**LSA-I Fraction:**	5.03699E+01	N
Pu-239 Eq-Ci:	5.21946E-02	**LSA-II Fraction:**	1.02298E-02	Y
Pu-239 Eq-Ci [2U]:	5.21946E-02	**LSA-III Fraction:**	5.11492E-04	Y
TRU Pu-239 Eq-Ci:	5.15191E-02	**Reportable Quantity:**	7.57337E+00	Y
TRU Pu-239 Eq-Ci [2U]:	5.15191E-02	*** ALC Ratio:**	2.69640E+06	NE
Decay Heat [U] (W):	3.39680E-03	*** ACM Ratio:**	1.51110E+03	NE
Tritium (Ci/m3):	0.00000E+00	**Limited Quantity:**	1.94930E+03	N
TRU ECW PE-Ci:	5.15191E-02			

Weight/Volume Used:

1	Container Net Weight:	1.90550E+03 kg
2	Container Volume:	1.01950E+01 m3

**ALC (Activity Limit for Exempt Consignment)*
**ACM (Activity Concentration for Exempt Material)*
U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY

Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
12/05/1991 12:00 AM	1784365 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT302	NO

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION

Doc. Number	Title	Uploaded By
1	S910321-TWSR	WCATS APPLICATION (000000)

COMMENTS

Date Time/ User Name	Comment
08/23/2013 9:37 AM WCATS APPLICATION (000000)	CELL4 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538

EDIT LOG

Date Time/ User Name	Quality Record	Explanation
02/12/2014 7:52 AM ROBERT W JONES (117434)	NO	Edit Admin Form Authorization; Looking for [P=108734, A=class gov.lanl.wcats.view.profile.container.dialog.JCVerification]; Error: Permission Not Found; Reason for Edit: Open Dialog
02/12/2014 7:52 AM ROBERT W JONES (117434)	NO	Edit Admin Form Authorization; Looking for [P=108734, A=class gov.lanl.wcats.view.profile.container.dialog.JCSTPEditor]; Error: Permission Not Found; Reason for Edit: Open Dialog

EDIT LOG

Date Time/ User Name	Quality Record	Explanation
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S910321, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = CELL4 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 5800.914, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19844, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 1.13671611990102737313229691764706189 67, [PKG_LOT] = , [PKG_PE_ACT] = .05157782385191051550947798954786673158 8, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .00337835082914145470059254051738804837 4, [TOTAL_DOSE] = 200, [TOT_ANCG] = 23.37646208861446903703501513724082749 14, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [NET_WT] = 4200.914, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12682, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S910321, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors
08/23/2013 8:50 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=791773/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RH-TRU

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 0321

2. Date: M M D D Y Y — 0 8 2 3 9 1

3. Retrievable Serial Number: B 1 9 8 4 4

4. Origin of Waste

Group	TA	Building	Wing	Program Code
M S T 5	3	2 9	9	X 7 7 A

5. Waste Code: A 4 1

6. Waste Description: CELL 4 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
3 6 0 0	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
2 0 0	3 2

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
2.9	T

11. Additional Description of Packaging and Packaging Materials

~~[illegible] [illegible] [illegible] [illegible] Box~~

1 W STEEL BOX WPRF 0 0 5 3 8

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
4 3 8	1.4 0 0 E	+0	m	8.3 0 0 E	-1	A		
P u 5 5	3.5 0 0 E	-1	m	2.1 0 0 E	-1	A		
C S 1 3 7	2.7 0 0 E	-1	C	. E		E		
S R 9 0	2.4 6 8 E	-1	C	. E		E		
Y 9 0	2.4 6 8 E	-1	C	. E		E		
R U 1 0 6	1.9 7 9 E	-3	C	. E		E		

APPROVALS

Waste Generator *(Print Name Here)*: Tobias J Romero

Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met *(Signature)*: Tobias Romero

HSE-1/-10/-11 Area Representative *(Print Name Here)*: Kenneth L Ault

Signature certifies that waste package or shipment is safe to handle and transport (Signature): K. Ault

Additional Signatures *(Optional)*: Reviewed E. Dow 8/30/91

13. Date Disposed: M M D D Y Y — 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	3 0 2		T		

15. Shaft Surface Dose: mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*: ANDREW J. CHAVARRIA

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*: A. J. Chavarria

Received	Logbook	Computer	Verified
AC	AC		
Date 12/5	Date 12/5	Date 12/23	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number S 9 1 0321 ~~0512~~ Continuation

2. Date M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste

Group	TA	Building	Wing	Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
Rh 106	1.979	E -3	C		E	E		
Sb 125	1.099	E -2	C		E	E		
Tc 125m	4.563	E -3	C		E	E		
Ba 137m	2.533	E -1	C		E	E		
Pm 147	1.542	E -2	C		E	E		
Eu 155	5.049	E -3	C		E	E		

APPROVALS

Waste Generator *(Print Name Here)*	**HSE-1/-10/-11 Area Representative** *(Print Name Here)*	**Additional Signatures** *(Optional)*
Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed M M D D Y Y

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.

15. Shaft Surface Dose mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*	Received	Logbook	Computer	Verified
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*	Date	Date	Date	Date

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 0 3 2 1	0 1 9 8 4 4

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.)	1.0E+1
Organic Material Volume (%)	0

Internal Shielding Type	Thickness (in.)
☒ None	
☐ Lead	.E
☐ Steel	.E
☐ Concrete	.E
☐ Other	.E

Nonradioactive Hazardous Materials Name	EPA Code	Quantity (g)
None		.E
		.E
		.E
		.E

Internal Packaging	Additional Information
☒ Plastic bags Number 1 Thickness 4.5 mil ☐ 90-mil HDPE Liner ☒ Blocking ☐ Other	Contaminated stainless steel Alpha containment box wrapped in plastic and packed in a 6 ft x 6 ft x 10 ft steel box. WPRF Reference Number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Tobias J Romero	Tobias J Romero	8/23/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	2.0E+2	Survey Meter Model RO-3C	Property No. 002691
Neutron Dose Rate (mrem/h)	.0E+0	Survey Meter Model PNR-4	Property No. 005213
Total Dose Rate (mrem/h)	2.0E+2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	5.1E+0	Printed Name Kenneth Auld	Date 8-23-91
Beta-Gamma Cont. (dpm/100cm²)	1.8E+2	Signature K. Auld	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE LE BRUN	Bruce L Brun	8/27/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	.E+	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	.E+	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	.E+	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	.E+	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	.E+	Signature	

HS Form Number 10-5B (11/88)

PACKAGING CONDITION INSPECTION

Waste Package Serial Number
0019844

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

I. GENERATOR'S PRE-USE VISUAL INSPECTION

Drum Lot Code	N/A	**Inspection Items**	**Initials**
Year Of Mfgr.	N/A	Ring, Bolt, & Nut	N/A
Box Serial No.	N/A	Lid & Gasket	N/A
Comments: container used for transportation and storage at TA-54 Area 'G' only		Chime	N/A
		Dents	TC
		Gouges	TC
		Paint	TC

This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging.

Name	Signature	Date
Tobias J Romero	Tobias J Romero	8/23/91

II. DRIVER'S VISUAL INSPECTION

Inspection Items	Initials
Filter	
Labels	
Damage	
Closure Ring	
TID Seal No.	

This waste package was visually inspected at time of pickup as required by approved procedures, and was found to be free of obvious damage or defects.

Comments

Name	Signature	Date

III. TA-54 INSPECTION

Weight (lbs.)
TID Seal No.
Comments:

This waste package was visually inspected for handling damage before shipping, and, if the package is a drum, the closure ring bolt was tightened as required by approved procedures.

Name	Signature	Date

HS Form Number 10-5C (11/88)

nal Laboratory
/ Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number
00538

...n sides of this form using a black or blue pen. Inadequate information will result in processing delays.
...eted form to: ATTN: WPRF, MS K490

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	WQ-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM
- ☒ Solid
- ☐ Cemented Sludge
- ☐ Semi-Solid/Sludge
- ☐ Absorbed Liquid
- ☐ Liquid
- ☐ Gas
- ☐ Multi-Layer
- ☐ Suspended Solids
- ☐ Powder or Ash

FLASH POINT (°F)
- ☐ Less Than 100
- ☐ 100 to 139
- ☐ 140 to 200
- ☐ Greater Than 200
- ☒ None

pH
- ☐ 2.0 or Less
- ☐ 2.1 to 12.4
- ☐ 12.5 or Greater
- ☒ Not Applicable

REACTIVITY
- ☐ Unstable
- ☐ Reacts With Water
- ☐ Cyanides
- ☐ Sulfides
- ☐ Shock Sensitive
- ☐ Class A or B Explosive
- ☒ Non-Reactive

PCBs
- ☐ < 50 ppm
- ☐ 50-500 ppm
- ☐ > 500 ppm
- ☒ No PCBs

Indicate Known Radioactivity Of Your Waste:
☐ Not Radioactive (Go To Next Section)

- ☐ < 2.0 nC/g
- ☐ > 2.0 nC/g
- ☐ > 10.0 nC/g
- ☒ > 100.0 nC/g
- ☒ Alpha
- ☒ Beta
- ☒ Gamma
- ☐ Tritium

List Known Radioistopes:
☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1.	235U	Activity/Unit of Measure	NA
Radiosotope 2.	239Pu	Activity/Unit of Measure	
Radiosotope 3.	MFP	Activity/Unit of Measure	
Radiosotope 4.	MAP	Activity/Unit of Measure	

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067		6-27-9.

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
	GARCIA DARYLL	G 730

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted con

	None			KOP	TCLP	Oth
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ → ☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ → ☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ → ☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ → ☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ → ☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ → ☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

	Compound Name	Concentration		Compound Name	Concentration
1.			5.		
2.			6.		
3.			7.		
4.			8.		

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
[signature]	7/1/91	

Appendix C

TRU Waste Storage Information, Container S910322 Stored in Shaft 303

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TRU WASTE STORAGE RECORD

S910322

1. Generator's Pre-Use Visual Inspection

Purchase Order #	Inspected Items		
This container has been visually inspected according to approved procedures and has been found to be free of damage that would make it unsuitable for TRU waste packaging.	☐ Ring, Bolt, and Nut	☐ Chime	☐ Dents
	☐ Lid and Gasket	☐ Gouges	☐ Paint

Printed Name	Signature	Sig. Date	Oper. Date

2. Generator's Package Information

Group	Technical Area	Building	Cost Center	Program Code	Cost Account	Work Package
LTP-PTS	54	000000				

Additional Information

☐ DP ☐ Non-DP If Non-DP waste, attach DOE approval doc.

Container	Liner
☐ Steel Drum (55 gal.)	☑ None
☐ Pipe Overpack Type:	☐ 90 mil liner
☐ Steel Drum (85 gal Overpack)	☐ 125 mil liner
☐ Standard Waste Box	☐ Fiberboard Liner
☐ Standard Waste Box Overpack	**Internal Shielding**
☐ RH Canister	☑ None
☐ Other (Call TWCO)	Type / Thickness

Radionuclide Content

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Am-241	3.091E-002	0.000E+000	C
Cs-137	7.950E-001	0.000E+000	C
Pu-238	1.028E-002	0.000E+000	C
Pu-239	5.207E-002	0.000E+000	C
Pu-240	3.344E-002	0.000E+000	C
Pu-241	1.065E+000	0.000E+000	C
Pu-242	1.198E-005	0.000E+000	C
Ru-106	5.827E-003	0.000E+000	C

Filter Serial No.			
	01		
	02		

Waste Profile Number	53393 (WS ID 37017)
Gross Weight (lb.)	6.20E+003
Net Weight (lb.)	4.60E+003
Shipping Category	
LANL Waste Stream ID	TA-03-27
TRUCON Code	

Hazardous Materials

Name	EPA Code	Qty (g)

Date Closed (MM/DD/YY):

Accumulation Start Date (MM/DD/YY): 12/04/91

The data in this section were collected, and waste described herein was packaged and labeled according to approved procedures.

Printed Name	Signature	Date:

3. Generator Site Health Physics Information

	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Gamma Dose Rate (mrem/h) (contact)				
Neutron Dose Rate (mrem/h) (contact)				

Total Dose Rate (mrem/h) (contact)	
Total Dose Rate (mrem/h) (1 meter)	*The data in this section were collected according to approved procedures.*
Alpha Contamination (dpm/100cm2)	Printed Name / Date
Beta-Gamma Cont (dpm/100 cm2)	Signature

TRU WASTE STORAGE RECORD

S910322

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.	Printed Name	Date:
	Signature	

5. Preload Visual Inspection

This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and defects.	Printed Name	Date:

6. Receiving Site Health Physics Information

Gamma Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Neutron Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Total Dose Rate (mrem/h) (contact)	*The data in this section were collected according to approved procedures.*			
Total Dose Rate (mrem/h) (1 meter)				
Alpha Contamination (dpm/100cm2)	Printed Name			Date
Beta-Gamma Cont (dpm/100 cm2)	Signature			

7. Storage Site Information

Received by (Initials)	Date Received	**Original Storage Data**		
This waste package was visually inspected and found to be properly labeled and in good condition. It was accepted and inspected according to approved procedures.		Building Number	Layer	Row Number
		Column Number	Date Stacked (MM/DD/YY)	
Printed Name	Date:	Printed Name	Date:	
Signature		Signature		

8. Waste Acceptance Office

Intials/Date	WE Description

NCR Number	Intials/Date	NCR Description

9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Sr-90	7.266E-001	0.000E+000	C
U-234	2.642E-004	0.000E+000	C
U-235	8.249E-006	0.000E+000	C
U-236	1.088E-006	0.000E+000	C
U-238	7.626E-008	0.000E+000	C
Y-90	7.266E-001	0.000E+000	C

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials

Name	EPA Code	Qty (g)
No Additional Hazardous Materials		

CONTAINER PROFILE
S910322
T-TTRU-TEMP

WS ID: 37017
C ID: 769768
Opt ID: B19960
ACTIVE

GENERAL INFORMATION

Container ID:	769768		
Labeled ID:	S910322		
Optional ID:	B19960	**Status:**	ACTIVE
Chemical Barcode:		**Decommissioned:**	NO
Physical State:	SOLID	**Container Type:**	SC: Shield cask
Waste Stream ID:	37017	**Container Subtype:**	Remotely handled canister
Work Path:	T-TTRU-TEMP	**Origin Date:**	04-Dec-1991 12:00 am
Quantity (Univ):		**Accum Start Date:**	04-Dec-1991
Compactible:		**Closed Date:**	

Discard Matrix:

TID(s):

Gen Contact:

Insert By: WCATS APPLICATION (000000)

Waste Desc: GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume:	10.20 CM	**Gross Weight:**	6201.12 lb
Waste Volume:	NOT SPECIFIED	**Tare Weight:**	1600.00 lb
		Net Weight:	4601.12 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT303

CONTAINER PROFILE
S910322
T-TTRU-TEMP

WS ID: 37017
C ID: 769768
Opt ID: B19960
ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: **Year of Manuf:**

Lot No.: **Serial No:**

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: **Equiv. Comb. Matrix:**

Adeq. Ventilation: **Compliant Metal Cont.:** YES

Overpack (1 to 1): NO **Retrievable:** **BIR WS Code:** LA-RM14

Content Code:

COST CODES

Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
------	X77A	----	----	100.00			*SELECTION LIST*

EPA CODES

System Code	Hazardous Waste No.	Waste Description & Treatment Subcategory

RADIONUCLIDES

Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Active, Assay Page: 338172, Date: 12/04/1991, Derivation: Generator Entered Results (e.g., Offsite Assay)								
38	4.10E+000	g	0.00E+000	N				NONE
55	1.00E+000	g	0.00E+000	N				NONE
Am-241	3.09E-002	Ci	0.00E+000	Y			Y	
Cs-137	7.95E-001	Ci	0.00E+000	N			Y	
Pu-238	1.03E-002	Ci	0.00E+000	Y			Y	
Pu-239	5.21E-002	Ci	0.00E+000	Y			Y	
Pu-240	3.34E-002	Ci	0.00E+000	Y			Y	
Pu-241	1.07E+000	Ci	0.00E+000	Y			Y	
Pu-242	1.20E-005	Ci	0.00E+000	Y			Y	
Ru-106	5.83E-003	Ci	0.00E+000	N			Y	
Sr-90	7.27E-001	Ci	0.00E+000	N			Y	
U-234	2.64E-004	Ci	0.00E+000	Y			Y	
U-235	8.25E-006	Ci	0.00E+000	Y			Y	
U-236	1.09E-006	Ci	0.00E+000	Y			Y	
U-238	7.63E-008	Ci	0.00E+000	Y			Y	
Y-90	7.27E-001	Ci	0.00E+000	N			Y	

CONTAINER PROFILE
S910322
T-TTRU-TEMP

WS ID: 37017
C ID: 769768
Opt ID: B19960
ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g):	1.65130E+03	**DOTFissile Mat (g):**	4.66464E+00	
Alpha (nCi/g):	6.08575E+01	**Transport Index:**		
TRU Alpha (nCi/g):	6.07139E+01	**NRC Class:**	C	
Pu-239 FGE:	3.31894E+00	**DOT Type:**	B	
Pu-239 FGE [2U]:	3.31894E+00	**LSA-I Fraction:**	1.32930E+02	N
Pu-239 Eq-Ci:	1.49186E-01	**LSA-II Fraction:**	2.67185E-02	Y
Pu-239 Eq-Ci [2U]:	1.49186E-01	**LSA-III Fraction:**	1.33593E-03	Y
TRU Pu-239 Eq-Ci:	1.47197E-01	**Reportable Quantity:**	2.18787E+01	Y
TRU Pu-239 Eq-Ci [2U]:	1.47197E-01	*** ALC Ratio:**	7.87863E+06	NE
Decay Heat [U] (W):	9.87538E-03	*** ACM Ratio:**	3.98791E+03	NE
Tritium (Ci/m3):	0.00000E+00	**Limited Quantity:**	5.57624E+03	N
TRU ECW PE-Ci:	1.47197E-01			

Weight/Volume Used:

1	Container Net Weight:	2.08703E+03 kg
2	Container Volume:	1.01950E+01 m3

**ALC (Activity Limit for Exempt Consignment)*
**ACM (Activity Concentration for Exempt Material)*
U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY

Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
12/05/1991 12:00 AM	1784396 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT303	NO

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION

Doc. Number	Title	Uploaded By
1	S910322-TWSR	WCATS APPLICATION (000000)

COMMENTS

Date Time/ User Name	Comment
08/23/2013 9:37 AM WCATS APPLICATION (000000)	CELL2 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538

EDIT LOG

Date Time/ User Name	Quality Record	Explanation

CONTAINER PROFILE
S910322
T-TTRU-TEMP

WS ID: 37017
C ID: 769768
Opt ID: B19960
ACTIVE

EDIT LOG

Date Time/ User Name	Quality Record	Explanation
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S910322, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = CELL2 STEEL ALPHA BOX IN STEEL BOX PUT RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 6201.1215, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19960, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 3.307518540762592287492668296995519313 49, [PKG_LOT] = , [PKG_PE_ACT] = . 14736521100545861574136568442247637596 6, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .009822326337818870405005068313547558088, [TOTAL_DOSE] = 700, [TOT_ANCG] = 60.983707709586075121117320430393703217 9, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [NET_WT] = 4601.1215, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12683, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S910322, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors
08/23/2013 8:48 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=769768/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 0322

2. Date: M M D D Y Y: 0 8 2 3 9 1

3. Retrievable Serial Number: 0 1 9 9 6 0

4. Origin of Waste

Group	TA	Building	Wing	Program Code
M S T	5	3	29	9	X 7 7 A

5. Waste Code: A 4 1

6. Waste Description: CECL 2 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
3600	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
700	120

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
3.1	T

11. Additional Description of Packaging and Packaging Materials: TIME capsule attached to box 1 IN STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
U 238	4.1 E+0		m	2.6 E+0		A		
P 455	1.0 E+0		m	6.6 E-1		A		
Cs 137	7.95 E-1		c	. E		E		
SR 90	7.2666 E-1		c	. E		E		
Y 90	7.2666 E-1		c	. E		E		
R 106	5.827 E-3		c	. E		E		

APPROVALS

Waste Generator *(Print Name Here)*: Tobias J Romero

Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*: Tobias J Romero

HSE-1/-10/-11 Area Representative *(Print Name Here)*: Kenneth Ault

Signature certifies that waste package or shipment is safe to handle and transport *(Signature)*: K. Ault

Additional Signatures *(Optional)*: Reviewed C. Dunn 8/30/91

13. Date Disposed: M M D D Y Y: 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	303		T		

15. Shaft Surface Dose (mr/hr):

HSE-7 Waste Management Representative *(Print Name Here)*: ANDREW J. CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*: Andrew J. Catanach

Received	Logbook	Computer	Verified
AC	AC		
Date 12/5	Date 12/5	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number S 9 1 — 0322 ~~0326~~ Continuation

2. Date M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste

Group	TA	Building	Wing	Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³, F = foot³, G = gallon)

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)

10. Gross Weight

Amount	(K = kilogram, P = pound, T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie, M = gram)	Error on Amount	±	Amount Determined By: (A = analysis, M = measurement, E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
Rh 106	5.827 E -3		C	E		E		
Sb 125	3.236 E -2		C	E		E		
TE 125m	1.344 E -2		C	E		E		
BA 137m	7.457 E -1		C	E		E		
Pm 147	4.539 E -2		C	E		E		
Eu 155	1.487 E -2		C	E		E		

APPROVALS

Waste Generator *(Print Name Here)*	**HSE-1/-10/-11 Area Representative** *(Print Name Here)*	**Additional Signatures** *(Optional)*
Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed M M D D Y Y: 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G1	303		T		

15. Shaft Surface Dose mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*: ANDREW J. CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*

Received	Logbook	Computer	Verified
AC	AC		
Date 12/5	Date 12/5	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 0 3 2 2	0 1 9 9 6 0

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 1.0E+0 **Organic Material Volume (%)** 0

Internal Shielding Type	Thickness (in.)	Nonradioactive Hazardous Materials Name	EPA Code	Quantity (g)
☒ None				
☐ Lead	• E	None		• E
☐ Steel	• E			• E
☐ Concrete	• E			• E
☐ Other	• E			• E

Internal Packaging

- ☑ Plastic bags
  - Number 1
  - Thickness 4.5 mil
- ☐ 90-mil HDPE Liner
- ☒ Blocking
- ☐ Other

Additional Information

Contaminated stainless steel ALPHA containment box wrapped in plastic and packed in a 6 ft x 6 ft x 10 ft steel box

WPRF Reference number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Tobias J Romero	Tobias J Romero	8/23/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h) 7.0E+2	Survey Meter Model RO-3C	Property No. 002691
Neutron Dose Rate (mrem/h) •0E+0	Survey Meter Model PNR-4	Property No. 005213
Total Dose Rate (mrem/h) 7.0E+0	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²) 1.0E+1	Printed Name Kenneth Ault	Date 8-23-91
Beta-Gamma Cont. (dpm/100cm²) 2.8E+2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE LE BRUN	Bruce LeBrun	8/27/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h) • E	Survey Meter Model	Property No.	
Neutron Dose Rate (mrem/h) • E	Survey Meter Model	Property No.	
Total Dose Rate (mrem/h) • E	*The data in this section were collected as prescribed in approved procedures.*		
Alpha contamination (dpm/100cm²) • E +	Printed Name	Date	
Beta-Gamma Cont. (dpm/100cm²) • E +	Signature		

HS Form Number 10-5B (11/88)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number
00535

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: ATTN: WPRF, MS K490

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-9653	G-742	TA-3	SM-29	Wg-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM
☒ Solid
☐ Cemented Sludge
☐ Semi-Solid/Sludge
☐ Absorbed Liquid
☐ Liquid
☐ Gas
☐ Multi-Layer
☐ Suspended Solids
☐ Powder or Ash

FLASH POINT (°F)
☐ Less Than 100
☐ 100 to 139
☐ 140 to 200
☐ Greater Than 200
☒ None

pH
☐ 2.0 or Less
☐ 2.1 to 12.4
☐ 12.5 or Greater
☒ Not Applicable

REACTIVITY
☐ Unstable
☐ Reacts With Water
☐ Cyanides
☐ Sulfides
☐ Shock Sensitive
☐ Class A or B Explosive
☒ Non-Reactive

PCBs
☐ < 50 ppm
☐ 50-500 ppm
☐ > 500 ppm
☒ No PCBs

Indicate Known Radioactivity Of Your Waste:
☐ Not Radioactive (Go To Next Section)

☐ < 2.0 nC/g
☐ > 2.0 nC/g
☐ > 10.0 nC/g
☒ > 100.0 nC/g

☒ Alpha
☒ Beta
☒ Gamma
☐ Tritium

List Known Radioistopes:
☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1.	235 U	Activity/Unit of Measure	NA
Radiosotope 2.	239 Pu	Activity/Unit of Measure	
Radiosotope 3.	MFP	Activity/Unit of Measure	
Radiosotope 4.	MAP	Activity/Unit of Measure	

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067	J Ledbetter	6-27-9

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
	GARCIA DARYLL	G 738

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP	TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ → ☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ → ☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ → ☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ → ☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ → ☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ → ☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ → ☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ → ☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ → ☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ → ☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ → ☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ → ☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ → ☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ → ☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ → ☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ → ☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ → ☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ → ☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ → ☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ → ☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

	Compound Name	Concentration		Compound Name	Concentration
1.			5.		
2.			6.		
3.			7.		
4.			8.		

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
[signature]	7/1/91	

0019960

DATE: 7/2/91

TO: J. Ledbetter, MST-5, (6742)

FROM: Juan C. Corpion, HSE-8, MS K490

SUBJ: **WASTE PROFILE REQUEST (WPR)**

The HSE-8 Hazardous and Solid Waste Section has reviewed and logged the information you provided on the attached WPR(s). Based on the information you provided, your waste(s) is:

A. Non-radioactive/Non-hazardous

- ☐ Solid waste
- ☐ Non-regulated chemical
- ☐ Sanitary waste
- ☐ Other non-disposable waste

B. Radioactive

- ☐ Low-level
- ☑ Transuranic
- ☐ Nuclear Material

C. Hazardous or Mixed

- ☐ Hazardous
- ☐ Mixed low-level
- ☐ Mixed transuranic

You are required to keep a copy of the WPR(s) in your files for at least 3 years. This WPR(s) is valid for one year or as long as the composition of the waste you have characterized remains the same. Should your waste change, submit a new WPR to HSE-8 and attach a copy of the WPR which is being replaced.

Attachment(s)

☛ **See Reverse Side for Handling Instruction**

PACKAGING CONDITION INSPECTION

Waste Package Serial Number
0019960

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

I. GENERATOR'S PRE-USE VISUAL INSPECTION

		Inspection Items	Initials
Drum Lot Code	N/A	Ring, Bolt, & Nut	N/A
Year Of Mfgr.	N/A	Lid & Gasket	N/A
Box Serial No.	N/A	Chime	N/A
Comments: container used for transportation and storage at TA-54 Area 'G' only		Dents	
		Gouges	
		Paint	

This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging.

Name	Signature	Date
Tobias J Romero	Tobias J Romero	8/23/91

II. DRIVER'S VISUAL INSPECTION

Inspection Items	Initials
Filter	
Labels	
Damage	
Closure Ring	
TID Seal No.	

This waste package was visually inspected at time of pickup as required by approved procedures, and was found to be free of obvious damage or defects.

Comments

Name	Signature	Date

III. TA-54 INSPECTION

Weight (lbs.)
TID Seal No.
Comments:

This waste package was visually inspected for handling damage before shipping, and, if the package is a drum, the closure ring bolt was tightened as required by approved procedures.

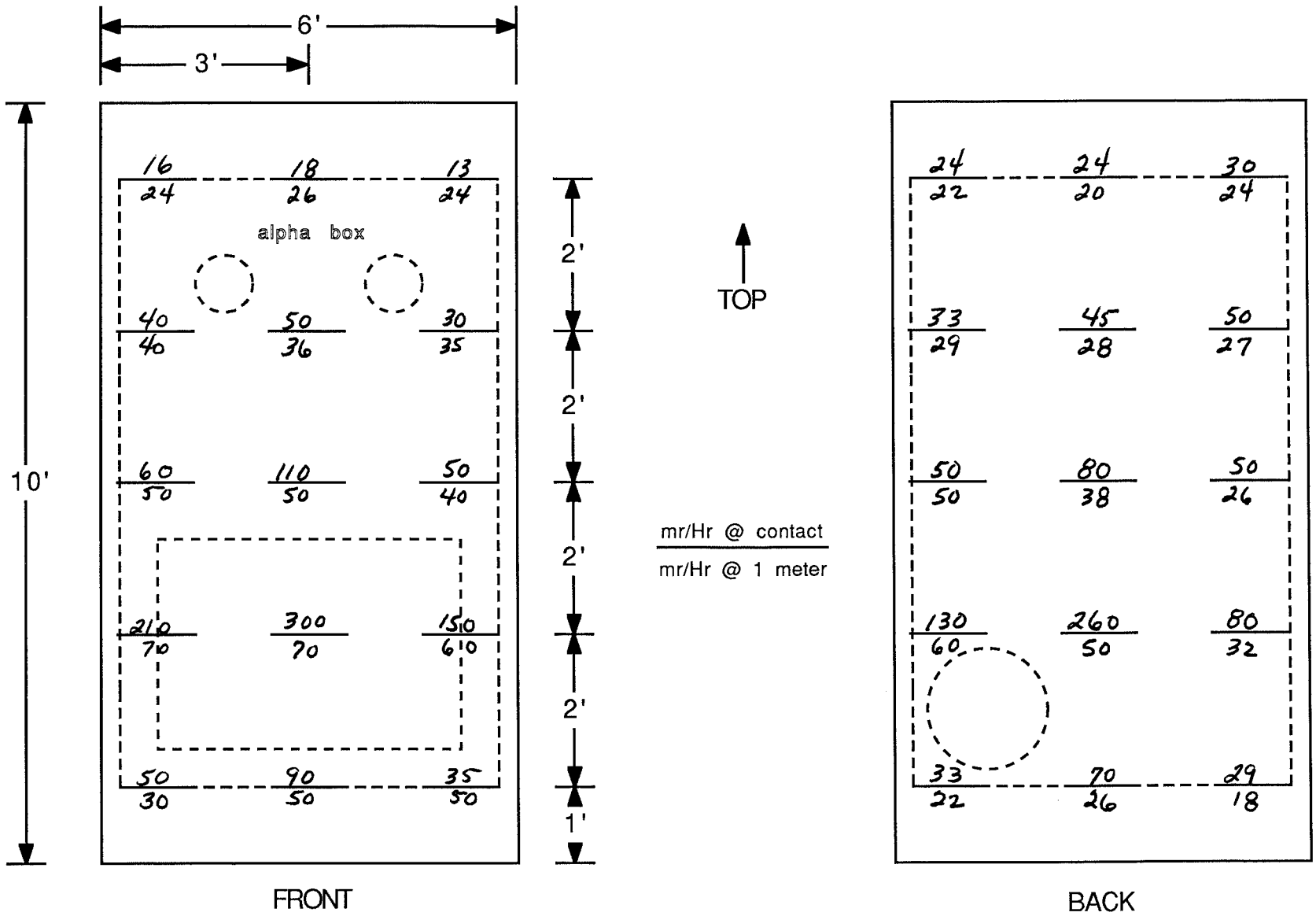
Name	Signature	Date

HS Form Number 10-5C (11/88)

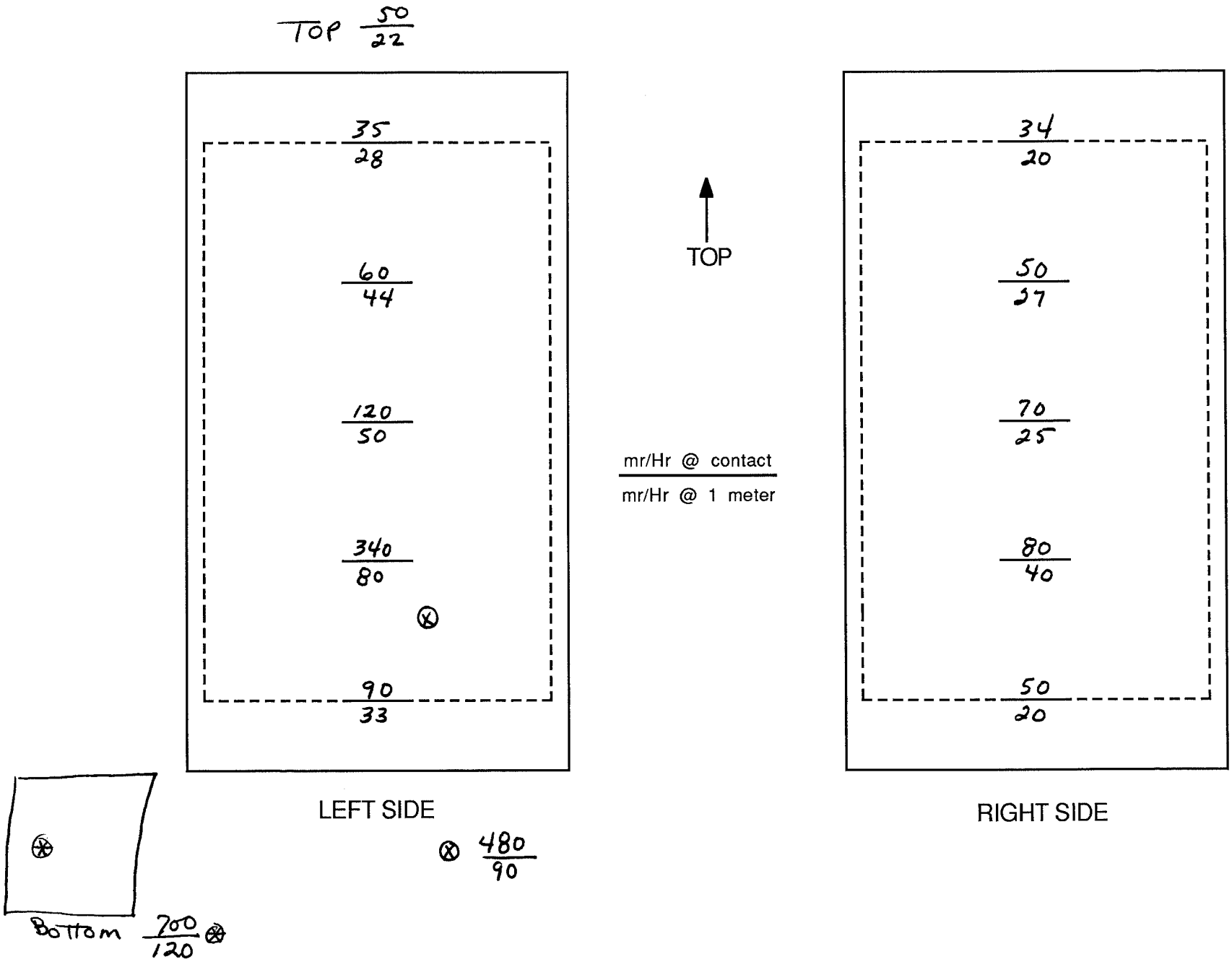
ITEM & PACKAGING DESCRITION

ORIGINATING LOCATION: TA 3 SM 29 RM WING 9 CELL 2

ORIGINATOR J. LEDBETTER GROUP MST-5 DATE 8/20/91

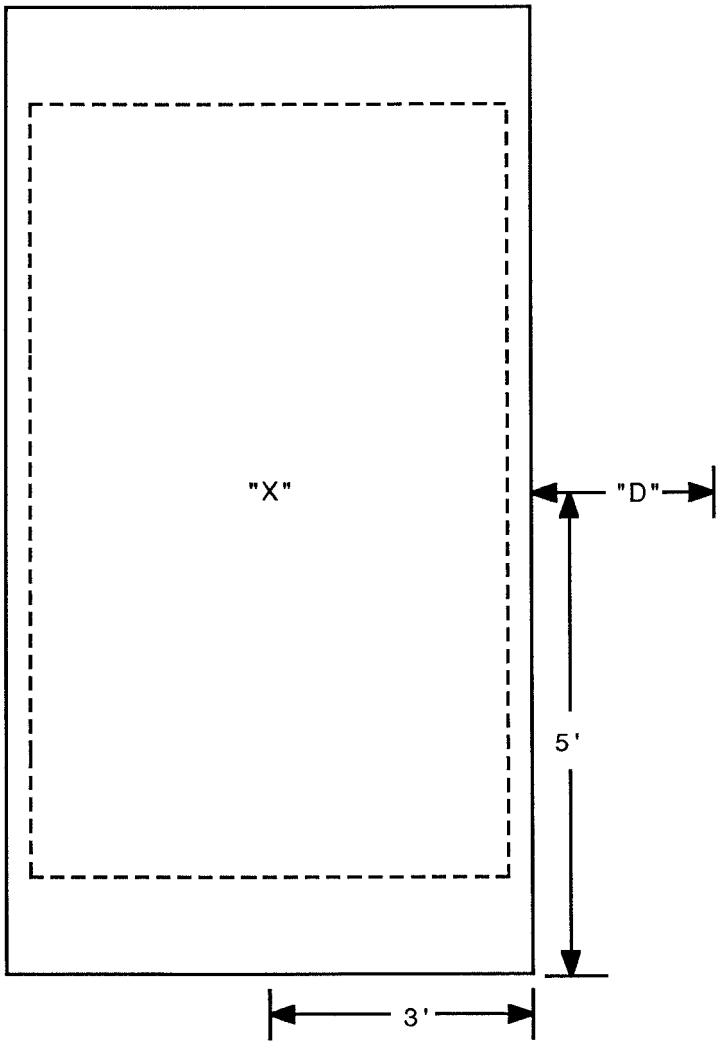


CELL 2


TOP 50/22
35/28
60/44
120/50
340/80
90/33
LEFT SIDE
TOP
mr/Hr @ contact
mr/Hr @ 1 meter
34/20
50/37
70/25
80/40
50/20
RIGHT SIDE
480/90
Bottom 700/120

FISSILE CONTENT MEASUREMENT

CELL 2



"D" (Distance from surface of box)	"X" (mr/Hr)			
	Front	Back	Left side	Right side
* 10'	20	15	20	11
11'	17	13	18	9
12'	12	9	12	8
13'	10	7.5	10	6.5
14'	10	7	9.5	6
15'	9	6.5	9	5

* Point source readings are taken atthe centerline of the box. The total distance for calculation is 13 feet (4 meters). Background dose-rate = 0.6 mr/hr

Instrument PIC-6A P/N 003183

Calibration Void 10/24/91

Survey By T Romero, MST-5 Date 8/21/91
M Lopez, MST-5

NARRATIVE
CELL 2

Contained within steel box #2 is cell 2 alpha box from Wing-9 of the CMR Building.

The gross weight of box #2 is 6,250 lbs. The alpha box weight is 3,500 lbs.

Alpha Cell #2 went hot in October of 1984 and was used sparsely until October 1986 to examine a few FFTf fuel pins. It was used for 9 months in 1989 for removal of sodium from intact fuel pins and a large number of residual sections. All the fuel was shipped to above ground storage at Richland, Washington. It was remotely decontaminated and removed from service in January 1990. The main contaminants are Pu^{239}, U^{235}, mixed fission products. The estimates of gram weight shown on the RSWD form are calculated from measurements taken at 4 meters. A procedure for the calculation is included in this package.

The internal alpha box has been secured in a manner for easy removal. The lid has been welded at the 4 corners. Cut or grind the corners free and remove the lid. Remove the 4 bolts holding the brackets to the alpha box top. Attach 4 lifting eyes and a 4 branch sling to the corner brackets. Lift straight up to remove. Exercise caution when removing the internal box to prevent striking the viewing window. It is located at the lower front side of the storage box. This side is labeled "front".

If further assistance is required contact the Wing-9 personnel in the CMR Building at 7-4653.

CELL 2 ALPHA BOX

0019960

A. CALCULATION FOR Plutonium and URANIUM

A.
19.4
14.4
19.4
10.4
} READINGS @ 4m - 66

15.90 MEAN
4.36 STD DEV

4.115 00 TOTAL U(g)
2.619 00 +/-

3.873 00 U235 (g)
2.465 00 +/-

1.041 00 TOTAL Pu (g)
6.626-01 +/-

8.957-01 Pu 239 (g)
5.701-01 +/-

B. calculations for Fission Products

B.
7.95-01 Ci Cs 137

7.2663-01 Ci Sr 90

7.2663-01 Ci Y 90

5.82735-03 Ci Ru 106

5.82735-03 Ci Rh 106

3.23565-02 Ci Sb 125

1.34355-02 Ci Te 125m

7.4571-01 Ci Ba 137m

4.53945-02 Ci Pm 147

1.48665-02 Ci Eu 155

TOTAL FISSION PRODUCT ACTIVITY
3.2581967 00 Ci
2.0739011 00 +/-

A. Calculations For Plutonium And Uranium

1. Calculate the mean dose-rate value ($\bar{x}1$) from the four measurements taken along a center-of-box axis at a center-of-box detector distance of 13 feet.
2. Calculate the standard deviation (one sigma) value on the mean value calculated in step 1. Call the standard deviation value Sa. Divide the standard deviation by the mean value and call this error term S1:

$$S1 = \frac{Sa}{\bar{x}1}$$

3. Correct the mean value x1 for gamma attenuation through 0.25 inches of steel as follows:

$$\bar{x}2 = \bar{x}1\ (1.45)$$

4. Correct x2 value for a worst-case distance (all material located in center-bottom or center-top of box) as follows

$$\bar{x}3 = \bar{x}2\ (1.05)$$

5. Convert the final, corrected dose-rate value $\bar{x}3$ to grams Pu as follows:

$$\text{grams Pu} = \bar{x}3\ (0.043)$$

6. Convert the final, corrected dose-rate value $\bar{x}3$ to grams 239 Pu as follows:

$$\text{grams 239 Pu} = \bar{x}3\ (0.037)$$

7. Convert the final corrected dose-rate value $\bar{x}3$ to grams U as follows:

$$\text{grams U} = \bar{x}3\ (0.17)$$

8. Convert the final, corrected dose-rate $\bar{x}3$ to grams 235 U as follows:

$$\text{grams 235 U} = \bar{x}3\ (0.16)$$

9. Calculate the relative overall measurement uncertainty as follows:

$$\text{Relative Overall Uncertainty} = \sqrt{0.33 + (S1)^2}$$

10. Multiply the Relative Overall Uncertainty value from step 9 times the gram Pu, 239 Pu, U, and 235 (steps 5, 6, 7, and 8) and report as the one sigma value for each element/isotope.

Justifications For Plutonium And Uranium

1. Point Source Model

A series of measurements were conducted to test the assumption that measurement of the dose rate of a 10' x 5' x 5' box using an uncollimated PIC-6 meter located 13 feet from the box centerline (10 feet from the front or rear face) and at the box horizontal axis, is reasonably represented by a point-source model.

The point-source model requires that the observed dose rate is inversely proportional to the square of the center-of-source to detector distance. To test compliance to this requirement, the box dose rate was measured at a 13 foot distance. The box was then rotated 90^0, three times, and measurements made on all four faces at the 13 foot distance. Without further box rotation, measurements were taken with one foot increases in the center-of-box to detector distance. At a final distance of 23 feet, the box was again rotated through 90^0 increments and measurements taken on each face.

The measurement data is presented in Table 1.

Table 1

Dose-Rate Measurements Box #14

PIC-6 Readings mR/hr (net)*	Center-of-box to Detector Distance, feet	Box Orientation
11.4	13	back
10.4	13	left side
9.4	13	front
11.4	13	right side
9.6	14	right side
8.9	15	right side
7.4	16	right side
6.9	17	right side
6.15	18	right side
5.4	19	right side
5.15	20	right side
4.65	21	right side
3.9	22	right side
3.4	23	right side
3.2	23	back
3.2	23	left side
3.2	23	front

*Background dose-rate = 0.6 mR/hr.

The Table 1 data was analyzed two ways to test the point source (inverse distance squared) model.

Method A. **Thirteen and 23 foot distance measurements with box rotation.**

Mean values and one sigma uncertainties were calculated on readings taken at box orientations back, left side, front, and right side, both at the 13 and 23 foot distances. Results of these calculations are listed in Table 2

Table 2

Center-of-box Detector distance, feet	Mean dose-Rate, mR/hr	One standard Deviation on Mean
13	10.65	0.96
23	3.25	0.10

To test the mean dose-rate value taken at 13 feet, the 23 foot mean dose-rate value is corrected for distance as follows:

$$3.25 \text{ mR/hr} \times \frac{(23)^2}{(13)^2} = 10.17 \text{ mR/hr}$$

This value compares with the observed 13 foot value as follows:

$$\frac{10.17 \text{ mR/hr@ 23 feet}}{10.65 \text{ mR/hr @ 13 feet}} = 0.96$$

2. Attenuation Correction

Spectra taken with a Geruanium detector and Canberra-35 MCA showed a very strong 137 Cs spectra. If other peaks were present, they were not disenable above the 137 Cs gamma peaks plus Compton continuum.

The hot cell gloveboxes has a wall thickness of 0.125 inches (steel) and the boxes housing the gloveboxes was of 0.125 inch wall thickness (steel). Total wall thickness is 0.250 inches (0.635 cm).

Attenuation correction for the 662 Kev, 137/Cs gamma through 0.635 cm of iron is:

$$T = e^{-\mu\rho x} = e^{-(0.0738)(7.86)(0.635)}$$

$$T = 0.69$$

A correction factor of $\frac{1}{T} = 1.45$ is used.

3. Worst-Case Distance Correction

The center-of-box to detector distance assumes the source of the gamma signal is at the very center of the box volume. Since the box was rotated and measurements taken at the four box faces (sides, front, and back), the worst-case location of the gamma source would be at the center of the box top or bottom. Distance from the detector to the box top or bottom center is 13.34 feet.

A worst-case bias correction for this distance effect is:

$$\text{Correction} = \frac{(13.34)^2}{(13.0)^2} = 1.05$$

4. Calibration Constant

Thirty-two cans of scrap representing the reactor fuel specimens handled in the hot cell gloveboxes, were measured for dose-rate with a PIC-6 instrument. Each of these cans had a know weight of fuel material. The attached table column F lists the dose-rates measured (at one meter) for the weight of scrap fuel listed in column I. The dose-rate were divided by the scrap fuel weight for each can and the mean value and one standard deviation for the mean determined. The values are: 67 mR/(hr)(gram), 38 mR/(hr)(gram) one sigma. The RSD is 0.57.

The fuel is of Mixed Oxide composition with the following makeup:

Pu:U ratio = 1:4
Weight fraction Pu = 0.18
Weight fraction 239 Pu = 0.155
Weight fraction = 0.70
Weight fraction 235 U = 0.65
Weight fraction 0 = 0.12

Dividing the weight fraction values for the elements and isotopes above by the nominal 67 mR/(hr)(g) and by 16 (adjusting

the 1 meter can measurement distance to the 4 meter box measurement distance), one obtains the following grams element or isotope per mR/hr constants listed below:

Calibration Constants

Isotope or Element	g Isotope or element per mR/hr
Pu	0.043
239 Pu	0.037
U	0.17
235 U	0.16

Note that the nominal 67 mR/(hr)(g) value is not corrected for attenuation. Attenuation correction for the cans of fuel scrap would be quite difficult because the can contents are very heterogeneous. By not performing attenuation corrections or the can dose-rates, we will overestimate the hot cell box fissile content.

5. Combined Error Terms

Two bias terms, the adjustment for worst-case distance and lack of attenuation correction on cans of fuel scrap, have been intensionally used to overstate the amount of fissile content of the hot-cell boxes. These terms will not be included in the combined error term.

Error terms to be included are for the mR/(hr)(g) factor for deriving calibration factors, the four measurements of the hot cell boxes, and the box attenuation correction. These terms discussed below:

a. Point Source Model.

The uncertainty on the point source model was estimated from the Table 3 data. The one standard deviation of 0.04 on the mean value of 0.99 is a relative error of 0.04.

b. Calibration Factor

The one standard deviation value on the mean 67 mR/(hr)(g), derived from the 32 can measurements, is 38 mR/(hr)(g). This translates to a relative error of 0.57.

c. Four Box Measurements

This error term is the one standard deviation on the mean value of the four box face mR/hr measured values. Call this term S1.

d. Attenuation Correction

This correction has uncertainties in both the nominal attenuating steel thickness and in the mass attenuation coefficient. Assuming the thickness can vary by 10% and the coefficient has a 20% uncertainty, these error terms introduce relative uncertainties into the mass of element or isotope as follows:

i) Thickness relative error = 0.03

ii) Attenuation coefficient relative error = 0.07

These uncertainty terms are combined in quadrature as follows:

$$\text{Overall Uncertainty} = \sqrt{(0.04)^2+(0.57)^2+(S1)^2+(0.03)^2+(0.07)^2}$$

$$\text{Overall Uncertainty} = \sqrt{0.33+(S1)^2}$$

The four percent difference from perfect agreement indicates very good agreement with the point-source model.

Method B. **Consistency of inverse-distance-squared correct measurements at increased distance.**

Eleven mR/hr measurements were performed while increasing the center-of-box to detector distance from 13 to 23 feet in one foot increments. The box remained in the "right side" orientation. Each mR/hr measurement value was "corrected" to the 13 foot distance and the "corrected" values listed in table 3.

Table 3

14-23 Foot mR/hr Values Corrected to 13 feet

Center-of-Box (11.4 to detector, feet value)	Net mR/hr observed	mR/hr corrected to 13 ft distance	13 ft value corrected
14	9.6	11.1	1.03
15	8.9	11.8	0.97
16	7.4	11.2	1.02
17	6.9	11.8	0.97
18	6.15	11.8	0.97
19	5.4	11.5	0.99
20	5.15	12.2	0.93
21	4.65	12.1	0.94
22	3.9	11.2	1.02
23	3.4	10.6	1.07

Reducing the right-hand column data from Table 3 yields a mean value of 0.99 and a one sigma value of 0.04. All values fell within one sigma except the 23 foot and 20 foot values which were within two sigma and on opposite "sides" of the mean value. This information indicates that the point-source model is appropriate for the 13 foot measurement distance.

B. Calculations for Fission Products

1. Multiply the mean PIC-6 value ($\bar{x}1$ from A.1) by 16 to estimate the point-source dose rate at one meter. Divide this value by 1000 to convert to Roentgans per hour at one meter (Rhm).

$$Rhm = (\bar{x}1)(16)/1000$$

2. Divide the Rhm from B.1 by 0.32 Rhm per Ci to convert to curies Cs-137.

3. Using the Ci Cs-137 value from B.2, multiply by the factors below to estimate the remaining fission product activities:

Ci Sr-90 = (Ci Cs-137)(0.914)
Ci Y-90 = (Ci Cs-137)(0.914)
Ci Ru-106 = (Ci Cs-137)(0.00733)
Ci Rh-106 = (Ci Cs-137)(0.00733)
Ci Sb-125 = (Ci Cs-137)(0.0407)
Ci Te-125m = (Ci Cs-137)(0.0169)
Ci Ba-137m = (Ci Cs-137)(0.938)
Ci Pm-147 = (Ci Cs-137)(0.0571)
Ci Eu-155 = (Ci Cs-137)(0.0187)

4. Calculate the total fission product activity from the Cs-137 activity as follows:

Total Fission Product Activity = (ci Cs-137)/0.244

Justifications For Fission Products

1. High-resolution gamma spectroscopy measurements on the hot cell liners showed the peaks and Compton continuum of Cs-137. No other peaks were observed. This observation is reasonable as the irradiated fuel samples examined in these cells had been out-of-reactor greater than 10 years and as the irradiated fuel radiation reaching the PIC-6 instrument was attenuated by 0.25 inches of steel. An assumption was made that the radiation measured with the PIC-6 was due solely to Cs-137.

2. Appendix B of report LA-4400 was used to convert the observed dose rates (measured at 4 meters) were multiplied by 16 (distance correction) prior to dividing by 0.32 Rhm per Ci.

3. Attached tables (Fission Products from U-235) supplied by R. Henderson (HSE-1) were use to estimate the curies associated with fission products other than Cs-137. Fuel residues the alpha boxes are conservatively estimated at 10-years-since-irradiation hence the "Ratio-to-Cs-137", "10 Years" table data was used.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	STEEL	LOGBOOK		WT.	RADIATION (R/hr)		ESTIMATED (g)		ASSAY	STD.	ASSAY	DRUM	CANISTER	?	STEEL CAN
2	CAN #	No.	PAGE	(Lbs.)	Contact	1meter	Pu	U	WT. (g)	DEV.	REPORT	No.	No.	?	LOCATION
49	151	23744	48	29	33	1.5	0.1	96	15.6	3.1	4/12/90			FU	CE5E3
50	152	23744	48	41	15	0.3	0.1	145	3.0	0.6	4/12/90			FU	CE5C3
51	159	23744	49	33	300	5	3	6	11.2	2.6	1/11/91			FU	CE4I6
52	171	23744	50	44	280	2.7	2	8	6.4	1.6	1/11/91			FU	CE4B2-2
53	173	23744	51	38.5	900	6	2	0.4	6.3	1.8	1/11/91			FU	CE4F4-2
54	351	23744	82	32	300	4	8	32	16.7	8.7	9/12/90			FU	CE5A3-2
55	352	23744	82	27	100	1	6	24	22.5	8.7	9/12/90			FU	CE5H6-2
56	353	23744	82	30	150	2	7	30	18.7	8.7	9/12/90			FU	CE5H2-2
57	354	23744	82	27	200	3	7	27	16.2	8.7	9/12/90			FU	CE5G4-2
58	355	23744	83	31	40	1	8	34	21.0	8.7	9/12/90			FU	CE5C3-2
59	356	23744	83	30	40	2	8	32	17.3	8.7	9/12/90			FU	CE5C5-2
60	357	23744	83	30	300	5	6	25	17.0	8.7	9/12/90			FU	CE5C4-2
61	358	23744	83	32	200	3	14	51	27.2	8.8	9/12/90			FU	CE5B4-2
62	360	23744	84	34	65	1	7	30	23.5	8.7	9/13/90			FU	CE5F6-2
63	361	23744	84	28	150	3	8	31	14.9	8.7	9/10/90			FU	CE5F5-2
64	437	23744	107	43	1	0.01	0.1	4	0.82	0.30	2/4/91			FU	CE4F9-3
65	123	23744	40	26	35	0.3	11	86	33	9	2/4/91			MS	CE7E9
66	124	23744	38	27	250	2.5	19	71	47	10	1/17/91			MS	CE7F9
67	125	23744	38	29	200	3	18	75	62	10	1/17/91			MS	CE4F8-2
68	126	23744	36	27	900	5.5	18	80	64	10	1/17/91			MS	CE4D4-2
69	127	23744	38	28	600	3	18	80	60	10	1/17/91			MS	CE4G3-2
70	128	23744	40	27	200	1.5	15	76	48	10	1/17/91			MS	CE4F1-3
71	129	23744	37	26	130	3	19	70	24.3	8.7	11/21/90			MS	CE4C6-2
72	130	23744	36	24	200	6	19	79	34	9	1/17/91			MS	CE4H8
73	131	23744	37	26.5	>1000	10.5	24	75	67	11	1/17/91			MS	CE4A8-2
74	132	23744	37	26	150	3	21	78	41	10	1/25/91			MS	CE7I9
75	133	23744	37	26	100	1.5	20	79	26.9	8.7	11/21/90			MS	CE4B7-2
76	134	23744	36	27	160	2.5	22	74	50	10	2/4/91			MS	CE7C9
77	135	23744	36	27.5	135	2.5	17	74	30.7	8.8	11/21/90			MS	CE4I5
78	137	23744	38	28	220	3	20	78	46	10	1/17/91			MS	CE4E8-2
79	138	23744	40	28	120	2	34	62	63	11	1/28/91			MS	CE4D8-2
80	139	23744	38	26	250	4	16	81	56	10	1/17/91			MS	CE4G8-2
81	140	23744	36	27	375	2.9	20	80	47	10	1/28/91			MS	CE4I1
82	141	23744	40	28	300	3	18	80	54	10	1/25/91			MS	CE7G9
83	142	23744	40	29	150	2	16	52	51	10	1/17/91			MS	CE7D9
84	143	23744	39	26	120	2	18	78	36	9	11/21/90			MS	CE4C7-2
85	144	23744	39	27	110	2	19	72	40	10	1/17/91			MS	CE7H9
86	145	23744	39	27	200	3	14	68	63	10	1/28/91			MS	CE4A7-2
87	146	23744	39	29	130	4	18	65	27.0	9.1	4/12/90			MS	CE5D3
88	147	23744	39	29	120	3.5	19	81	53.4	10.6	4/12/90			MS	CE5D8
89	148	23744	37	29	175	1.5	25	66	22.7	9.0	4/12/90			MS	CE5B8
90	267	23744	65	28	110	5	12	87	76	11	1/17/91			MS	CE4H6
91	268	23744	65	30	600	7	19	80	76	11	1/17/91			MS	CE4G5
92	273	23744	66	32	500	5	17	80	76	12	1/25/91			MS	CE4D9-3
93	274	23744	66	30	80	1.5	27	63	38	9	1/11/91			MS	CE4G1-3
94	275	23744	66	29.5	5	1.3	6	91	41	9	1/11/91			MS	CE4I3
95	276	23744	67	29	60	1.5	18	70	36	9	1/11/91			MS	CE4G5-2
96	277	23744	67	31	70	1.5	25	52	34	10	1/28/91			MS	CE4G4
97	285	23744	68	28	600	10	59	38	17.4	3.1	10/3/90			TH	CE4F5
98	286	23744	69	27	500	9	84	3	16.7	2.9	10/3/90			TH	CE4F2
99	287	23744	69	26	500	10	84	5	16.7	2.9	11/21/90			TH	CE4H3
100	288	23744	69	26	500	9	85	4	17.2	3.0	10/3/90			TH	CE4E2
101	289	23744	69	27	400	8	88	24	11.1	1.9	10/1/90			TH	CE4D9
102	290	23744	69	28	500	10	87	23	10.7	1.8	10/1/90			TH	CE4C8
103	291	23744	69	29	550	8	86	5	18.7	3.4	11/21/90			TH	CE4H1
104	292	23744	69	26	350	5.5	45	93	14.0	2.5	10/3/90			TH	CE4E3

Prompt Fission Products from U-235
Relative Curies

Nuclide	7 Years	10 Years	20 Years
Sr-90	9.74E-04	9.09E-04	7.11E-04
Y-90	9.74E-04	9.09E-04	7.11E-04
Ru-106	5.76E-05	7.29E-06	7.35E-09
Rh-106	5.76E-05	7.29E-06	7.35E-09
Sb-125	8.75E-05	4.05E-05	3.11E-06
Te-125m	3.62E-05	1.68E-05	1.29E-06
Cs-137	1.06E-03	9.95E-04	7.87E-04
Ba-137m	9.95E-04	9.33E-04	7.38E-04
Pm-147	8.11E-05	5.68E-05	2.62E-06
Eu-155	2.49E-05	1.86E-05	1.20E-05
Total	4.35E-03	3.89E-03	2.97E-03

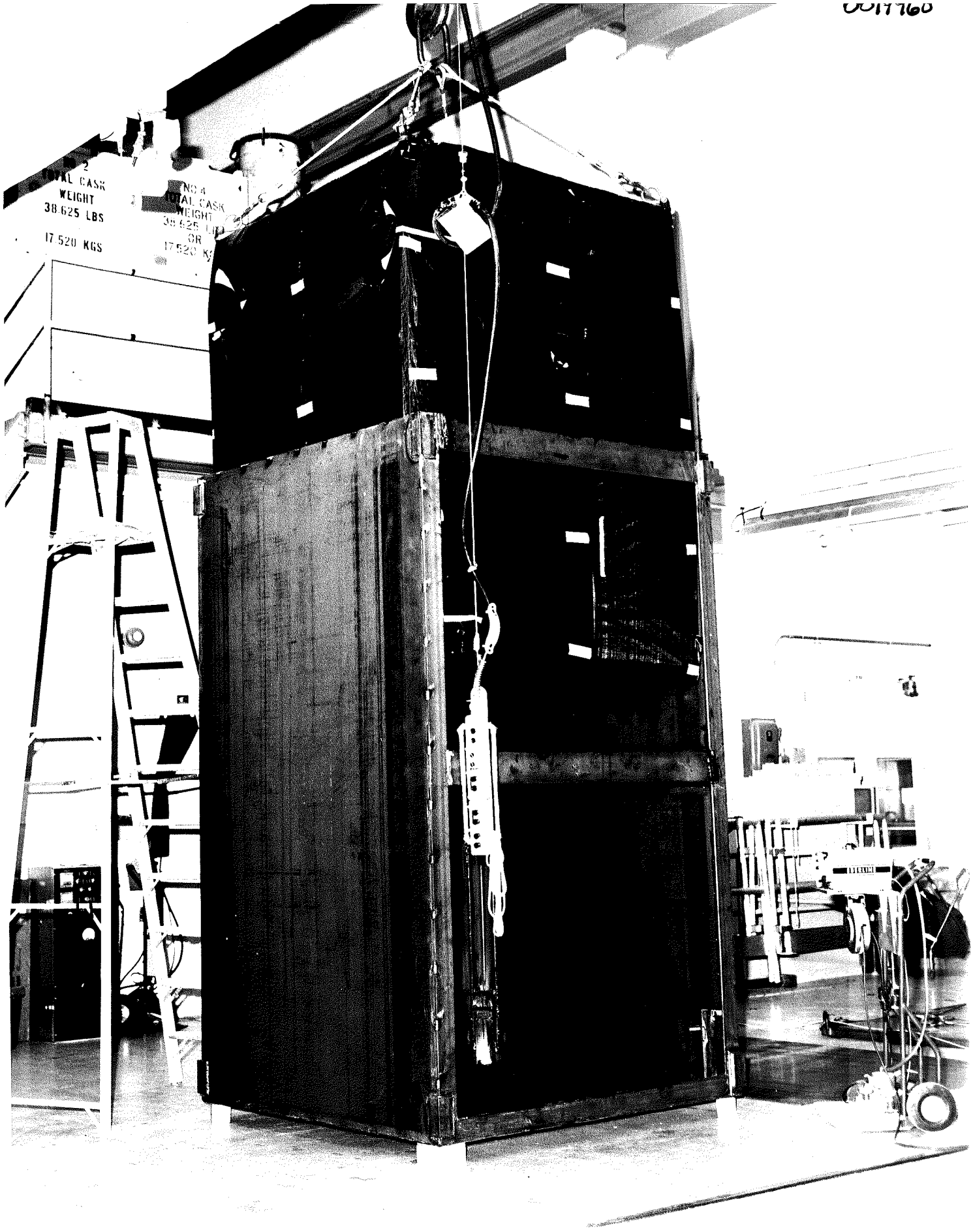
Ratio to Cs-137

Nuclide	7 Years	10 Years	20 Years
Sr-90	91.89%	91.36%	90.34%
Y-90	91.89%	91.36%	90.34%
Ru-106	5.43%	0.73%	0.00%
Rh-106	5.43%	0.73%	0.00%
Sb-125	8.25%	4.07%	0.40%
Te-125m	3.42%	1.69%	0.16%
Cs-137	100.00%	100.00%	100.00%
Ba-137m	93.87%	93.77%	93.77%
Pm-147	7.65%	5.71%	0.33%
Eu-155	2.35%	1.87%	1.52%

Ratio to total listed activity (>95%)

Nuclide	7 Years	10 Years	20 Years
Sr-90	22.40%	23.35%	23.97%
Y-90	22.40%	23.35%	23.97%
Ru-106	1.32%	0.19%	0.00%
Rh-106	1.32%	0.19%	0.00%
Sb-125	2.01%	1.04%	0.10%
Te-125m	0.83%	0.43%	0.04%
Cs-137	24.38%	25.56%	26.53%
Ba-137m	22.88%	23.96%	24.88%
Pm-147	1.87%	1.46%	0.09%
Eu-155	0.57%	0.48%	0.40%

Nuclide		
Sr-90	No Gammas	
Y-90	No Gammas	
Ru-106	.511 MeV	20 %
Rh-106	.622 MeV	10 %
Sb-125	.430 MeV	30 %
Te-125m	No Gammas	
Cs-137	No Gammas	
Ba-137m	.661 MeV	90 %
Pm-147	.474 MeV	36 %
Eu-155	.086 MeV	30 %
	.105 MeV	20 %


TOTAL CASK
WEIGHT
38,625 LBS
17,520 KGS
NO 4
TOTAL CASK
WEIGHT
OR

RH-TRU

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S911 0322

2. Date: M M D D Y Y — 0 8 2 3 9 1

3. Retrievable Serial Number: B 1 9 9 6 0

4. Origin of Waste

Group	TA	Building	Wing	Program Code
MST	5	29	9	X77A

5. Waste Code: 441

6. Waste Description: CFCL 2 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
360.0	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
700.	120.

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
3.1	T

11. Additional Description of Packaging and Packaging Materials

~~TRUE Composite Inserted to box~~
1 IN STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
U 238	4.100 E	+0	M	2.600 E	+0	A		
Pu 55	1.000 E	+0	M	6.600 E	-1	A		
Cs 137	7.950 E	-1	C	. E		E		
Sr 90	7.266 E	-1	C	. E		E		
Y 90	7.266 E	-1	C	. E		E		
Ru 106	5.827 E	-3	C	. E		E		

APPROVALS

Waste Generator *(Print Name Here)*: Tobias J Romero

Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*: Tobias Romero

HSE-1/-10/-11 Area Representative *(Print Name Here)*: Kenneth Ault

Signature certifies that waste package or shipment is safe to handle and transport (Signature): K. Ault

Additional Signatures *(Optional)*: Review C. Dan 8/30/11

13. Date Disposed: M M D D Y Y — 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	303		T		

15. Shaft Surface Dose (mr/hr):

HSE-7 Waste Management Representative *(Print Name Here)*: ANDREW J. CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*: Andrew J. Catanach

Received	Logbook	Computer	Verified
AC	AC		
Date 12/5	Date 12/5	Date 12/23	Date

Form Number HS 10-2A (12/89)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 0322

2. Date (M M D D Y Y)	3. Retrievable Serial Number	4. Origin of Waste: Group	TA	Building	Wing	Program Code	5. Waste Code
0 8 2 3 9 1	0 1 9 9 6 0	M S T	5 3	2 9	9	X 7 7 A	A 4 1

6. Waste Description: CELC 2 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages: Plastic Bags	Card-Board Boxes	Drums: No.	Drums: Gal.	Wooden Crates: No.	Wooden Crates: Volume-ft³	8. Gross Volume: Amount	(M = meter³, F = foot³, G = gallon)	9. Package Radiation at: Surface (mr/hr)	1 Meter (mr/hr)
	•		•		•	3600	F	700	120

10. Gross Weight: Amount	(K = kilogram, P = pound, T = ton)
31	T

11. Additional Description of Packaging and Packaging Materials: TIME capsule attached to box
1 N STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie, M = gram)	Error on Amount	±	Amount Determined By: (A = analysis, M = measurement, E = estimate)	SS Materials Write-Off: Account	Project Code
U 238	4.1 E	+0	m	2.6 E	+0	A		
Pu 239	1.0 E	+0	m	6.6 E	-1	A		
Cs 137	7.95 E	-1	c	. E		E		
Sr 90	7.266 E	-1	c	. E		E		
Y 90	7.266 E	-1	c	. E		E		
Ru 106	5.827 E	-3	c	. E		E		

APPROVALS

Waste Generator (Print Name Here)	HSE-1/-10/-11 Area Representative (Print Name Here)	Additional Signatures (Optional)
Tobias J Romero	Kenneth Ault	Reviewed D. Dorr 8/30/11
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met (Signature): Tobias J Romero	Signature certifies that waste package or shipment is safe to handle and transport (Signature): K. Ault	

13. Date Disposed (M M D D Y Y)	14. Disposal/Storage Location: Area	Shaft	Pit	Post(s)	Layer	Pos.	15. Shaft Surface Dose (mr/hr)
1 2 0 5 9 1	G	303		T			

HSE-7 Waste Management Representative (Print Name Here)	Received	Logbook	Computer	Verified
ANDREW J. CATANACH	AC	AC		
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. (Signature): Andrew J. Catanach	Date 12/5	Date 12/5	Date 12/23	Date

Form Number HS 10-2A (12/89)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number S 9 1 0322 ~~0104~~ Continuation

2. Date M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste

Group	TA	Building	Wing	Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
Rh 106	5.827	E -3	C		E	E		
Sb 125	3.236	E -2	C		E	E		
Te 125m	1.344	E -2	C		E	E		
Ba 137m	7.457	E -1	C		E	E		
Pm 147	4.539	E -2	C		E	E		
Eu 155	1.487	E -2	C		E	E		

APPROVALS

Waste Generator *(Print Name Here)*	**HSE-1/-10/-11 Area Representative** *(Print Name Here)*	**Additional Signatures** *(Optional)*
Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed M M D D Y Y: 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	3013		T		

15. Shaft Surface Dose mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*
ANDREW J. CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*

Received	Logbook	Computer	Verified
AC	AC		
Date 12/5	Date 12/5	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 0 3 2 2	0 1 9 9 6 0

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 1.0E+0 **Organic Material Volume (%)** 0

Internal Shielding Type	Thickness (in.)
☒ None	
☐ Lead	• E
☐ Steel	• E
☐ Concrete	• E
☐ Other	• E

Nonradioactive Hazardous Materials

Name	EPA Code	Quantity (g)
None		• E
		• E
		• E
		• E

Internal Packaging

☑ Plastic bags
Number 1
Thickness 4.5 mil
☐ 90-mil HDPE Liner
☒ Blocking
☐ Other

Additional Information

Contaminated stainless steel ALPHA containment box wrapped in plastic and packed in a 6 ft x 6 ft x 10 ft steel box

WRRF Reference number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Tobias J Romero	Tobias J Romero	8/23/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	7.0E+2	Survey Meter Model RO-3C	Property No. 002691
Neutron Dose Rate (mrem/h)	.0E+0	Survey Meter Model PNR-4	Property No. 005213
Total Dose Rate (mrem/h)	7.0E+0	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	1.0E+1	Printed Name Kenneth Ault	Date 8-23-91
Beta-Gamma Cont. (dpm/100cm²)	2.8E+2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE LE BRUN	Bruce Le Brun	8/27/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	• E	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	• E	Signature	

HS Form Number 10-5B (11/88)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number 00535

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: ATTN: WPRF, MS K490

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-9653	G-742	TA-3	SM-29	WQ-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM
☒ Solid
☐ Cemented Sludge
☐ Semi-Solid/Sludge
☐ Absorbed Liquid
☐ Liquid
☐ Gas
☐ Multi-Layer
☐ Suspended Solids
☐ Powder or Ash

FLASH POINT (°F)
☐ Less Than 100
☐ 100 to 139
☐ 140 to 200
☐ Greater Than 200
☒ None

pH
☐ 2.0 or Less
☐ 2.1 to 12.4
☐ 12.5 or Greater
☒ Not Applicable

REACTIVITY
☐ Unstable
☐ Reacts With Water
☐ Cyanides
☐ Sulfides
☐ Shock Sensitive
☐ Class A or B Explosive
☒ Non-Reactive

PCBs
☐ < 50 ppm
☐ 50-500 ppm
☐ > 500 ppm
☒ No PCBs

Indicate Known Radioactivity Of Your Waste:
☐ Not Radioactive (Go To Next Section)

☐ < 2.0 nC/g
☐ > 2.0 nC/g
☐ > 10.0 nC/g
☒ > 100.0 nC/g

☒ Alpha
☒ Beta
☒ Gamma
☐ Tritium

List Known Radioistopes:
☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1.	235 U	Activity/Unit of Measure	NA
Radiosotope 2.	239 Pu	Activity/Unit of Measure	
Radiosotope 3.	MFP	Activity/Unit of Measure	
Radiosotope 4.	MAP	Activity/Unit of Measure	

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067		6-27-9

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
	GARCIA DARYLL	G 730

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP		TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ →	☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ →	☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ →	☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ →	☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

	Compound Name	Concentration		Compound Name	Concentration
1.			5.		
2.			6.		
3.			7.		
4.			8.		

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
[signature]	7/1/91	

Appendix D

TRU Waste Storage Information, Container S912719 Stored in Shaft 304

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TRU WASTE STORAGE RECORD

S912719

1. Generator's Pre-Use Visual Inspection

Purchase Order #	Inspected Items		
This container has been visually inspected according to approved procedures and has been found to be free of damage that would make it unsuitable for TRU waste packaging.	☐ Ring, Bolt, and Nut	☐ Chime	☐ Dents
	☐ Lid and Gasket	☐ Gouges	☐ Paint

Printed Name	Signature	Sig. Date	Oper. Date

2. Generator's Package Information

Group	Technical Area	Building	Cost Center	Program Code	Cost Account	Work Package
LTP-PTS	54	000000				

Additional Information

☐ DP ☐ Non-DP If Non-DP waste, attach DOE approval doc.

Container	Liner
☐ Steel Drum (55 gal.)	☑ None
☐ Pipe Overpack Type:	☐ 90 mil liner
☐ Steel Drum (85 gal Overpack)	☐ 125 mil liner
☐ Standard Waste Box	☐ Fiberboard Liner
☐ Standard Waste Box Overpack	**Internal Shielding**
☐ RH Canister	☑ None
☐ Other (Call TWCO)	Type / Thickness

Radionuclide Content

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Am-241	2.163E-002	0.000E+000	C
Cs-137	5.325E-001	0.000E+000	C
Pu-238	7.197E-003	0.000E+000	C
Pu-239	3.645E-002	0.000E+000	C
Pu-240	2.341E-002	0.000E+000	C
Pu-241	7.457E-001	0.000E+000	C
Pu-242	8.387E-006	0.000E+000	C
Ru-106	3.903E-003	0.000E+000	C

Filter Serial No.			
	01		
	02		

Waste Profile Number	53393 (WS ID 37017)
Gross Weight (lb.)	5.60E+003
Net Weight (lb.)	4.00E+003
Shipping Category	
LANL Waste Stream ID	TA-03-27
TRUCON Code	

Hazardous Materials

Name	EPA Code	Qty (g)

Date Closed (MM/DD/YY):

Accumulation Start Date (MM/DD/YY): 12/04/91

The data in this section were collected, and waste described herein was packaged and labeled according to approved procedures.

Printed Name	Signature	Date:

3. Generator Site Health Physics Information

	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Gamma Dose Rate (mrem/h) (contact)				
Neutron Dose Rate (mrem/h) (contact)				

Total Dose Rate (mrem/h) (contact)	
Total Dose Rate (mrem/h) (1 meter)	*The data in this section were collected according to approved procedures.*
Alpha Contamination (dpm/100cm2)	Printed Name / Date
Beta-Gamma Cont (dpm/100 cm2)	Signature

TRU WASTE STORAGE RECORD

S912719

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.	Printed Name	Date:
	Signature	

5. Preload Visual Inspection

This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and defects.	Printed Name	Date:

6. Receiving Site Health Physics Information

Gamma Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Neutron Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Total Dose Rate (mrem/h) (contact)	*The data in this section were collected according to approved procedures.*			
Total Dose Rate (mrem/h) (1 meter)				
Alpha Contamination (dpm/100cm2)	Printed Name			Date
Beta-Gamma Cont (dpm/100 cm2)	Signature			

7. Storage Site Information

Received by (Initials)	Date Received	**Original Storage Data**		
This waste package was visually inspected and found to be properly labeled and in good condition. It was accepted and inspected according to approved procedures.		Building Number	Layer	Row Number
		Column Number	Date Stacked (MM/DD/YY)	
Printed Name	Date:	Printed Name	Date:	
Signature		Signature		

8. Waste Acceptance Office

Intials/Date	WE Description

NCR Number	Intials/Date	NCR Description

TRU WASTE STORAGE RECORD

S912719

9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued			
Nuclide	**Amount**	**Uncertainty**	**C= Curie M = Gram**
Sr-90	4.867E-001	0.000E+000	C
U-234	1.804E-004	0.000E+000	C
U-235	5.634E-006	0.000E+000	C
U-236	7.429E-007	0.000E+000	C
U-238	5.208E-008	0.000E+000	C
Y-90	4.867E-001	0.000E+000	C

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials		
Name	**EPA Code**	**Qty (g)**
No Additional Hazardous Materials		

CONTAINER PROFILE
S912719
T-TTRU-TEMP

WS ID: 37017
C ID: 766494
Opt ID: B19455
ACTIVE

GENERAL INFORMATION

Container ID:	766494		
Labeled ID:	S912719		
Optional ID:	B19455	**Status:**	ACTIVE
Chemical Barcode:		**Decommissioned:**	NO
Physical State:	SOLID	**Container Type:**	SC: Shield cask
Waste Stream ID:	37017	**Container Subtype:**	Remotely handled canister
Work Path:	T-TTRU-TEMP	**Origin Date:**	04-Dec-1991 12:00 am
Quantity (Univ):		**Accum Start Date:**	04-Dec-1991
Compactible:		**Closed Date:**	

Discard Matrix:

TID(s):

Gen Contact:

Insert By: WCATS APPLICATION (000000)

Waste Desc: GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume:	10.20 CM	**Gross Weight:**	5600.92 lb
Waste Volume:	NOT SPECIFIED	**Tare Weight:**	1600.00 lb
		Net Weight:	4000.92 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT304

CONTAINER PROFILE
S912719
T-TTRU-TEMP

WS ID: 37017
C ID: 766494
Opt ID: B19455
ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: **Year of Manuf:**

Lot No.: **Serial No:**

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: **Equiv. Comb. Matrix:**

Adeq. Ventilation: **Compliant Metal Cont.:** YES

Overpack (1 to 1): NO **Retrievable:** **BIR WS Code:** LA-RM14

Content Code:

COST CODES

Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
------	X77A	----	----	100.00			*SELECTION LIST*

EPA CODES

System Code	Hazardous Waste No.	Waste Description & Treatment Subcategory

RADIONUCLIDES

Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Active, Assay Page: 339626, Date: 12/04/1991, Derivation: Generator Entered Results (e.g., Offsite Assay)								
38	2.80E+000	g	0.00E+000	N				NONE
55	7.00E-001	g	0.00E+000	N				NONE
Am-241	2.16E-002	Ci	0.00E+000	Y			Y	
Cs-137	5.32E-001	Ci	0.00E+000	N			Y	
Pu-238	7.20E-003	Ci	0.00E+000	Y			Y	
Pu-239	3.64E-002	Ci	0.00E+000	Y			Y	
Pu-240	2.34E-002	Ci	0.00E+000	Y			Y	
Pu-241	7.46E-001	Ci	0.00E+000	Y			Y	
Pu-242	8.39E-006	Ci	0.00E+000	Y			Y	
Ru-106	3.90E-003	Ci	0.00E+000	N			Y	
Sr-90	4.87E-001	Ci	0.00E+000	N			Y	
U-234	1.80E-004	Ci	0.00E+000	Y			Y	
U-235	5.63E-006	Ci	0.00E+000	Y			Y	
U-236	7.43E-007	Ci	0.00E+000	Y			Y	
U-238	5.21E-008	Ci	0.00E+000	Y			Y	
Y-90	4.87E-001	Ci	0.00E+000	N			Y	

CONTAINER PROFILE
S912719
T-TTRU-TEMP

WS ID: 37017
C ID: 766494
Opt ID: B19455
ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g):	1.29183E+03	**DOTFissile Mat (g):**	3.20012E+00	
Alpha (nCi/g):	4.89884E+01	**Transport Index:**		
TRU Alpha (nCi/g):	4.88754E+01	**NRC Class:**	C	
Pu-239 FGE:	2.28138E+00	**DOT Type:**	B	
Pu-239 FGE [2U]:	2.28138E+00	**LSA-I Fraction:**	1.05214E+02	N
Pu-239 Eq-Ci:	1.04371E-01	**LSA-II Fraction:**	2.14704E-02	Y
Pu-239 Eq-Ci [2U]:	1.04371E-01	**LSA-III Fraction:**	1.07352E-03	Y
TRU Pu-239 Eq-Ci:	1.03038E-01	**Reportable Quantity:**	1.50695E+01	Y
TRU Pu-239 Eq-Ci [2U]:	1.03038E-01	*** ALC Ratio:**	5.33694E+06	NE
Decay Heat [U] (W):	6.73900E-03	*** ACM Ratio:**	3.15642E+03	NE
Tritium (Ci/m3):	0.00000E+00	**Limited Quantity:**	3.89642E+03	N
TRU ECW PE-Ci:	1.03038E-01			

Weight/Volume Used:

1	Container Net Weight:	1.81479E+03 kg
2	Container Volume:	1.01950E+01 m3

**ALC (Activity Limit for Exempt Consignment)*
**ACM (Activity Concentration for Exempt Material)*
U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY

Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
12/05/1991 12:00 AM	1784523 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT304	NO

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION

Doc. Number	Title	Uploaded By
1	S912719-TWSR	WCATS APPLICATION (000000)

COMMENTS

Date Time/ User Name	Comment
08/23/2013 9:37 AM WCATS APPLICATION (000000)	6ELL 13 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538

EDIT LOG

Date Time/ User Name	Quality Record	Explanation

CONTAINER PROFILE
S912719
T-TTRU-TEMP

WS ID: 37017
C ID: 766494
Opt ID: B19455
ACTIVE

EDIT LOG

Date Time/ User Name	Quality Record	Explanation
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S912719, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = 6ELL 13 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 5600.9205, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19455, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 2.27343223980205474626459383529412379343, [PKG_LOT] = , [PKG_PE_ACT] = . 10315564770382103101895597909573346317 6, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .0067022189586578738032988044154678032 31, [TOTAL_DOSE] = 600, [TOT_ANCG] = 49.089956603001616043231508139312897409 6, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [NET_WT] = 4000.9205, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12686, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S912719, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors
08/23/2013 8:47 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=766494/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RH-TRU

~~RHOB TOPE~~

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

WPRF# 00538

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number	2. Date	3. Retrievable Serial Number	5. Waste Code
S91 2719	M M D D Y Y: 08 09 91	B 19455	441

4. Origin of Waste

Group	TA	Building	Wing	Program Code
MST	5	3	29	9	X77A

6. Waste Description

CELL 13 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
3600	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
600	70

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
2.8	T

11. Additional Description of Packaging and Packaging Materials

~~TYPE A SHIPPING ASSEMBLY~~ 1 W STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
438	2.800 E	+0	m	1.600 E	+0	A		
PU55	7.000 E	-1	m	4.100 E	-1	A		
CS137	5.325 E	-1	C	. E		E		
SR90	4.867 E	-1	C	. E		E		
Y90	4.867 E	-1	C	. E		E		
RU106	3.903 E	-3	C	. E		E		

APPROVALS

Waste Generator (Print Name Here)	HSE-1/-10/-11 Area Representative (Print Name Here)	Additional Signatures (Optional)
Jim LEDBETTER	Kenneth L Ault	
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met. (Signature) J. Ledbetter	Signature certifies that waste package or shipment is safe to handle and transport (Signature) K. Ault	

13. Date Disposed	14. Disposal/Storage Location						15. Shaft Surface Dose
M M D D Y Y: 12 05 91	Area	Shaft	Pit	Post(s)	Layer	Pos.	mr/hr
	6	304		T			

HSE-7 Waste Management Representative (Print Name Here)	Received	Logbook	Computer	Verified
ANDREW J. CATANACH	AC	AC	RBS	
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. (Signature) A. Catanach	Date 12-5-91	Date 12-5-91	Date 12/23/91	Date

Form Number HS 10-2A (12/89)

INSTRUCTIONS FOR WASTE GENERATOR

Filling Out the Form. The waste generator must complete this form to document all waste buried or retrievably stored at the Laboratory's TA-54, Area G, site. Be sure to complete each section before proceeding to the next section. The waste generator must follow these instructions:

1. Don't use more than the allotted spaces on the form (one letter or number per space).
2. Ensure that all data recorded on this form are legibly printed and clearly readable.
3. Note that the decimal point positions are already indicated in the sections where decimals would be needed (for example, see Section 7 on the front of this form). Enter information accurately in relation to these decimal points. *Do not alter decimal point positions.*
4. Use the number zero (0) on the form *ONLY* on entries requiring that numerical designation. *Do not use the number zero to fill blank spaces.*
5. Where the amount of information available does not allow recording all data on one form, use additional forms for different portions of the waste.

When the Form is Completed. The waste generator must ensure that the properly completed form accompanies each waste shipment and each package of retrievable transuranic (TRU) waste delivered to the disposal/storage site. Waste generators may keep a copy of the completed form for their files.

PERTINENT INSTRUCTIONS FOR SPECIFIC SECTIONS OF THIS FORM

Section 5, Waste Code. Identify all waste by a 3-digit description code, as given in Attachment I, "Valid Waste Codes." Choose the code that best describes the waste material, especially selecting the most appropriate letter designator, as follows: A = actual contamination; S = suspect contamination; or M = radioactive/hazardous mixed waste.

Section 6, Waste Description. Allow one space for each letter and one space after each word. Use this section to provide any additional information about the waste.

Section 9, Package Radiation. Do not use symbols for "greater than (>)," for "less than (<)," for "greater than or equal to (≥)," or for "less than or equal to (≤)." Round off fractions to the nearest whole number. If radiation levels exceed that which can be listed, leave this section blank and record the data in Section 11.

Section 11, Additional Description of Packaging and Packaging Materials. Use this space to provide property number, related form numbers, data that cannot be entered in Section 6 or 9 (see above), etc.

Section 12, Radionuclide Content. List radionuclides using either the normally accepted notations (for example, U235, Pu239, Co60, and H3) or, for accountable materials, the element identification plus the SS Material Type Code (for example, Pu52 for plutonium code 52, U38 for uranium code 38). Acceptable codes include MFP for mixed fission products and MAP for mixed activation products.

For nonradioactive chemical or hazardous waste, enter the correct chemical identification, such as CHEM, PCB, or ASBES. If more than one contaminant is identifiable, each contaminant should be listed (with all appropriate data) on a separate line in Section 12. If there are more than six (6) radionuclides identified, or if there are any questions regarding the completion of this form, contact HSE-7 at 7-5397.

Questions regarding the handling or packaging of radioactive or hazardous wastes should be referred to Disposal Site Operations (7-6095).

APPROVAL SIGNATURES

Waste Generator. The waste generator must sign the form in the space allotted to indicate compliance with applicable waste packaging and disposal requirements. This signature is required for all waste, whether radioactive or nonradioactive. Note that both the generator's *printed name* and *written signature* are required.

HSE-1/-10/-11 Area Representative. An area representative from either the HSE-1, -10, or -11 group must sign the form if the wastes are radioactively contaminated. This signature indicates that the package or shipment is safe to handle and transport. Note that both the area representative's *printed name* and *written signature* are required.

Additional Signatures. An area representative from HSE-3 or HSE-5 may be required to sign this form before certain hazardous materials are transported. This signature space also may be used for the group leader's signature, if required by the generator's group/division.

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 2 7 1 9	0 1 9 4 5 5

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 10 E + 1 | **Organic Material Volume (%)** 0

Internal Shielding Type	Thickness (in.)	Nonradioactive Hazardous Materials Name	EPA Code	Quantity (g)
☒ None				
☐ Lead	• E	NONE		• E
☐ Steel	• E			• E
☐ Concrete	• E			• E
☐ Other	• E			• E

Internal Packaging

- ☒ Plastic bags
  - Number 2
  - Thickness 3 mil
- ☐ 90-mil HDPE Liner
- ☒ Blocking
- ☐ Other

Additional Information

Contaminated stainless steel alpha containment box wrapped in plastic and packed in a 6 ft x 6 ft x 10 ft steel box

WRAP Reference number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Jim LEDBETTER	J. Ledbetter	8/9/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	6.0 E + 2	Survey Meter Model RO-3C	Property No. 002630
Neutron Dose Rate (mrem/h)	•0 E + 0	Survey Meter Model PNR-4	Property No. 005231
Total Dose Rate (mrem/h)	6.0 E + 2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	7.1 E + D	Printed Name Kenneth L. Ault	Date 8/9/91
Beta-Gamma Cont. (dpm/100cm²)	3.3 E + 2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE T. REICH	Bruce T. Reich	8/12/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	• E +	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	• E +	Signature	

HS Form Number 10-5B (11/88)

PROCEDURES AND INSTRUCTIONS

This form must be used to supplement the information on the Radioactive Solid Waste Disposal Record (RSWD, HS Form 10-2A) when the RSWD is used to document disposal of noncertified transuranic solid waste. A data package containing this form, its related RSWD, and a completed Packaging Condition Inspection form must be sent to the HSE-7 TRU Waste Operations Section (MS E516) for approval before the waste is sent to the TA-54 storage site. All three forms will be returned to the waste generator to accompany the waste to TA-54.

Use scientific notation. Whenever the notation "E" is given in a block, enter the plus or minus sign, as appropriate. Accompany all signatures with a typed or printed name. Use black ink.

RSWD Form Number. Obtain from RSWD form.

Retrievable Serial Number. Obtain from RSWD. Enter this number in the "Waste Package Serial Number" space on the Packaging Condition Inspection form also. That form was intended for use with certified TRU waste but it must also be used with noncertified TRU waste.

I. WASTE GENERATOR'S PACKAGE INFORMATION

The waste generator shall complete the entire section as explained here and then send the form to the area health physics representative.

Organic Mat'l Weight. Enter the total weight of organic material in the package, including the packaging, in pounds (lb).

Organic Mat'l Volume. This is the fraction of the waste package usable volume made unavailable for other waste. Measure or estimate, then round to the nearest 10% and enter.

Internal Shielding. Check the appropriate box and enter the thickness in inches. If "Other" is checked, describe the material in the "Additional Information" block. Lead shielding also must be entered as a nonradioactive hazardous waste.

Internal Packaging. Check the appropriate box(es) and enter data as necessary. If "Other" is checked, describe the material in the "Additional Information" block.

Nonradioactive Hazardous Material. Use name and code number as given in 40 CFR 261, Subparts C and D. If none are listed, enter NONE. Enter the weight in grams.

Statement. Read carefully before signing this important statement. Type, stamp, or print legibly in the "Printed Name" block. The actual signature must be in ink; do not use a rubber stamp for the signature. Enter the date actually signed, not the date from the RSWD.

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

The area health physics representative at the generator's site completes and signs this section. The waste generator then sends the data package to the HSE-7 TRU Waste Operations Office (MS E516) for review and approval.

III. HSE-7 AUTHORIZATION

The HSE-7 TRU Waste Operations Section representative completes and signs this section, thereby authorizing transport. The waste generator must arrange for transportation ONLY AFTER RECEIVING SUCH AUTHORIZATION FROM HSE-7. Refer to AR 10-5. Ensure that the forms received from HSE-7 accompany the waste to the receiving site.

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

The HSE-1 health physics representative at the receiving site must complete and sign the Receiving Site Health Physics Information section.

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number
00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: **ATTN: WPRF, MS K490**

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	Wg-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM
☒ Solid
☐ Cemented Sludge
☐ Semi-Solid/Sludge
☐ Absorbed Liquid
☐ Liquid
☐ Gas
☐ Multi-Layer
☐ Suspended Solids
☐ Powder or Ash

FLASH POINT (°F)
☐ Less Than 100
☐ 100 to 139
☐ 140 to 200
☐ Greater Than 200
☒ None

pH
☐ 2.0 or Less
☐ 2.1 to 12.4
☐ 12.5 or Greater
☒ Not Applicable

REACTIVITY
☐ Unstable
☐ Reacts With Water
☐ Cyanides
☐ Sulfides
☐ Shock Sensitive
☐ Class A or B Explosive
☒ Non-Reactive

PCBs
☐ < 50 ppm
☐ 50-500 ppm
☐ > 500 ppm
☒ No PCBs

Indicate Known Radioactivity Of Your Waste:
☐ Not Radioactive (Go To Next Section)

☐ < 2.0 nC/g
☐ > 2.0 nC/g
☐ > 10.0 nC/g
☒ > 100.0 nC/g

☒ Alpha
☒ Beta
☒ Gamma
☐ Tritium

List Known Radioistopes:
☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1. 235 U — Activity/Unit of Measure NA
Radiosotope 2. 239 Pu — Activity/Unit of Measure
Radiosotope 3. MFP — Activity/Unit of Measure
Radiosotope 4. MAP — Activity/Unit of Measure

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067		6-27-91

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
	GARCIA DARYLL	G 730 ~~738~~

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP		TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ →	☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ →	☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ →	☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ →	☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

Compound Name	Concentration		Compound Name	Concentration
1.			5.	
2.			6.	
3.			7.	
4.			8.	

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
[signature]	7/1/91	

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 2719

2. Date (M M D D Y Y): 0 8 0 9 9 1

3. Retrievable Serial Number: 0 1 9 4 5 5

4. Origin of Waste

Group	TA	Building	Wing	Program Code
M S T	5	3 2 9	9	X 7 7 A

5. Waste Code: 4 4 1

6. Waste Description

CELL 13 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
36.0	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
60.	7 0.

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
2.8	T

11. Additional Description of Packaging and Packaging Materials

TIME CAPSULE Attached to box
1W STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
238	2.8	E +0	m	1.6	E +0	A		
PU55	7.0	E -1	m	4.1	E -1	A		
CS137	5.325	E -1	c	.	E	E		
SR90	4.867	E -1	c	.	E	E		
Y90	4.867	E -1	c	.	E	E		
RU106	3.903	E -3	c	.	E	E		

APPROVALS

Waste Generator *(Print Name Here)*: Jim LEOBETTER

Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met *(Signature)*: Jleobetter

HSE-1/-10/-11 Area Representative *(Print Name Here)*: Kenneth L Ault

Signature certifies that waste package or shipment is safe to handle and transport (Signature): K. Ault

Additional Signatures *(Optional)*

13. Date Disposed (M M D D Y Y): 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
	304.		T		

15. Shaft Surface Dose (mr/hr):

HSE-7 Waste Management Representative *(Print Name Here)*: CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met *(Signature)*:

Received	Logbook	Computer	Verified
AC	AC		
Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

INSTRUCTIONS FOR WASTE GENERATOR

Filling Out the Form. The waste generator must complete this form to document all waste buried or retrievably stored at the Laboratory's TA-54, Area G, site. Be sure to complete each section before proceeding to the next section. The waste generator must follow these instructions:

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PERTINENT INSTRUCTIONS FOR SPECIFIC SECTIONS OF THIS FORM

Section 5, Waste Code. Identify all waste by a 3-digit description code, as given in Attachment I, "Valid Waste Codes." Choose the code that best describes the waste material, especially selecting the most appropriate letter designator, as follows: A = actual contamination; S = suspect contamination; or M = radioactive/hazardous mixed waste.

Section 6, Waste Description. Allow one space for each letter and one space after each word. Use this section to provide any additional information about the waste.

Section 9, Package Radiation. Do not use symbols for "greater than (>)," for "less than (<)," for "greater than or equal to (≥)," or for "less than or equal to (≤)." Round off fractions to the nearest whole number. If radiation levels exceed that which can be listed, leave this section blank and record the data in Section 11.

Section 11, Additional Description of Packaging and Packaging Materials. Use this space to provide property number, related form numbers, data that cannot be entered in Section 6 or 9 (see above), etc.

Section 12, Radionuclide Content. List radionuclides using either the normally accepted notations (for example, U235, Pu239, Co60, and H3) or, for accountable materials, the element identification plus the SS Material Type Code (for example, Pu52 for plutonium code 52, U38 for uranium code 38). Acceptable codes include MFP for mixed fission products and MAP for mixed activation products.

For nonradioactive chemical or hazardous waste, enter the correct chemical identification, such as CHEM, PCB, or ASBES. If more than one contaminant is identifiable, each contaminant should be listed (with all appropriate data) on a separate line in Section 12. If there are more than six (6) radionuclides identified, or if there are any questions regarding the completion of this form, contact HSE-7 at 7-5397.

Questions regarding the handling or packaging of radioactive or hazardous wastes should be referred to Disposal Site Operations (7-6095).

APPROVAL SIGNATURES

Waste Generator. The waste generator must sign the form in the space allotted to indicate compliance with applicable waste packaging and disposal requirements. This signature is required for all waste, whether radioactive or nonradioactive. Note that both the generator's *printed name* and *written signature* are required.

HSE-1/-10/-11 Area Representative. An area representative from either the HSE-1, -10, or -11 group must sign the form if the wastes are radioactively contaminated. This signature indicates that the package or shipment is safe to handle and transport. Note that both the area representative's *printed name* and *written signature* are required.

Additional Signatures. An area representative from HSE-3 or HSE-5 may be required to sign this form before certain hazardous materials are transported. This signature space also may be used for the group leader's signature, if required by the generator's group/division.

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number S 9 1 ~~2720~~ 2719 Continuation

2. Date M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste

Group	TA	Building	Wing	Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages

Plastic Bags	Caro-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
Rh 106	3.903	E -3	C		E	E		
Sb 125	2.167	E -2	C		E	E		
TE 125m	8.999	E -3	C		E	E		
BA 133m	4.995	E -1	C		E	E		
Pm 147	3.041	E -2	C		E	E		
EU 155	9.958	E -3	C		E	E		

APPROVALS

Waste Generator *(Print Name Here)*	HSE-1/-10/-11 Area Representative *(Print Name Here)*	Additional Signatures *(Optional)*
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met *(Signature)*	Signature certifies that waste package or shipment is safe to handle and transport *(Signature)*	

13. Date Disposed M M D D Y Y: 12 05 91

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
6	304		T		

15. Shaft Surface Dose mr/hr

HSE-7 Waste Management Representative *(Print Name Here)* ANDREW J. CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*

Received	Logbook	Computer	Verified
AC	AC		
Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

INSTRUCTIONS FOR WASTE GENERATOR

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1. Don't use more than the allotted spaces on the form (one letter or number per space).
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3. Note that the decimal point positions are already indicated in the sections where decimals would be needed (for example, see Section 7 on the front of this form). Enter information accurately in relation to these decimal points. *Do not alter decimal point positions.*
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Section 5, Waste Code. Identify all waste by a 3-digit description code, as given in Attachment I, "Valid Waste Codes." Choose the code that best describes the waste material, especially selecting the most appropriate letter designator, as follows: A = actual contamination; S = suspect contamination; or M = radioactive/hazardous mixed waste.

Section 6, Waste Description. Allow one space for each letter and one space after each word. Use this section to provide any additional information about the waste.

Section 9, Package Radiation. Do not use symbols for "greater than (>)," for "less than (<)," for "greater than or equal to (≥)," or for "less than or equal to (≤)." Round off fractions to the nearest whole number. If radiation levels exceed that which can be listed, leave this section blank and record the data in Section 11.

Section 11, Additional Description of Packaging and Packaging Materials. Use this space to provide property number, related form numbers, data that cannot be entered in Section 6 or 9 (see above), etc.

Section 12, Radionuclide Content. List radionuclides using either the normally accepted notations (for example, U235, Pu239, Co60, and H3) or, for accountable materials, the element identification plus the SS Material Type Code (for example, Pu52 for plutonium code 52, U38 for uranium code 38). Acceptable codes include MFP for mixed fission products and MAP for mixed activation products.

For nonradioactive chemical or hazardous waste, enter the correct chemical identification, such as CHEM, PCB, or ASBES. If more than one contaminant is identifiable, each contaminant should be listed (with all appropriate data) on a separate line in Section 12. If there are more than six (6) radionuclides identified, or if there are any questions regarding the completion of this form, contact HSE-7 at 7-5397.

Questions regarding the handling or packaging of radioactive or hazardous wastes should be referred to Disposal Site Operations (7-6095).

APPROVAL SIGNATURES

Waste Generator. The waste generator must sign the form in the space allotted to indicate compliance with applicable waste packaging and disposal requirements. This signature is required for all waste, whether radioactive or nonradioactive. Note that both the generator's *printed name* and *written signature* are required.

HSE-1/-10/-11 Area Representative. An area representative from either the HSE-1, -10, or -11 group must sign the form if the wastes are radioactively contaminated. This signature indicates that the package or shipment is safe to handle and transport. Note that both the area representative's *printed name* and *written signature* are required.

Additional Signatures. An area representative from HSE-3 or HSE-5 may be required to sign this form before certain hazardous materials are transported. This signature space also may be used for the group leader's signature, if required by the generator's group/division.

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Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number
00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: **ATTN: WPRF, MS K490**

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	Wg-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM	FLASH POINT (°F)	pH	REACTIVITY	PCBs
☒ Solid	☐ Less Than 100	☐ 2.0 or Less	☐ Unstable	☐ < 50 ppm
☐ Cemented Sludge	☐ 100 to 139	☐ 2.1 to 12.4	☐ Reacts With Water	☐ 50-500 ppm
☐ Semi-Solid/Sludge	☐ 140 to 200	☐ 12.5 or Greater	☐ Cyanides	☐ > 500 ppm
☐ Absorbed Liquid	☐ Greater Than 200	☒ Not Applicable	☐ Sulfides	☒ No PCBs
☐ Liquid	☒ None		☐ Shock Sensitive	
☐ Gas			☐ Class A or B Explosive	
☐ Multi-Layer			☒ Non-Reactive	
☐ Suspended Solids				
☐ Powder or Ash				

Indicate Known Radioactivity Of Your Waste:

☐ Not Radioactive (Go To Next Section)

☐ < 2.0 nC/g	☒ Alpha
☐ > 2.0 nC/g	☒ Beta
☐ > 10.0 nC/g	☒ Gamma
☒ > 100.0 nC/g	☐ Tritium

List Known Radioistopes:

☐ Determined By Assay ☐ Determined By Estimate

Radioisotope 1.	235 U	Activity/Unit of Measure	NA
Radioisotope 2.	239 Pu	Activity/Unit of Measure	
Radioisotope 3.	MFP	Activity/Unit of Measure	
Radioisotope 4.	MAP	Activity/Unit of Measure	

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067	J. Ledbetter	6-27-9

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
	GARCIA DARYLL	G 730 ~~738~~

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP		TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ →	☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ →	☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ →	☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ →	☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

Compound Name	Concentration		Compound Name	Concentration
1.			5.	
2.			6.	
3.			7.	
4.			8.	

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

- ☐ Non-Radioactive, Non-Hazardous
  - ☐ Solid Waste
  - ☐ Non-Regulated Chemical Waste
  - ☐ Sanitary Waste
  - ☐ Other Non-Disposable Waste
- ☑ Radioactive
  - ☐ Low-Level Radioactive Waste
  - ☑ Transuranic Waste
  - ☐ Special Nuclear Material
- ☐ Hazardous or Mixed
  - ☐ Hazardous Waste
  - ☐ Mixed Low-Level Waste
  - ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
J Hagen	7/1/91	

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 2 7 1 9	0 1 9 4 5 5

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.)	1.0 E + 1	Organic Material Volume (%)	0

Internal Shielding Type	Thickness (in.)	Nonradioactive Hazardous Materials Name	EPA Code	Quantity (g)
☒ None				
☐ Lead	• E	None		• E
☐ Steel	• E			• E
☐ Concrete	• E			• E
☐ Other	• E			• E

Internal Packaging	Additional Information
☑ Plastic bags Number 2 Thickness 3 mil	Contaminated stainless steel Alpha containment box wrapped in plastic and packed in a 6 ft x 6 ft x 10 ft steel box
☐ 90-mil HDPE Liner	
☑ Blocking	
☐ Other	WRAP Reference Number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Jim LEDBETTER	J. Ledbetter	8/9/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	6.0 E + 2	Survey Meter Model RO-3C	Property No. 002630
Neutron Dose Rate (mrem/h)	• E + 0	Survey Meter Model PNR-4	Property No. 005231
Total Dose Rate (mrem/h)	6.0 E + 2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	7.1 E + D	Printed Name Kenneth L. Ault	Date 8/9/91
Beta-Gamma Cont. (dpm/100cm²)	3.3 E + 2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE T. REICH	Bruce T. Reich	8/12/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	• E +	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	• E +	Signature	

HS Form Number 10-5B (11/88)

PROCEDURES AND INSTRUCTIONS

This form must be used to supplement the information on the Radioactive Solid Waste Disposal Record (RSWD, HS Form 10-2A) when the RSWD is used to document disposal of noncertified transuranic solid waste. A data package containing this form, its related RSWD, and a completed Packaging Condition Inspection form must be sent to the HSE-7 TRU Waste Operations Section (MS E516) for approval before the waste is sent to the TA-54 storage site. All three forms will be returned to the waste generator to accompany the waste to TA-54.

Use scientific notation. Whenever the notation "E" is given in a block, enter the plus or minus sign, as appropriate. Accompany all signatures with a typed or printed name. Use black ink.

RSWD Form Number. Obtain from RSWD form.

Retrievable Serial Number. Obtain from RSWD. Enter this number in the "Waste Package Serial Number" space on the Packaging Condition Inspection form also. That form was intended for use with certified TRU waste but it must also be used with noncertified TRU waste.

I. WASTE GENERATOR'S PACKAGE INFORMATION

The waste generator shall complete the entire section as explained here and then send the form to the area health physics representative.

Organic Mat'l Weight. Enter the total weight of organic material in the package, including the packaging, in pounds (lb).

Organic Mat'l Volume. This is the fraction of the waste package usable volume made unavailable for other waste. Measure or estimate, then round to the nearest 10% and enter.

Internal Shielding. Check the appropriate box and enter the thickness in inches. If "Other" is checked, describe the material in the "Additional Information" block. Lead shielding also must be entered as a nonradioactive hazardous waste.

Internal Packaging. Check the appropriate box(es) and enter data as necessary. If "Other" is checked, describe the material in the "Additional Information" block.

Nonradioactive Hazardous Material. Use name and code number as given in 40 CFR 261, Subparts C and D. If none are listed, enter NONE. Enter the weight in grams.

Statement. Read carefully before signing this important statement. Type, stamp, or print legibly in the "Printed Name" block. The actual signature must be in ink; do not use a rubber stamp for the signature. Enter the date actually signed, not the date from the RSWD.

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

The area health physics representative at the generator's site completes and signs this section. The waste generator then sends the data package to the HSE-7 TRU Waste Operations Office (MS E516) for review and approval.

III. HSE-7 AUTHORIZATION

The HSE-7 TRU Waste Operations Section representative completes and signs this section, thereby authorizing transport. The waste generator must arrange for transportation ONLY AFTER RECEIVING SUCH AUTHORIZATION FROM HSE-7. Refer to AR 10-5. Ensure that the forms received from HSE-7 accompany the waste to the receiving site.

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

The HSE-1 health physics representative at the receiving site must complete and sign the Receiving Site Health Physics Information section.

PACKAGING CONDITION INSPECTION

Waste Package Serial Number 0019455

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Los Alamos, New Mexico 87545

I. GENERATOR'S PRE-USE VISUAL INSPECTION

Drum Lot Code	N/A	**Inspection Items**	**Initials**
Year Of Mfgr.	N/A	Ring, Bolt, & Nut	N/A
Box Serial No.	N/A	Lid & Gasket	N/A
Comments. Container used for transportation and storage at TA-54 Area 'G' only		Chime	N/A
		Dents	TJR
		Gouges	TJR
		Paint	TJR

This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging.

Name	Signature	Date
Tobias J. Romero	Tobias J. Romero	8/9/91

II. DRIVER'S VISUAL INSPECTION

Inspection Items	Initials
Filter	N/A
Labels	PWM
Damage	PWM
Closure Ring	N/A
TID Seal No.	N/A

This waste package was visually inspected at time of pickup as required by approved procedures, and was found to be free of obvious damage or defects.

Comments

Name	Signature	Date
Paul W Montoya	Paul W Montoya	8-14-91

III. TA-54 INSPECTION

Weight (lbs.)	*This waste package was visually inspected for handling damage before shipping, and, if the package is a drum, the closure ring bolt was tightened as required by approved procedures.*
TID Seal No	
Comments	

Name	Signature	Date

HS Form Number 10-5C (11/88)

PROCEDURES AND INSTRUCTIONS

This form must be used to document packages of TRU waste that have been generated according to the Los Alamos TRU Waste Certification Plan. Accompany all signatures with a typed or printed name. Use black ballpoint or ink.

I. Generator's Pre-Use Inspection

The waste generator shall complete this entire section as explained here, then attach this form to the CWSR form (HS Form Number 10-5A).

Drums: *NOTE: Defective lids, bolts, nuts, and closure rings may be replaced. Make note of replacements in the "Comments section."*

- Obtain the drum lot code from the side of the drum, above the top rolling hoop. The year of manufacture is the last two digits in the code stamped in the bottom head of the drum. Example: 16-55-88.
- Remove the closure ring and inspect the welds on the lugs for cracks, verify that the bolt and nut are present and in good condition, and observe the general condition of the ring.
- Remove the lid and inspect for deformation that would interfere with proper closure. Look for tears in the gasket. Inspect the threads on the bung hole to ensure that a filter can be installed.
- Inspect the body for damage to the chime (top curl) that could cause leakage. Look for dents that might permit leakage along the sideseam and the bottom rim seams. Reject drums with gouges that significantly reduce the remaining thickness of the drum wall. Severe corrosion or badly damaged paint is unacceptable.
- Defective drums must be clearly marked to ensure that they are not inadvertently used for TRU waste.

Boxes:

- Inspect boxes in much the same manner as drums except that box lids may not be interchangeable and the filters may already be installed.

II. Driver's Inspection

- Verify that the waste package contains a filtered vent and that the labels are properly applied to the package and the paperwork.
- Visually inspect the package for handling damage severe enough to bring into question the safety of the package.
- If the package is a drum, check the closure ring to ensure that it is well tightened.
- Enter the tamper seal number.

III. TA-54 (West) Inspection

- Enter the weight in whole pounds.
- Enter the tamper seal number.
- Visually inspect the package for handling damage.

001945

DATE: 7/2/91

TO: J. Ledbetter, MST-5, (6742)

FROM: Juan C. Corpion, HSE-8, MS K490

SUBJ: **WASTE PROFILE REQUEST (WPR)**

The HSE-8 Hazardous and Solid Waste Section has reviewed and logged the information you provided on the attached WPR(s). Based on the information you provided, your waste(s) is:

A. Non-radioactive/Non-hazardous

- ☐ Solid waste
- ☐ Non-regulated chemical
- ☐ Sanitary waste
- ☐ Other non-disposable waste

B. Radioactive

- ☐ Low-level
- ☑ Transuranic
- ☐ Nuclear Material

C. Hazardous or Mixed

- ☐ Hazardous
- ☐ Mixed low-level
- ☐ Mixed transuranic

You are required to keep a copy of the WPR(s) in your files for at least 3 years. This WPR(s) is valid for one year or as long as the composition of the waste you have characterized remains the same. Should your waste change, submit a new WPR to HSE-8 and attach a copy of the WPR which is being replaced.

Attachment(s)

☛ **See Reverse Side for Handling Instruction**

INSTRUCTIONS FOR HANDLING YOUR WASTE

A. Non-Radioactive/Non-Hazardous

Solid Waste

With the exception of classified solid waste, this waste may be placed in a garbage receptacle for removal by Johnson Control personnel.

Non-Regulated Chemical Waste

Complete a Chemical Waste Disposal Request Form (CWDR), attach a copy of the WPR, and send both forms to HSE-7 at MS J593.

Sanitary Waste

This waste may be discharged into an approved sanitary waste line. Contact HSE-8 at 7-5021 if you are unsure whether your sinks are connected to sanitary lines. Do not dispose this waste into an acid waste line.

Other Non-Disposable Waste

This waste is administratively-controlled. Complete a Chemical Waste Disposal Request Form (CWDR), attach a copy of the WPR to the CWDR, and send both forms to HSE-7 at MS J593.

B. Radioactive

Low-Level

If the waste is not an aqueous low-level radioactive waste , complete a Radioactive Solid Waste Disposal form (RSWD), attach a copy of the WPR to the RSWD, and send both forms to HSE-7 at MS J592. For aqueous, low-level radioactive waste, complete a Batch Waste Disposal form, attach a copy of the WPR, and send the form to HSE-7 at MS E518.

Transuranic Waste

Complete a Radioactive Solid Waste Disposal form (RSWD), attach a copy of the WPR, and send both forms to HSE-7 at MS J592.

Nuclear Materials

Contact OS-2 (Material Control and Accountability) at 7-5886 for instructions.

C. Hazardous or Mixed

Hazardous Waste

Complete a Chemical Waste Disposal Request Form (CWDR), attach a copy of the WPR, and send both form to HSE-7 at MS J593.

Mixed Low-Level Waste

Complete a Chemical Waste Disposal Request and a Radioactive Solid Waste Disposal form (RSWD), attach a copy of the WPR, and send all three forms to HSE-7 at MS J593.

Mixed Transuranic Waste

Same procedure used for mixed low-level waste.

Appendix E

TRU Waste Storage Information, Container S912717 Stored in Shaft 305

This page intentionally left blank.

TRU WASTE STORAGE RECORD

S912717

1. Generator's Pre-Use Visual Inspection

Purchase Order #	Inspected Items		
This container has been visually inspected according to approved procedures and has been found to be free of damage that would make it unsuitable for TRU waste packaging.	☐ Ring, Bolt, and Nut	☐ Chime	☐ Dents
	☐ Lid and Gasket	☐ Gouges	☐ Paint

Printed Name	Signature	Sig. Date	Oper. Date

2. Generator's Package Information

Group	Technical Area	Building	Cost Center	Program Code	Cost Account	Work Package
LTP-PTS	54	000000				

Additional Information

☐ DP ☐ Non-DP If Non-DP waste, attach DOE approval doc.

Container	Liner
☐ Steel Drum (55 gal.)	☑ None
☐ Pipe Overpack Type:	☐ 90 mil liner
☐ Steel Drum (85 gal Overpack)	☐ 125 mil liner
☐ Standard Waste Box	☐ Fiberboard Liner
☐ Standard Waste Box Overpack	**Internal Shielding**
☐ RH Canister	☑ None
☐ Other (Call TWCO)	Type / Thickness

Radionuclide Content

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Am-241	4.636E-002	0.000E+000	C
Cs-137	1.170E+000	0.000E+000	C
Pu-238	1.542E-002	0.000E+000	C
Pu-239	7.810E-002	0.000E+000	C
Pu-240	5.017E-002	0.000E+000	C
Pu-241	1.598E+000	0.000E+000	C
Pu-242	1.797E-005	0.000E+000	C
Ru-106	8.576E-003	0.000E+000	C

Filter Serial No.			
	01		
	02		

Waste Profile Number	53393 (WS ID 37017)
Gross Weight (lb.)	5.40E+003
Net Weight (lb.)	3.80E+003
Shipping Category	
LANL Waste Stream ID	TA-03-27
TRUCON Code	

Hazardous Materials

Name	EPA Code	Qty (g)

Date Closed (MM/DD/YY):

Accumulation Start Date (MM/DD/YY): 12/04/91

The data in this section were collected, and waste described herein was packaged and labeled according to approved procedures.

Printed Name	Signature	Date:

3. Generator Site Health Physics Information

	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Gamma Dose Rate (mrem/h) (contact)				
Neutron Dose Rate (mrem/h) (contact)				

Total Dose Rate (mrem/h) (contact)	
Total Dose Rate (mrem/h) (1 meter)	*The data in this section were collected according to approved procedures.*
Alpha Contamination (dpm/100cm2)	Printed Name / Date
Beta-Gamma Cont (dpm/100 cm2)	Signature

TRU WASTE STORAGE RECORD

S912717

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.	Printed Name	Date:
	Signature	

5. Preload Visual Inspection

This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and defects.	Printed Name	Date:

6. Receiving Site Health Physics Information

Gamma Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Neutron Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Total Dose Rate (mrem/h) (contact)	*The data in this section were collected according to approved procedures.*			
Total Dose Rate (mrem/h) (1 meter)				
Alpha Contamination (dpm/100cm2)	Printed Name			Date
Beta-Gamma Cont (dpm/100 cm2)	Signature			

7. Storage Site Information

Received by (Initials)	Date Received	**Original Storage Data**		
This waste package was visually inspected and found to be properly labeled and in good condition. It was accepted and inspected according to approved procedures.		Building Number	Layer	Row Number
		Column Number	Date Stacked (MM/DD/YY)	
Printed Name	Date:	Printed Name	Date:	
Signature		Signature		

8. Waste Acceptance Office

Intials/Date	WE Description

NCR Number	Intials/Date	NCR Description

TRU WASTE STORAGE RECORD

S912717

9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued			
Nuclide	**Amount**	**Uncertainty**	**C= Curie M = Gram**
Sr-90	1.069E+000	0.000E+000	C
U-234	3.931E-004	0.000E+000	C
U-235	1.227E-005	0.000E+000	C
U-236	1.619E-006	0.000E+000	C
U-238	1.135E-007	0.000E+000	C
Y-90	1.069E+000	0.000E+000	C

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials		
Name	**EPA Code**	**Qty (g)**
No Additional Hazardous Materials		

CONTAINER PROFILE
S912117
WDB-CON-LLW

WS ID: 35716
C ID: 560350
ACTIVE

GENERAL INFORMATION

Container ID:	560350		
Labeled ID:	S912117		
Optional ID:		**Status:**	ACTIVE
Chemical Barcode:		**Decommissioned:**	NO
Physical State:		**Container Type:**	OT: Other (WCATS Specific)
Waste Stream ID:	35716	**Container Subtype:**	Unspecified
Work Path:	WDB-CON-LLW	**Origin Date:**	04-Jun-1991 12:00 am
Quantity (Univ):		**Accum Start Date:**	
Compactible:		**Closed Date:**	

Discard Matrix:

TID(s):

Gen Contact:

Insert By: WCATS APPLICATION (000000)

Waste Desc: [SYSTEM PROFILE] FOR CONSOLIDATING & PACKAGING WASTE

WEIGHTS AND VOLUMES

Container Volume:	4.30 CM	**Gross Weight:**	1129.40 lb
Waste Volume:	NOT SPECIFIED	**Tare Weight:**	0.00 kg
		Net Weight:	512.29 kg

LOCATION

Pickup (Origin): LANL: 55: GEN-AREAS

Current: LANL: 54-G-DISP: PIT37: 28

COST CODES

Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
							SELECTION LIST

RADIOLOGICAL SURVEY

Survey Type	Instrument Number	Survey Date	At Contact mrem/hr	At 30 cm mrem/hr	At 1 M mrem/hr	Alpha dpm/100cm2	Beta/Gama dpm/100 cm2
Survey ID: 40603, Status: Active							
B/G Survey			= 0.00	=	= 0.00	Not Applicable	

CONTAINER PROFILE
S912117
WDB-CON-LLW

WS ID: 35716
C ID: 560350
ACTIVE

RADIONUCLIDES

Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Active, Assay Page: 218239, Date: 03/01/2012, Derivation: System Partitioned (e.g., Packaging or Processing)								
Am-241	1.24E-003	Ci	0.00E+000	N			Y	
Pu-238	5.97E-005	Ci	0.00E+000	N			Y	
Pu-239	2.03E-003	Ci	0.00E+000	N			Y	
Pu-240	4.74E-004	Ci	0.00E+000	N			Y	
Pu-241	7.20E-003	Ci	0.00E+000	N			Y	
Pu-242	2.74E-008	Ci	0.00E+000	N			Y	
U-234	4.33E-009	Ci	0.00E+000	N			Y	
U-235	7.53E-011	Ci	0.00E+000	N			Y	

RAD CALCULATIONS

Total Activity (nCi/g):	2.14723E+01	**DOTFissile Mat (g):**	3.27494E-02
Alpha (nCi/g):	7.41684E+00	**Transport Index:**	0.0
TRU Alpha (nCi/g):	7.41648E+00	**NRC Class:**	A
Pu-239 FGE:	3.28782E-02	**DOT Type:**	A
Pu-239 FGE [2U]:	3.28782E-02	**LSA-I Fraction:**	9.32035E+00 N
Pu-239 Eq-Ci:	3.95901E-03	**LSA-II Fraction:**	2.83078E-03 Y
Pu-239 Eq-Ci [2U]:	3.95901E-03	**LSA-III Fraction:**	1.41539E-04 Y
TRU Pu-239 Eq-Ci:	3.95901E-03	**Reportable Quantity:**	3.87138E-01 N
TRU Pu-239 Eq-Ci [2U]:	3.95901E-03	*** ALC Ratio:**	3.25135E+04 NE
Decay Heat [U] (W):	1.22694E-04	*** ACM Ratio:**	2.79611E+02 NE
Tritium (Ci/m3):	0.00000E+00	**Limited Quantity:**	1.45017E+02 N
TRU ECW PE-Ci:	3.95901E-03		

Weight/Volume Used:

1 Container Net Weight: 5.12288E+02 kg
2 Total Item Volume: 4.30000E+00 m3

**ALC (Activity Limit for Exempt Consignment)*
**ACM (Activity Concentration for Exempt Material)*
U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY

Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
06/04/1991 12:00 AM	516620 EXECUTED	LANL:54-G-DISP - PIT37 POST 28:LAYER 05:POSITION NORTH	NO

CONTAINER PROFILE
S912117
WDB-CON-LLW

WS ID: 35716
C ID: 560350
ACTIVE

TASK HISTORY

Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
06/04/1991 12:00 AM	348725 EXECUTED	LANL:55 - C-CONSOLID	NA

Note: Highlighted row indicates container was output or receiving container for the indicated task

EDIT LOG

Date Time/ User Name	Quality Record	Explanation
11/09/2012 3:07 PM WCATS APPLICATION (000000)	YES	C_MASTER.VOL_CONTAINER_UNIT [560350] changed from gal to CM (see SCR.2012.11.08.A)
02/28/2012 11:20 AM WCATS APPLICATION (000000)	NO	WASTEDB.LOCATION TABLE: [LOC_ID]= 177895, [CON_ID]= S912117, [LOC_CD]= 37 -> Pit 37, [RECDATE]= 1991-06-04 00:00:00, [TMESTAMP]= 2006-10-13 16:07:54, [USRSTAMP]= 113170 -> SLOAN TIMOTHY J , [X_COOR]= 28, [Y_COOR]= 0, [Z_COOR]= 5, [POSITION]= N
02/28/2012 8:26 AM WCATS APPLICATION (000000)	NO	CHEMLL.CONTAINER TABLE: [CHECKBY]= -> , [CHECKDATE]= , [CHEM_STATE]= , [DISPOSITION_CD]= DS -> DISPOSAL - CHEM/LLM, [DOTCON_CD]= 99 -> , [DOTHAZ_CD]= -> , [DOTSHIP]= , [DOTUNNA_CD]= , [DOT_DESC_CD]= , [DOT_TYPE]= , [ERGNO]= , [FISSILE_CLASS]= , [HAZ_SUB]= , [HWTYPE]= , [LABEL_CAT]= , [LABEL_SEC]= , [LIM_QUANT]= , [LSA]= , [MANIFEST_LNUM]= , [MANIFEST_PNUM]= , [NRC_CLASS]= , [OTHERCONID]= , [PACKING_GRP]= , [PICKBY]= -> , [RCV_CONV_VOL]= , [RCV_CONV_WGT]= 512.29623108825, [RCV_DATE]= 1991-06-04 00:00:00, [RCV_METER_RAD]= 0, [RCV_SURFACE_RAD]= 0, [RCV_VOL]= , [RCV_WGT]= 1129.4008621875, [RGN_CD]= -> , [TARE_WGT]= , [TECH_NAME]= , [TMP_CON_ID]= , [TRANS_INDEX]= , [UPD_WHEN]= 2011-12-22 14:44:52, [UPD_WHO]= W113170 -> , [VUNIT_CD]= -> , [WUNIT_CD]= P -> POUND, [HAZSUB_FLAG]= , [OSWP]= , [ROAD_CLOSURE]= , [LSA_SCO_CD]= -> , [RAD_RQ]= , [COMPACT]= , [COMPACTDATE]= , [WASTE_VERIF]= , [VERIF_COMPLETE]= , [HDL_CD]= , [ACCUM_START]= , [CLOSED]= , [USRSTAMP]= -> , [TMESTAMP]= , [ALPHA_CONT]= , [BETA_GAMMA_CONT]= , [TOTAL_DOSE] = , [REPACK]=
02/27/2012 3:51 PM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=560350/PATH_ID=105): FAILED (NO WORKPATH UNITS)

RH-TRU

~~Page 1 of 2~~

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 2717

2. Date: M M D D Y Y: 0 8 0 9 9 1

3. Retrievable Serial Number: B 1 9 5 2 5

4. Origin of Waste

Group	TA	Building	Wing	Program Code
M S T 5	3	2 9	9	X 7 7 A

5. Waste Code: A 4 1

6. Waste Description: CELL 9 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
3 6 0 0	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
8 0 0	9 0

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
2 0 7	T

11. Additional Description of Packaging and Packaging Materials

~~Fiberglass Affached to box~~

1 IN STEEL BOX WPRF 0 0 5 3 8

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
U 3 8	6.1 0 0 E	+ 0	m	3.5 0 0 E	+ 6	A		
P U 5 5	1.5 0 0 E	+ 6	m	8.5 0 0 E	− 1	A		
C S 1 3 7	1.1 7 0 E	+ 0	C	. E		E		
S R 9 0	1.0 6 9 E	+ 0	C	. E		E		
Y 9 0	1.0 6 9 E	+ 0	C	. E		E		
R U 1 0 6	8.5 7 6 E	− 3	C	. E		E		

APPROVALS

Waste Generator *(Print Name Here)*	HSE-1/-10/-11 Area Representative *(Print Name Here)*	Additional Signatures *(Optional)*
Jim Leobetter	Kenneth L Ault	
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed: M M D D Y Y: 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
C	3 0 5		T		

15. Shaft Surface Dose: mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*: ~~EUGENE J. CATANACH~~

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*

Received	Logbook	Computer	Verified
AC	AC		
Date 12-5-91	Date 12-5-91	Date 2/23/92	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 2 7 1 7	0 1 9 5 2 5

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 1.0 E + 1 | **Organic Material Volume (%)** 0

Internal Shielding Type	Thickness (in.)	Nonradioactive Hazardous Materials Name	EPA Code	Quantity (g)
☒ None				
☐ Lead	• E	NONE		• E
☐ Steel	• E			• E
☐ Concrete	• E			• E
☐ Other	• E			• E

Internal Packaging

- ☑ Plastic bags
  - Number 2
  - Thickness 3 mil
- ☐ 90-mil HDPE Liner
- ☒ Blocking
- ☐ Other

Additional Information

Contaminated stainless steel alpha containment box wrapped in plastic and packed in a 6ft x 6ft x 10ft steel box

WPRF Reference Number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Jim LEOBETTER	J. Leobetter	8/9/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	8.0 E + 2	Survey Meter Model RO-3C	Property No. 002630
Neutron Dose Rate (mrem/h)	•0 E + 0	Survey Meter Model PNR-4	Property No. 005231
Total Dose Rate (mrem/h)	8.0 E + 2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	1.3 E + 1	Printed Name Kenneth L Ault	Date 8/9/91
Beta-Gamma Cont. (dpm/100cm²)	6.1 E + 2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE T. REICH	Bruce T. Reich	8/12/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	• E +	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	• E +	Signature	

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Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number 00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: **ATTN: WPRF, MS K490**

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	Wg-9

☒ Knowledge of Process ☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below) ☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT boxes

General Description Of Waste (check at least one block for each column):

FORM	FLASH POINT (°F)	pH	REACTIVITY	PCBs
☒ Solid	☐ Less Than 100	☐ 2.0 or Less	☐ Unsteble	☐ <50 ppm
☐ Cemented Sludge	☐ 100 to 139	☐ 2.1 to 12.4	☐ Reacts With Water	☐ 50-500 ppm
☐ Semi-Solid/Sludge	☐ 140 to 200	☐ 12.5 or Greater	☐ Cyanides	☐ >500 ppm
☐ Absorbed Liquid	☐ Greater Than 200	☒ Not Applicable	☐ Sulfides	☒ No PCBs
☐ Liquid	☒ None		☐ Shock Sensitive	
☐ Gas			☐ Class A or B Explosive	
☐ Multi-Layer			☒ Non-Reactive	
☐ Suspended Solids				
☐ Powder or Ash				

Indicate Known Radioactivity Of Your Waste:

☐ Not Radioactive (Go To Next Section)

☐ <2.0 nC/g	☒ Alpha
☐ >2.0 nC/g	☒ Beta
☐ >10.0 nC/g	☒ Gamma
☒ >100.0 nC/g	☐ Tritium

List Known Radioistopes:

☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1.	235 U	Activity/Unit of Measure	NA
Radiosotope 2.	239 Pu	Activity/Unit of Measure	
Radiosotope 3.	MFP	Activity/Unit of Measure	
Radiosotope 4.	MAP	Activity/Unit of Measure	

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067	J Ledbetter	6-27-91

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).

Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
GARCIA DARYLL	G 730 ~~738~~

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP		TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ →	☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ →	☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ →	☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ →	☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

Compound Name	Concentration		Compound Name	Concentration
1.			5.	
2.			6.	
3.			7.	
4.			8.	

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
J Hagen	7/1/91	

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S91 2717

2. Date: MM DD YY: 08 09 91

3. Retrievable Serial Number: 019525

4. Origin of Waste

Group	TA	Building	Wing	Program Code
MST	5	29	9	X77A

5. Waste Code: A41

6. Waste Description: CELL 9 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³, F = foot³, G = gallon)
3600	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
800	90

10. Gross Weight

Amount	(K = kilogram, P = pound, T = ton)
2.7	T

11. Additional Description of Packaging and Packaging Materials: TIME CAPSULE ATTACHED TO BOX / IN STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie, M = gram)	Error on Amount	±	Amount Determined By: (A = analysis, M = measurement, E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
U238	6.1 E+0		m	3.5 E+6		A		
Pu55	1.5 E+0		m	8.5 E-1		A		
CS137	1.17 E+0		C	. E		E		
SR90	1.069 E+0		C	. E		E		
Y90	1.069 E+0		C	. E		E		
RU106	8.576 E-3		C	. E		E		

APPROVALS

Waste Generator (Print Name Here)	HSE-1/-10/-11 Area Representative (Print Name Here)	Additional Signatures (Optional)
Jim HEOBETTER	Kenneth L Ault	
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met (Signature)	Signature certifies that waste package or shipment is safe to handle and transport (Signature)	

13. Date Disposed: MM DD YY: 12 05 91

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
1	305		T		

15. Shaft Surface Dose: mr/hr

HSE-7 Waste Management Representative (Print Name Here)	Received	Logbook	Computer	Verified
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. (Signature)	Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number S 9 1 2747 ~~2740~~ continuation

2. Date M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste

Group	TA	Building	Wing	Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
Rh 106	8.576	E -3	C		E	E		
Sb 125	4.762	E -2	C		E	E		
TE 125m	1.977	E -2	C		E	E		
BA 137m	1.097	E +0	C		E	E		
Pm 147	6.681	E -2	C		E	E		
Eu 155	2.188	E -2	C		E	E		

APPROVALS

Waste Generator *(Print Name Here)*	**HSE-1/-10/-11 Area Representative** *(Print Name Here)*	**Additional Signatures** *(Optional)*
Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed M M D D Y Y: 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	305		T		

15. Shaft Surface Dose mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*

Received	Logbook	Computer	Verified
AC	AC		
Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 2 7 1 7	0 1 9 5 2 5

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 1.0 E + 1 **Organic Material Volume (%)** 6

Internal Shielding Type	Thickness (in.)	Nonradioactive Hazardous Materials Name	EPA Code	Quantity (g)
☒ None				
☐ Lead	• E	NONE		• E
☐ Steel	• E			• E
☐ Concrete	• E			• E
☐ Other	• E			• E

Internal Packaging

- ☑ Plastic bags
  - Number 2
  - Thickness 3 mil
- ☐ 90-mil HDPE Liner
- ☒ Blocking
- ☐ Other

Additional Information

Contaminated stainless steel alpha containment box wrapped in plastic and packed in a 6ft x 6ft x 10ft steel box

WPRF Reference Number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Jim LEOBETTER	J. Leobetter	8/9/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	8.0 E + 2	Survey Meter Model RO-3C	Property No. 002630
Neutron Dose Rate (mrem/h)	•0 E + 0	Survey Meter Model PNR-4	Property No. 005231
Total Dose Rate (mrem/h)	8.0 E + 2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	1.3 E + 1	Printed Name Kenneth L Ault	Date 8/9/91
Beta-Gamma Cont. (dpm/100cm²)	6.1 E + 2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE T. REICH	Bruce T. Reich	8/12/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	• E +	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	• E +	Signature	

HS Form Number 10-5B (11/88)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number 00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: **ATTN: WPRF, MS K490**

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	Wg-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM	FLASH POINT (°F)	pH	REACTIVITY	PCBs
☒ Solid	☐ Less Than 100	☐ 2.0 or Less	☐ Unstable	☐ <50 ppm
☐ Cemented Sludge	☐ 100 to 139	☐ 2.1 to 12.4	☐ Reacts With Water	☐ 50-500 ppm
☐ Semi-Solid/Sludge	☐ 140 to 200	☐ 12.5 or Greater	☐ Cyanides	☐ >500 ppm
☐ Absorbed Liquid	☐ Greater Than 200	☒ Not Applicable	☐ Sulfides	☒ No PCBs
☐ Liquid	☒ None		☐ Shock Sensitive	
☐ Gas			☐ Class A or B Explosive	
☐ Multi-Layer			☒ Non-Reactive	
☐ Suspended Solids				
☐ Powder or Ash				

Indicate Known Radioactivity Of Your Waste:

☐ Not Radioactive (Go To Next Section)

☐ <2.0 nC/g	☒ Alpha
☐ >2.0 nC/g	☒ Beta
☐ >10.0 nC/g	☒ Gamma
☒ >100.0 nC/g	☐ Tritium

List Known Radioistopes:

☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1. 235 U — Activity/Unit of Measure NA
Radiosotope 2. 239 Pu — Activity/Unit of Measure
Radiosotope 3. MFP — Activity/Unit of Measure
Radiosotope 4. MAP — Activity/Unit of Measure

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067	J Ledbetter	6-27-9
If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi) GARCIA DARYLL		Mail Stop 730 G ~~738~~

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP	TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ → ☐	☐
Barium	☒	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Cadmium	☒	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ → ☐	☐
Chromium	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Lead	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Mercury	☒	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ → ☐	☐
Nickel	☒	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ → ☐	☐
Selenium	☒	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ → ☐	☐
Silver	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☐	☐ → ☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ → ☐	☐
Carbon Tetrachloride	☒	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
Chlorobenzene	☒	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Chloroform	☒	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ → ☐	☐
Cresol	☒	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ → ☐	☐
1,4-Dichlorobenzene	☒	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ → ☐	☐
1,2-Dichloroethane	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
1,1-Dichloroethylene	☒	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ → ☐	☐
2,4-Dinitrotoluene	☒	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ → ☐	☐
Hexachlorobenzene	☒	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ → ☐	☐
Hexachlorobutadiene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
Hexachloroethane	☒	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ → ☐	☐
Methyl Ethyl Ketone	☒	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ → ☐	☐
Nitrobenzene	☒	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ → ☐	☐
Pentachlorophenol	☒	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ → ☐	☐
Pyridine	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ → ☐	☐
Tetrachloroethylene	☒	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ → ☐	☐
Trichloroethylene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ → ☐	☐
2,4,5-Trichlorophenol	☒	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ → ☐	☐
2,4,6-Trichlorophenol	☒	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ → ☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ → ☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

Compound Name	Concentration		Compound Name	Concentration
1.			5.	
2.			6.	
3.			7.	
4.			8.	

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
J Hagen	7/1/91	

PACKAGING CONDITION INSPECTION

Waste Package Serial Number 0019525

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

I. GENERATOR'S PRE-USE VISUAL INSPECTION

Drum Lot Code	N/A	**Inspection Items**	**Initials**
Year Of Mfgr.	N/A	Ring, Bolt, & Nut	N/A
Box Serial No.	N/A	Lid & Gasket	N/A
Comments: Container used for transportation and storage at TA-54 Area 'G' only		Chime	N/A
		Dents	TML
		Gouges	TML
		Paint	TML
			TML

This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging.

Name	Signature	Date
TOBIAS J. ROMERO	Tobias J Romero	8/9/91

II. DRIVER'S VISUAL INSPECTION

Inspection Items	**Initials**	
Filter	NA	*This waste package was visually inspected at time of pickup as required by approved procedures, and was found to be free of obvious damage or defects.*
Labels	PWM	
Damage	PWM	Comments
Closure Ring	NA	
TID Seal No. NA		
Name Paul W Montoya	Signature Paul W Montoya	Date 8-14-91

III. TA-54 INSPECTION

Weight (lbs.)	*This waste package was visually inspected for handling damage before shipping, and, if the package is a drum, the closure ring bolt was tightened as required by approved procedures.*	
TID Seal No.		
Comments:		
Name	Signature	Date

HS Form Number 10-5C (11/88)

0019525

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

TO : Jim Ledbetter, MST-5, MS G742 not at G724

DATE : May 7, 1991

FROM : Nate King, HSE-3

MAIL STOP/TELEPHONE : G726/7-4127

SYMBOL : HSE-3:HAZ:91-318

SUBJECT : PACKAGING AND TRANSPORTATION OF ALPHA BOXES

Based upon our meeting of April 29, 1991 and recent changes at the Laboratory regarding transfers of hazardous materials you will be required to follow the guidance indicated below.

1. Each steel container must be marked on the outside "Radioactive Material NOS UN2982".

2. A Hazardous Materials Transfer Form and a Radioactive Material Transfer Tag must be completed for each container.

3. A copy of the Radiation Work Permit must be sent to the HAZPACT Section for review and approval. Not required if Contact Reading is < 1 R/hr. @ Contact

4. Arrangements must be made through ES&H S^2 for road closure during the transfer.

These actions are necessary because it is not apparent that these alpha boxes can be declared Low Specific Activity. The metal containers are, at best, strong tight packaging, but have not been tested. From the best guess available it would appear that you have a type A quantity of ^{137}Cs and MFP. Therefore, I recommend that you proceed down the pathway laid out by the above steps. I would like to also suggest that the metal boxes be painted with some type of rustproof paint.

NK:icf

xc: W. Bradley, ES&H S^2, MS K303
E. Derr HSE-7, MS J592
S. Dalton, HSE-3, MS G726
HAZPACT File (2)

0019525

DATE: 7/2/91

TO: J. Ledbetter, MST-5, (6742)

FROM: Juan C. Corpion, HSE-8, MS K490

SUBJ: **WASTE PROFILE REQUEST (WPR)**

The HSE-8 Hazardous and Solid Waste Section has reviewed and logged the information you provided on the attached WPR(s). Based on the information you provided, your waste(s) is:

A. Non-radioactive/Non-hazardous

- ☐ Solid waste
- ☐ Non-regulated chemical
- ☐ Sanitary waste
- ☐ Other non-disposable waste

B. Radioactive

- ☐ Low-level
- ☑ Transuranic
- ☐ Nuclear Material

C. Hazardous or Mixed

- ☐ Hazardous
- ☐ Mixed low-level
- ☐ Mixed transuranic

You are required to keep a copy of the WPR(s) in your files for at least 3 years. This WPR(s) is valid for one year or as long as the composition of the waste you have characterized remains the same. Should your waste change, submit a new WPR to HSE-8 and attach a copy of the WPR which is being replaced.

Attachment(s)

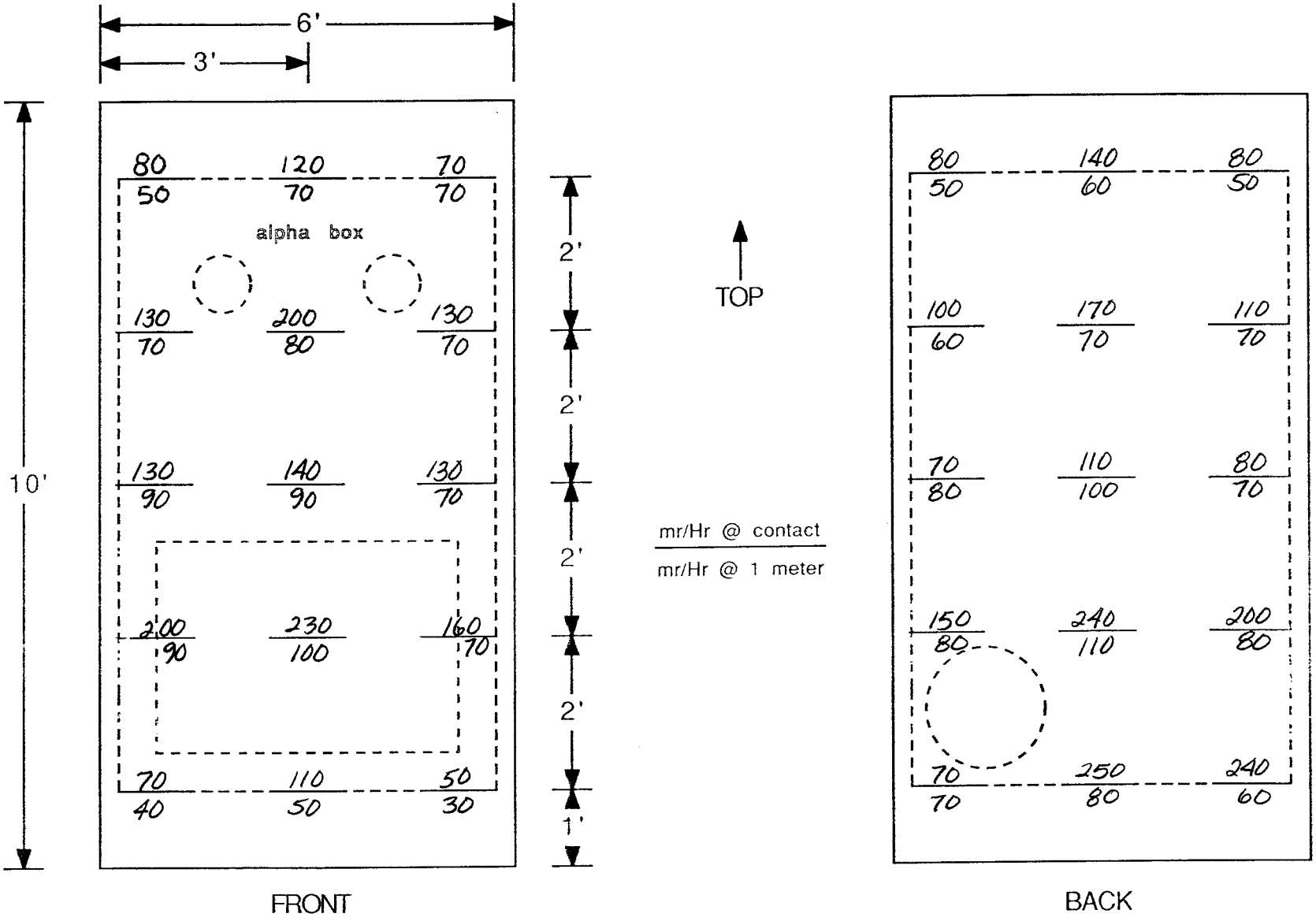
☛ **See Reverse Side for Handling Instruction**

0019525

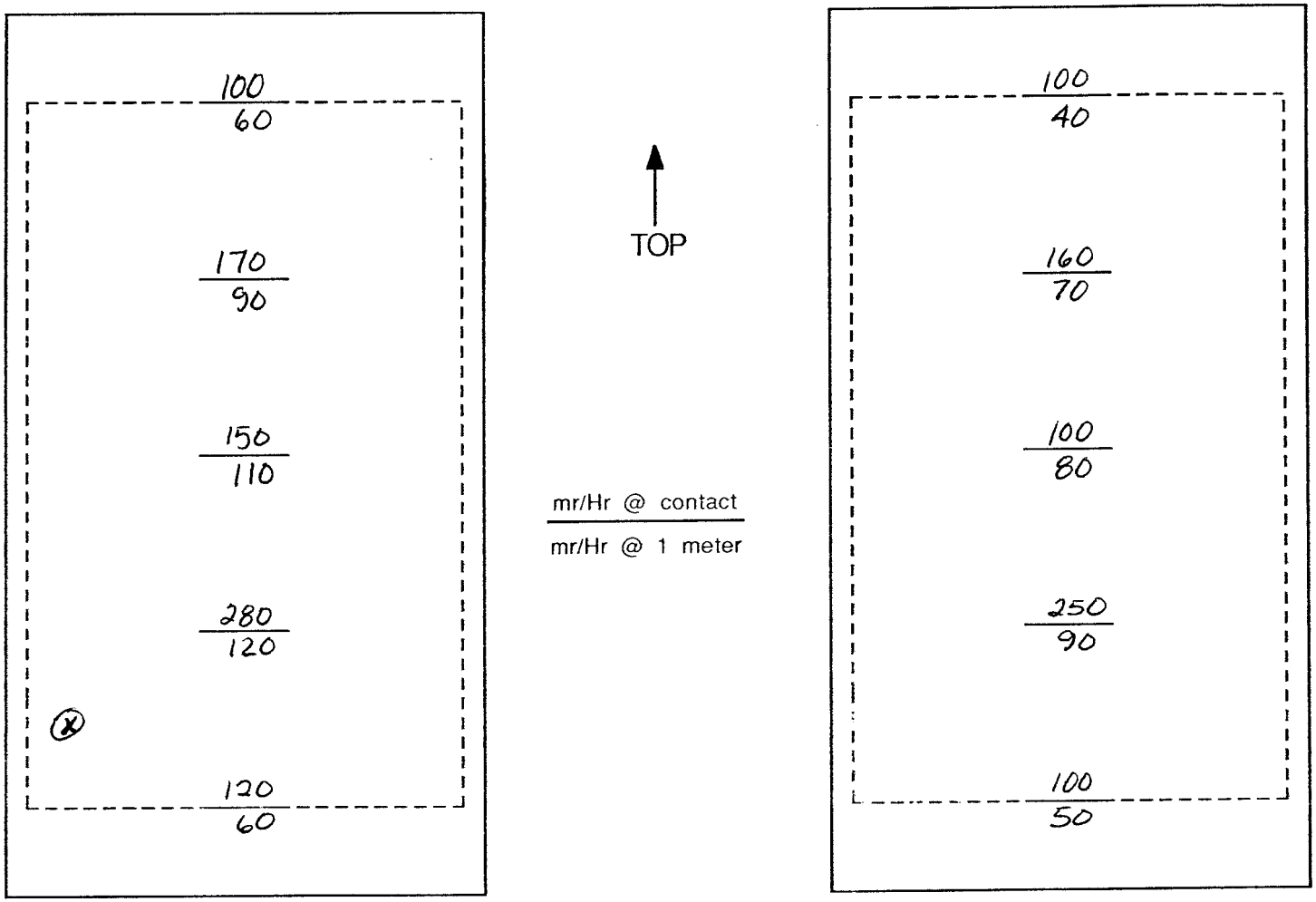
ITEM & PACKAGING DESCRITION

ORIGINATING LOCATION: TA 03 SM 29 RM Wing 9 CELL 9

ORIGINATOR J. Ledbetter GROUP MST-5 DATE 5/7/91



CELL 9



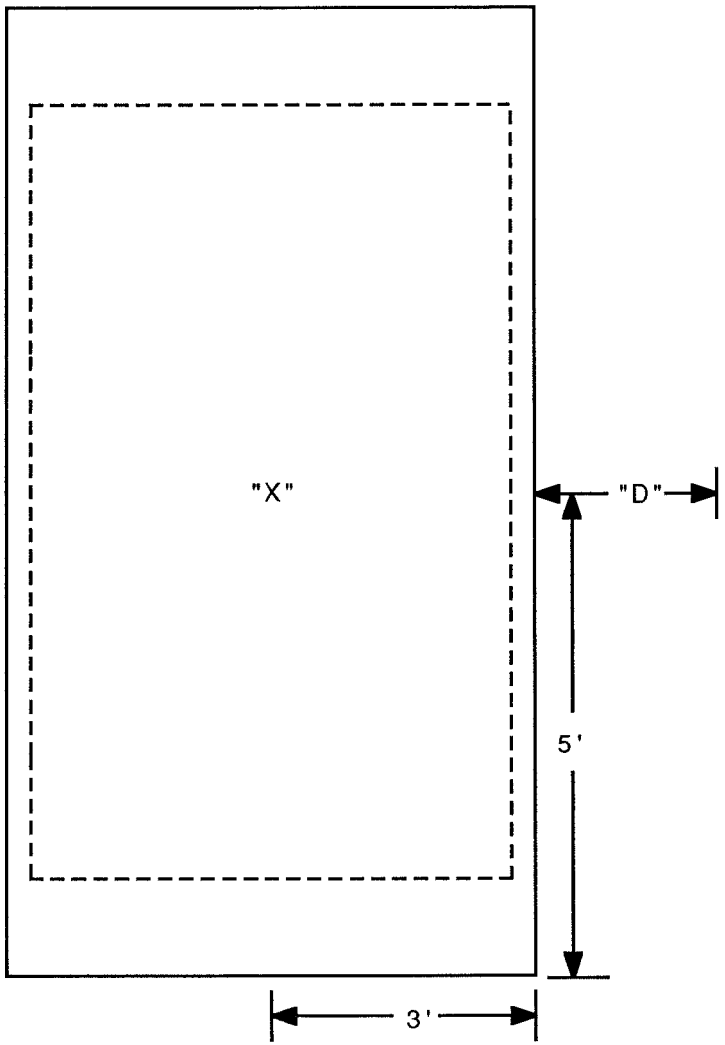
LEFT SIDE

RIGHT SIDE

⊗ 800 mr/hr @ contact
90 mr/hr @ 1 meter

FISSILE CONTENT MEASUREMENT

CELL 9



"D" (Distance from surface of box)	"X" (mr/Hr)			
	Front	Back	Left side	Right side
* 10'	24	25	22	25
11'	19	18	19	20
12'	13	13	14	13
13'	11	10	12	11
14'	9	8.5	10.5	9
15'	8	7.5	9	8

* Point source readings are taken atthe centerline of the box. The total distance for calculation is 13 feet (4 meters). Background dose-rate = 0.6 mR/hr.

Instrument PIC-6A P/N 003113

Calibration Void 8/1/91

Survey By Ross Martinez Date 7/8/91
HSE-10

NARRATIVE
CELL 9

Contained within this steel box #9 is a alpha containment box from cell 9 in Wing-9.

The dimensions of the alpha box is ~ 65" x 65" x 8' tall and the gross wt. of the package is 5500 lbs. The weight of the alpha box is approximately 2800 lbs.

The cell 9 alpha box was used for a number of years (8 to 10) as a metallographic sectioning cell. It is the most contaminated and radioactive box that will come out of Wing-9.

Extra care and precautions should be taken when retrieving and introducing into the size reduction facility.

Contaminates are Pu^{239}, U^{235}, MFP and MAP. A large amount of the MFP is ^{137}Cs. LMFBR fuel has been the only fuel sectioned in this box. Estimated gram weights will be calculated from dose measurements and stated on the radioactive solid waste disposal form (HS 10-2A). The method of calculation is included in the package.

The internal alpha box has been secured in place in a manner to allow easy removal.

1. Cut or grind off the lid welds at the 4 corners at the top.
2. Remove 4 3/4" hold-down bolts and remove brackets.
3. Attach sling at topped holes at 4 corners.
4. Hoist the alpha box free.

NOTE: The window of the alpha box is located at the lower front panel.

For further assistance, contact personnel at Wing-9 Hot Cell Facility (74653).

CELL 9 ALPHA BOX

A. Calculations For Plutonium And Uranium

A.
23.4
24.4
21.4
24.4
} READINGS @ 4m -B6

23.40 MEAN
1.41 STD. DEV.

6.057 00 TOTAL U(g)
3.498 00 +/-

5.700 00 U235(g)
3.293 00 +/-

1.532 00 TOTAL Pu(g)
8.849-01 +/-

1.318 00 Pu^{239}(g)
7.614-01 +/-

B. Calculations For Fission Products

B.
1.17 00 Ci Cs^{137}

1.06938 00 Ci Sr^{90}

1.06938 00 Ci Y^{90}

8.5761-03 Ci Ru^{106}

8.5761-03 Ci Rh^{106}

4.7619-02 Ci Sb^{125}

1.9773-02 Ci Te^{125m}

1.09746 00 Ci Ba^{137m}

6.6807-02 Ci Pm^{147}

2.1879-02 Ci Eu^{155}

TOTAL FISSION PRODUCT ACTIVITY
4.795082 00 Ci
2.7697672 00 +/-

A. Calculations For Plutonium And Uranium

1. Calculate the mean dose-rate value ($\bar{x}1$) from the four measurements taken along a center-of-box axis at a center-of-box detector distance of 13 feet.
2. Calculate the standard deviation (one sigma) value on the mean value calculated in step 1. Call the standard deviation value Sa. Divide the standard deviation by the mean value and call this error term S1:

$$S1 = \frac{Sa}{\bar{x}1}$$

3. Correct the mean value x1 for gamma attenuation through 0.25 inches of steel as follows:

$$\bar{x}2 = \bar{x}1\ (1.45)$$

4. Correct x2 value for a worst-case distance (all material located in center-bottom or center-top of box) as follows

$$\bar{x}3 = \bar{x}2\ (1.05)$$

5. Convert the final, corrected dose-rate value $\bar{x}3$ to grams Pu as follows:

$$\text{grams Pu} = \bar{x}3\ (0.043)$$

6. Convert the final, corrected dose-rate value $\bar{x}3$ to grams 239 Pu as follows:

$$\text{grams 239 Pu} = \bar{x}3\ (0.037)$$

7. Convert the final corrected dose-rate value $\bar{x}3$ to grams U as follows:

$$\text{grams U} = \bar{x}3\ (0.17)$$

8. Convert the final, corrected dose-rate $\bar{x}3$ to grams 235 U as follows:

$$\text{grams 235 U} = \bar{x}3\ (0.16)$$

9. Calculate the relative overall measurement uncertainty as follows:

$$\text{Relative Overall Uncertainty} = \sqrt{0.33 + (S1)^2}$$

10. Multiply the Relative Overall Uncertainty value from step 9 times the gram Pu, 239 Pu, U, and 235 (steps 5, 6, 7, and 8) and report as the one sigma value for each element/isotope.

Justifications For Plutonium And Uranium

1. Point Source Model

A series of measurements were conducted to test the assumption that measurement of the dose rate of a 10' x 5' x 5' box using an uncollimated PIC-6 meter located 13 feet from the box centerline (10 feet from the front or rear face) and at the box horizontal axis, is reasonably represented by a point-source model.

The point-source model requires that the observed dose rate is inversely proportional to the square of the center-of-source to detector distance. To test compliance to this requirement, the box dose rate was measured at a 13 foot distance. The box was then rotated 90^0, three times, and measurements made on all four faces at the 13 foot distance. Without further box rotation, measurements were taken with one foot increases in the center-of-box to detector distance. At a final distance of 23 feet, the box was again rotated through 90^0 increments and measurements taken on each face.

The measurement data is presented in Table 1.

Table 1

Dose-Rate Measurements Box #14

PIC-6 Readings mR/hr (net)*	Center-of-box to Detector Distance, feet	Box Orientation
11.4	13	back
10.4	13	left side
9.4	13	front
11.4	13	right side
9.6	14	right side
8.9	15	right side
7.4	16	right side
6.9	17	right side
6.15	18	right side
5.4	19	right side
5.15	20	right side
4.65	21	right side
3.9	22	right side
3.4	23	right side
3.2	23	back
3.2	23	left side
3.2	23	front

*Background dose-rate = 0.6 mR/hr.

The Table 1 data was analyzed two ways to test the point source (inverse distance squared) model.

Method A. Thirteen and 23 foot distance measurements with box rotation.

Mean values and one sigma uncertainties were calculated on readings taken at box orientations back, left side, front, and right side, both at the 13 and 23 foot distances. Results of these calculations are listed in Table 2

Table 2

Center-of-box Detector distance, feet	Mean dose-Rate, mR/hr	One standard Deviation on Mean
13	10.65	0.96
23	3.25	0.10

To test the mean dose-rate value taken at 13 feet, the 23 foot mean dose-rate value is corrected for distance as follows:

$$3.25 \text{ mR/hr} \times \frac{(23)^2}{(13)^2} = 10.17 \text{ mR/hr}$$

This value compares with the observed 13 foot value as follows:

$$\frac{10.17 \text{ mR/hr@ 23 feet}}{10.65 \text{ mR/hr @ 13 feet}} = 0.96$$

2. Attenuation Correction

Spectra taken with a Geruanium detector and Canberra-35 MCA showed a very strong 137 Cs spectra. If other peaks were present, they were not disenable above the 137 Cs gamma peaks plus Compton continuum.

The hot cell gloveboxes has a wall thickness of 0.125 inches (steel) and the boxes housing the gloveboxes was of 0.125 inch wall thickness (steel). Total wall thickness is 0.250 inches (0.635 cm).

Attenuation correction for the 662 Kev, 137/Cs gamma through 0.635 cm of iron is:

$$T = e^{-\mu\rho x} = e^{-(0.0738)(7.86)(0.635)}$$

$$T = 0.69$$

A correction factor of $\frac{1}{T} = 1.45$ is used.

3. Worst-Case Distance Correction

The center-of-box to detector distance assumes the source of the gamma signal is at the very center of the box volume. Since the box was rotated and measurements taken at the four box faces (sides, front, and back), the worst-case location of the gamma source would be at the center of the box top or bottom. Distance from the detector to the box top or bottom center is 13.34 feet.

A worst-case bias correction for this distance effect is:

$$\text{Correction} = \frac{(13.34^2}{(13.0)^2} = 1.05$$

4. Calibration Constant

Thirty-two cans of scrap representing the reactor fuel specimens handled in the hot cell gloveboxes, were measured for dose-rate with a PIC-6 instrument. Each of these cans had a know weight of fuel material. The attached table column F lists the dose-rates measured (at one meter) for the weight of scrap fuel listed in column I. The dose-rate were divided by the scrap fuel weight for each can and the mean value and one standard deviation for the mean determined. The values are: 67 mR/(hr)(gram), 38 mR/(hr)(gram) one sigma. The RSD is 0.57.

The fuel is of Mixed Oxide composition with the following makeup:

Pu:U ratio = 1:4
Weight fraction Pu = 0.18
Weight fraction 239 Pu = 0.155
Weight fraction = 0.70
Weight fraction 235 U = 0.65
Weight fraction 0 = 0.12

Dividing the weight fraction values for the elements and isotopes above by the nominal 67 mR/(hr)(g) and by 16 (adjusting

the 1 meter can measurement distance to the 4 meter box measurement distance), one obtains the following grams element or isotope per mR/hr constants listed below:

Calibration Constants

Isotope or Element	g Isotope or element per mR/hr
Pu	0.043
239 Pu	0.037
U	0.17
235 U	0.16

Note that the nominal 67 mR/(hr)(g) value is not corrected for attenuation. Attenuation correction for the cans of fuel scrap would be quite difficult because the can contents are very heterogeneous. By not performing attenuation corrections or the can dose-rates, we will overestimate the hot cell box fissile content.

5. Combined Error Terms

Two bias terms, the adjustment for worst-case distance and lack of attenuation correction on cans of fuel scrap, have been intensionally used to overstate the amount of fissile content of the hot-cell boxes. These terms will not be included in the combined error term.

Error terms to be included are for the mR/(hr)(g) factor for deriving calibration factors, the four measurements of the hot cell boxes, and the box attenuation correction. These terms discussed below:

a. Point Source Model.

The uncertainty on the point source model was estimated from the Table 3 data. The one standard deviation of 0.04 on the mean value of 0.99 is a relative error of 0.04.

b. Calibration Factor

The one standard deviation value on the mean 67 mR/(hr)(g), derived from the 32 can measurements, is 38 mR/(hr)(g). This translates to a relative error of 0.57.

c. Four Box Measurements

This error term is the one standard deviation on the mean value of the four box face mR/hr measured values. Call this term S1.

d. Attenuation Correction

This correction has uncertainties in both the nominal attenuating steel thickness and in the mass attenuation coefficient. Assuming the thickness can vary by 10% and the coefficient has a 20% uncertainty, these error terms introduce relative uncertainties into the mass of element or isotope as follows:

i) Thickness relative error = 0.03

ii) Attenuation coefficient relative error = 0.07

These uncertainty terms are combined in quadrature as follows:

$$\text{Overall Uncertainty} = \sqrt{(0.04)^2+(0.57)^2+(S1)^2+(0.03)^2+(0.07)^2}$$

$$\text{Overall Uncertainty} = \sqrt{0.33+(S1)^2}$$

The four percent difference from perfect agreement indicates very good agreement with the point-source model.

Method B. **Consistency of inverse-distance-squared correct measurements at increased distance.**

Eleven mR/hr measurements were performed while increasing the center-of-box to detector distance from 13 to 23 feet in one foot increments. The box remained in the "right side" orientation. Each mR/hr measurement value was "corrected" to the 13 foot distance and the "corrected" values listed in table 3.

Table 3

14-23 Foot mR/hr Values Corrected to 13 feet

Center-of-Box (11.4 to detector, feet value)	Net mR/hr observed	mR/hr corrected to 13 ft distance	13 ft value corrected
14	9.6	11.1	1.03
15	8.9	11.8	0.97
16	7.4	11.2	1.02
17	6.9	11.8	0.97
18	6.15	11.8	0.97
19	5.4	11.5	0.99
20	5.15	12.2	0.93
21	4.65	12.1	0.94
22	3.9	11.2	1.02
23	3.4	10.6	1.07

Reducing the right-hand column data from Table 3 yields a mean value of 0.99 and a one sigma value of 0.04. All values fell within one sigma except the 23 foot and 20 foot values which were within two sigma and on opposite "sides" of the mean value. This information indicates that the point-source model is appropriate for the 13 foot measurement distance.

B. Calculations for Fission Products

1. Multiply the mean PIC-6 value ($\bar{x}1$ from A.1) by 16 to estimate the point-source dose rate at one meter. Divide this value by 1000 to convert to Roentgans per hour at one meter (Rhm).

$$Rhm = (\bar{x}1)(16)/1000$$

2. Divide the Rhm from B.1 by 0.32 Rhm per Ci to convert to curies Cs-137.

3. Using the Ci Cs-137 value from B.2, multiply by the factors below to estimate the remaining fission product activities:

Ci Sr-90 = (Ci Cs-137)(0.914)
Ci Y-90 = (Ci Cs-137)(0.914)
Ci Ru-106 = (Ci Cs-137)(0.00733)
Ci Rh-106 = (Ci Cs-137)(0.00733)
Ci Sb-125 = (Ci Cs-137)(0.0407)
Ci Te-125m = (Ci Cs-137)(0.0169)
Ci Ba-137m = (Ci Cs-137)(0.938)
Ci Pm-147 = (Ci Cs-137)(0.0571)
Ci Eu-155 = (Ci Cs-137)(0.0187)

4. Calculate the total fission product activity from the Cs-137 activity as follows:

Total Fission Product Activity = (ci Cs-137)/0.244

Justifications For Fission Products

1. High-resolution gamma spectroscopy measurements on the hot cell liners showed the peaks and Compton continuum of Cs-137. No other peaks were observed. This observation is reasonable as the irradiated fuel samples examined in these cells had been out-of-reactor greater than 10 years and as the irradiated fuel radiation reaching the PIC-6 instrument was attenuated by 0.25 inches of steel. An assumption was made that the radiation measured with the PIC-6 was due solely to Cs-137.

2. Appendix B of report LA-4400 was used to convert the observed dose rates (measured at 4 meters) were multiplied by 16 (distance correction) prior to dividing by 0.32 Rhm per Ci.

3. Attached tables (Fission Products from U-235) supplied by R. Henderson (HSE-1) were use to estimate the curies associated with fission products other than Cs-137. Fuel residues the alpha boxes are conservatively estimated at 10-years-since-irradiation hence the "Ratio-to-Cs-137", "10 Years" table data was used.

Data from Logbook #23744

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	STEEL	LOGBOOK		WT.	RADIATION (R/hr)		ESTIMATED (g)		ASSAY	STD.	ASSAY	DRUM	CANISTER	?	STEEL CAN
2	CAN #	No.	PAGE	(Lbs.)	Contact	1meter	Pu	U	WT. (g)	DEV.	REPORT	No.	No.	?	LOCATION
49	151	23744	48	29	33	1.5	0.1	96	15.6	3.1	4/12/90			RU	CE5E3
50	152	23744	48	41	15	0.3	0.1	145	3.0	0.6	4/12/90			RU	CE5C3
51	159	23744	49	33	300	5	3	6	11.2	2.6	1/11/91			RU	CE4I6
52	171	23744	50	44	280	2.7	2	8	6.4	1.6	1/11/91			RU	CE4B2-2
53	173	23744	51	38.5	900	6	2	0.4	6.3	1.8	1/11/91			RU	CE4F4-2
54	351	23744	82	32	300	4	8	32	16.7	8.7	9/12/90			RU	CE5A3-2
55	352	23744	82	27	100	1	6	24	22.5	8.7	9/12/90			RU	CE5H6-2
56	353	23744	82	30	150	2	7	30	18.7	8.7	9/12/90			RU	CE5H2-2
57	354	23744	82	27	200	3	7	27	16.2	8.7	9/12/90			RU	CE5G4-2
58	355	23744	83	31	40	1	8	34	21.0	8.7	9/12/90			RU	CE5C3-2
59	356	23744	83	30	40	2	8	32	17.3	8.7	9/12/90			RU	CE5C5-2
60	357	23744	83	30	300	5	6	25	17.0	8.7	9/12/90			RU	CE5C4-2
61	358	23744	83	32	200	3	14	51	27.2	8.8	9/12/90			RU	CE5B4-2
62	360	23744	84	34	65	1	7	30	23.5	8.7	9/13/90			RU	CE5F6-2
63	361	23744	84	28	150	3	8	31	14.9	8.7	9/10/90			RU	CE5F5-2
64	437	23744	107	43	1	0.01	0.1	4	0.82	0.30	2/4/91			RU	CE4F9-3
65	123	23744	40	26	35	0.3	11	86	33	9	2/4/91			MS	CE7E9
66	124	23744	38	27	250	2.5	19	71	47	10	1/17/91			MS	CE7F9
67	125	23744	38	29	200	3	18	75	62	10	1/17/91			MS	CE4F8-2
68	126	23744	36	27	900	5.5	18	80	64	10	1/17/91			MS	CE4D4-2
69	127	23744	38	28	600	3	18	80	60	10	1/17/91			MS	CE4G3-2
70	128	23744	40	27	200	1.5	15	76	48	10	1/17/91			MS	CE4F1-3
71	129	23744	37	26	130	3	19	70	24.3	8.7	11/21/90			MS	CE4C6-2
72	130	23744	36	24	200	6	19	79	34	9	1/17/91			MS	CE4H8
73	131	23744	37	26.5	>1000	10.5	24	75	67	11	1/17/91			MS	CE4A8-2
74	132	23744	37	26	150	3	21	78	41	10	1/25/91			MS	CE7I9
75	133	23744	37	26	100	1.5	20	79	26.9	8.7	11/21/90			MS	CE4B7-2
76	134	23744	36	27	160	2.5	22	74	50	10	2/4/91			MS	CE7C9
77	135	23744	36	27.5	135	2.5	17	74	30.7	8.8	11/21/90			MS	CE4I5
78	137	23744	38	28	220	3	20	78	46	10	1/17/91			MS	CE4E8-2
79	138	23744	40	28	120	2	34	62	63	11	1/28/91			MS	CE4D8-2
80	139	23744	38	26	250	4	16	81	56	10	1/17/91			MS	CE4G8-2
81	140	23744	36	27	375	2.9	20	80	47	10	1/28/91			MS	CE4I1
82	141	23744	40	28	300	3	18	80	54	10	1/25/91			MS	CE7G9
83	142	23744	40	29	150	2	16	52	51	10	1/17/91			MS	CE7D9
84	143	23744	39	26	120	2	18	78	36	9	11/21/90			MS	CE4C7-2
85	144	23744	39	27	110	2	19	72	40	10	1/17/91			MS	CE7H9
86	145	23744	39	27	200	3	14	68	63	10	1/28/91			MS	CE4A7-2
87	146	23744	39	29	130	4	18	65	27.0	9.1	4/12/90			MS	CE5D3
88	147	23744	39	29	120	3.5	19	81	53.4	10.6	4/12/90			MS	CE5D8
89	148	23744	37	29	175	1.5	25	66	22.7	9.0	4/12/90			MS	CE5B8
90	267	23744	65	28	110	5	12	87	76	11	1/17/91			MS	CE4H6
91	268	23744	65	30	600	7	19	80	76	11	1/17/91			MS	CE4G5
92	273	23744	66	32	500	5	17	80	76	12	1/25/91			MS	CE4D9-3
93	274	23744	66	30	80	1.5	27	63	38	9	1/11/91			MS	CE4G1-3
94	275	23744	66	29.5	5	1.3	6	91	41	9	1/11/91			MS	CE4I3
95	276	23744	67	29	60	1.5	18	70	36	9	1/11/91			MS	CE4G5-2
96	277	23744	67	31	70	1.5	25	52	34	10	1/28/91			MS	CE4G4
97	285	23744	68	28	600	10	59	38	17.4	3.1	10/3/90			TH	CE4F5
98	286	23744	69	27	500	9	84	3	16.7	2.9	10/3/90			TH	CE4F2
99	287	23744	69	26	500	10	84	5	16.7	2.9	11/21/90			TH	CE4H3
100	288	23744	69	26	500	9	85	4	17.2	3.0	10/3/90			TH	CE4E2
101	289	23744	69	27	400	8	88	24	11.1	1.9	10/1/90			TH	CE4D9
102	290	23744	69	28	500	10	87	23	10.7	1.8	10/1/90			TH	CE4C8
103	291	23744	69	29	550	8	86	5	18.7	3.4	11/21/90			TH	CE4H1
104	292	23744	69	26	350	5.5	45	93	14.0	2.5	10/3/90			TH	CE4E3

Prompt Fission Products from U-235
Relative Curies

Nuclide	7 Years	10 Years	20 Years
Sr-90	9.74E-04	9.09E-04	7.11E-04
Y-90	9.74E-04	9.09E-04	7.11E-04
Ru-106	5.76E-05	7.29E-06	7.35E-09
Rh-106	5.76E-05	7.29E-06	7.35E-09
Sb-125	8.75E-05	4.05E-05	3.11E-06
Te-125m	3.62E-05	1.68E-05	1.29E-06
Cs-137	1.06E-03	9.95E-04	7.87E-04
Ba-137m	9.95E-04	9.33E-04	7.38E-04
Pm-147	8.11E-05	5.68E-05	2.62E-06
Eu-155	2.49E-05	1.86E-05	1.20E-05
Total	4.35E-03	3.89E-03	2.97E-03

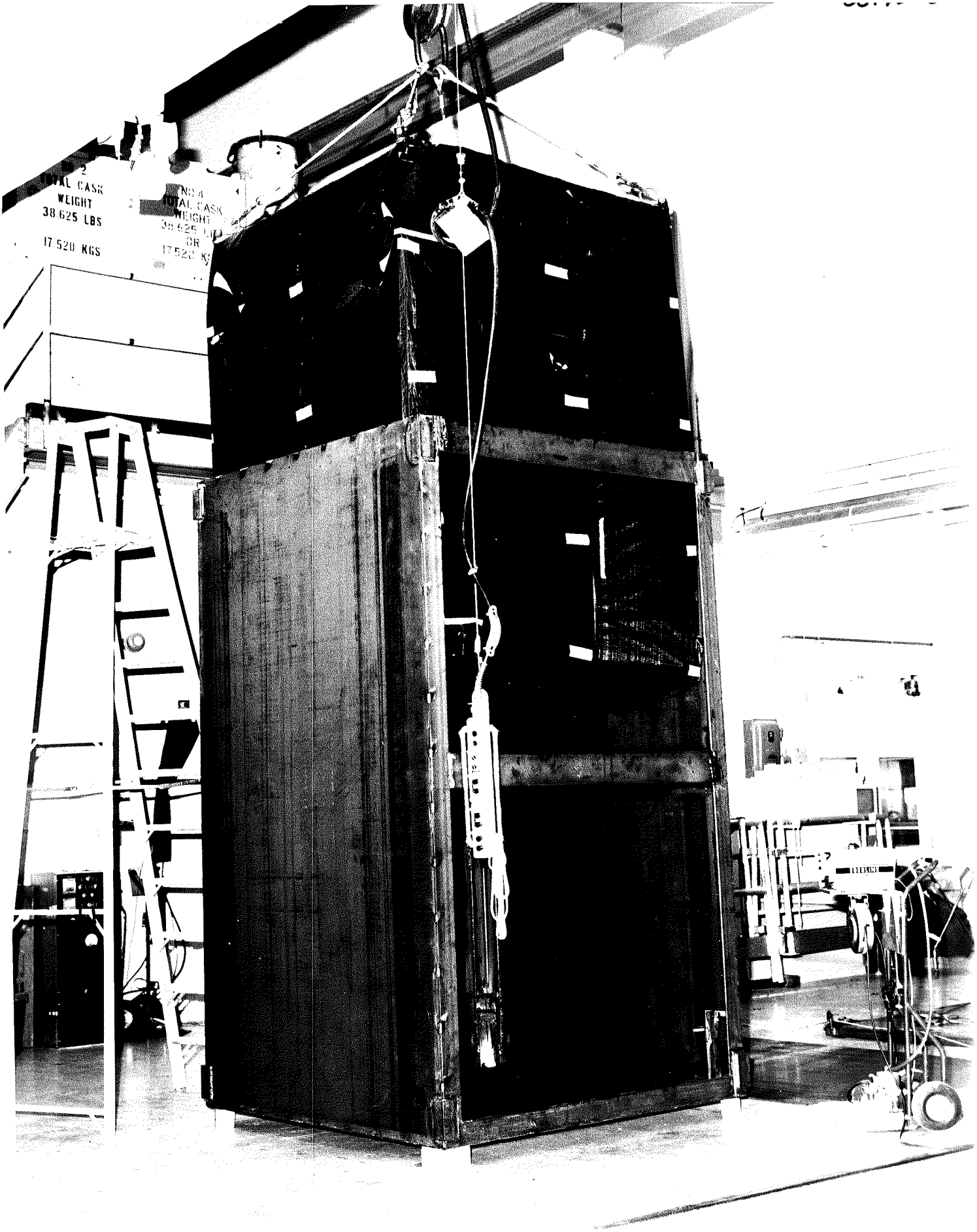
Ratio to Cs-137

Nuclide	7 Years	10 Years	20 Years
Sr-90	91.89%	91.36%	90.34%
Y-90	91.89%	91.36%	90.34%
Ru-106	5.43%	0.73%	0.00%
Rh-106	5.43%	0.73%	0.00%
Sb-125	8.25%	4.07%	0.40%
Te-125m	3.42%	1.69%	0.16%
Cs-137	100.00%	100.00%	100.00%
Ba-137m	93.87%	93.77%	93.77%
Pm-147	7.65%	5.71%	0.33%
Eu-155	2.35%	1.87%	1.52%

Ratio to total listed activity (>95%)

Nuclide	7 Years	10 Years	20 Years
Sr-90	22.40%	23.35%	23.97%
Y-90	22.40%	23.35%	23.97%
Ru-106	1.32%	0.19%	0.00%
Rh-106	1.32%	0.19%	0.00%
Sb-125	2.01%	1.04%	0.10%
Te-125m	0.83%	0.43%	0.04%
Cs-137	24.38%	25.56%	26.53%
Ba-137m	22.88%	23.96%	24.88%
Pm-147	1.87%	1.46%	0.09%
Eu-155	0.57%	0.48%	0.40%

Nuclide		
Sr-90	No Gammas	
Y-90	No Gammas	
Ru-106	.511 MeV	20 %
Rh-106	.622 MeV	10 %
Sb-125	.430 MeV	30 %
Te-125m	No Gammas	
Cs-137	No Gammas	
Ba-137m	.661 MeV	90 %
Pm-147	.474 MeV	36 %
Eu-155	.086 MeV	30 %
	.105 MeV	20 %


TOTAL CASK
WEIGHT
38,625 LBS
17,520 KGS

Appendix F

TRU Waste Storage Information, Container S910327 Stored in Shaft 306

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TRU WASTE STORAGE RECORD

S910327

1. Generator's Pre-Use Visual Inspection

Purchase Order #	Inspected Items		
This container has been visually inspected according to approved procedures and has been found to be free of damage that would make it unsuitable for TRU waste packaging.	☐ Ring, Bolt, and Nut	☐ Chime	☐ Dents
	☐ Lid and Gasket	☐ Gouges	☐ Paint

Printed Name	Signature	Sig. Date	Oper. Date

2. Generator's Package Information

Group	Technical Area	Building	Cost Center	Program Code	Cost Account	Work Package
LTP-PTS	54	000000				

Additional Information

☐ DP ☐ Non-DP If Non-DP waste, attach DOE approval doc.

Container	Liner
☐ Steel Drum (55 gal.)	☑ None
☐ Pipe Overpack Type:	☐ 90 mil liner
☐ Steel Drum (85 gal Overpack)	☐ 125 mil liner
☐ Standard Waste Box	☐ Fiberboard Liner
☐ Standard Waste Box Overpack	**Internal Shielding**
☐ RH Canister	☑ None
☐ Other (Call TWCO)	Type / Thickness

Radionuclide Content

Nuclide	Amount	Uncertainty	C= Curie M = Gram
Am-241	2.411E-002	0.000E+000	C
Cs-137	5.950E-001	0.000E+000	C
Pu-238	8.020E-003	0.000E+000	C
Pu-239	4.061E-002	0.000E+000	C
Pu-240	2.609E-002	0.000E+000	C
Pu-241	8.309E-001	0.000E+000	C
Pu-242	9.346E-006	0.000E+000	C
Ru-106	4.362E-003	0.000E+000	C

Filter Serial No.			
	01		
	02		

Waste Profile Number	53393 (WS ID 37017)
Gross Weight (lb.)	5.40E+003
Net Weight (lb.)	3.80E+003
Shipping Category	
LANL Waste Stream ID	TA-03-27
TRUCON Code	

Hazardous Materials

Name	EPA Code	Qty (g)

Date Closed (MM/DD/YY):

Accumulation Start Date (MM/DD/YY): 12/04/91

The data in this section were collected, and waste described herein was packaged and labeled according to approved procedures.

Printed Name	Signature	Date:

3. Generator Site Health Physics Information

	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Gamma Dose Rate (mrem/h) (contact)				
Neutron Dose Rate (mrem/h) (contact)				

Total Dose Rate (mrem/h) (contact)	
Total Dose Rate (mrem/h) (1 meter)	*The data in this section were collected according to approved procedures.*
Alpha Contamination (dpm/100cm2)	Printed Name / Date
Beta-Gamma Cont (dpm/100 cm2)	Signature

TRU WASTE STORAGE RECORD

S910327

4. TRU Waste Management Review/Authorization

The data package for this waste has been reviewed. Basedon the information provided, this waste meets the WAC requirements for storage at TA-54.	Printed Name	Date:
	Signature	

5. Preload Visual Inspection

This waste package was visually inspected prior to transport according to approved procedures. It meets WAC packaging and labeling requirements and is free from obvious damage and defects.	Printed Name	Date:

6. Receiving Site Health Physics Information

Gamma Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Neutron Dose Rate (mrem/h) (contact)	Survey Date	Survey Meter Model	Property Number	Calibration Void Date
Total Dose Rate (mrem/h) (contact)	*The data in this section were collected according to approved procedures.*			
Total Dose Rate (mrem/h) (1 meter)				
Alpha Contamination (dpm/100cm2)	Printed Name			Date
Beta-Gamma Cont (dpm/100 cm2)	Signature			

7. Storage Site Information

Received by (Initials)	Date Received	**Original Storage Data**		
This waste package was visually inspected and found to be properly labeled and in good condition. It was accepted and inspected according to approved procedures.		Building Number	Layer	Row Number
		Column Number	Date Stacked (MM/DD/YY)	
Printed Name	Date:	Printed Name	Date:	
Signature		Signature		

8. Waste Acceptance Office

Intials/Date	WE Description

NCR Number	Intials/Date	NCR Description

TRU WASTE STORAGE RECORD

S910327

9. Continuation Sheet for Radionuclide Content (from Page 1, Section 2)

Radionuclide Content - Continued			
Nuclide	**Amount**	**Uncertainty**	**C= Curie M = Gram**
Sr-90	5.438E-001	0.000E+000	C
U-234	1.998E-004	0.000E+000	C
U-235	6.237E-006	0.000E+000	C
U-236	8.225E-007	0.000E+000	C
U-238	5.766E-008	0.000E+000	C
Y-90	5.438E-001	0.000E+000	C

10. Continuation Sheet for Hazardous Materials (from Page 1, Section 2)

Hazardous Materials		
Name	**EPA Code**	**Qty (g)**
No Additional Hazardous Materials		

CONTAINER PROFILE
S910327
T-TTRU-TEMP

WS ID: 37017
C ID: 769769
Opt ID: B19336
ACTIVE

GENERAL INFORMATION

Container ID:	769769		
Labeled ID:	S910327		
Optional ID:	B19336	**Status:**	ACTIVE
Chemical Barcode:		**Decommissioned:**	NO
Physical State:	SOLID	**Container Type:**	SC: Shield cask
Waste Stream ID:	37017	**Container Subtype:**	Remotely handled canister
Work Path:	T-TTRU-TEMP	**Origin Date:**	04-Dec-1991 12:00 am
Quantity (Univ):		**Accum Start Date:**	04-Dec-1991
Compactible:		**Closed Date:**	

Discard Matrix:

TID(s):

Gen Contact:

Insert By: WCATS APPLICATION (000000)

Waste Desc: GENERATED AT 03-00029

WEIGHTS AND VOLUMES

Container Volume:	10.20 CM	**Gross Weight:**	5400.93 lb
Waste Volume:	NOT SPECIFIED	**Tare Weight:**	1600.00 lb
		Net Weight:	3800.93 lb

LOCATION

Pickup (Origin): LANL: 03-CMR: GEN-AREAS

Current: LANL: 54-G-DISP: SHAFT306

CONTAINER PROFILE
S910327
T-TTRU-TEMP

WS ID: 37017
C ID: 769769
Opt ID: B19336
ACTIVE

PAYLOAD INFORMATION

Container Procurement

P.O. Number: **Year of Manuf:**

Lot No.: **Serial No:**

Solution Package: 53: SP BG - Hot Cell Liners

TRUCON Code:

Shipping Category:

CCP AK Report:

WIPP Waste Stream: TA-03-27: COMBINED COMBUSTIBLE AND NONCOMBUSTIBLE

Matrix Code:

Defense Waste: **Equiv. Comb. Matrix:**

Adeq. Ventilation: **Compliant Metal Cont.:** YES

Overpack (1 to 1): NO **Retrievable:** **BIR WS Code:** LA-RM14

Content Code:

COST CODES

Cost Center	Prog Code	Cost Account	Work Package	Percent Allocation	Cost Center Status	Cost Code Status	Recharge Mode
------	X77A	----	----	100.00			*SELECTION LIST*

EPA CODES

System Code	Hazardous Waste No.	Waste Description & Treatment Subcategory

RADIONUCLIDES

Nuclide	Amount	Unit	Uncert	MT Derived (Y/N)	Activated (Y/N)	MDA Result (Y/N)	Normal Form (Y/N)	Measurement Code/Comment
Status: Active, Assay Page: 338173, Date: 12/04/1991, Derivation: Generator Entered Results (e.g., Offsite Assay)								
38	3.10E+000	g	0.00E+000	N				NONE
55	7.80E-001	g	0.00E+000	N				NONE
Am-241	2.41E-002	Ci	0.00E+000	Y			Y	
Cs-137	5.95E-001	Ci	0.00E+000	N			Y	
Pu-238	8.02E-003	Ci	0.00E+000	Y			Y	
Pu-239	4.06E-002	Ci	0.00E+000	Y			Y	
Pu-240	2.61E-002	Ci	0.00E+000	Y			Y	
Pu-241	8.31E-001	Ci	0.00E+000	Y			Y	
Pu-242	9.35E-006	Ci	0.00E+000	Y			Y	
Ru-106	4.36E-003	Ci	0.00E+000	N			Y	
Sr-90	5.44E-001	Ci	0.00E+000	N			Y	
U-234	2.00E-004	Ci	0.00E+000	Y			Y	
U-235	6.24E-006	Ci	0.00E+000	Y			Y	
U-236	8.23E-007	Ci	0.00E+000	Y			Y	
U-238	5.77E-008	Ci	0.00E+000	Y			Y	
Y-90	5.44E-001	Ci	0.00E+000	N			Y	

CONTAINER PROFILE
S910327
T-TTRU-TEMP

WS ID: 37017
C ID: 769769
Opt ID: B19336
ACTIVE

RAD CALCULATIONS

Total Activity (nCi/g):	1.51788E+03	**DOTFissile Mat (g):**	3.54724E+00	
Alpha (nCi/g):	5.74585E+01	**Transport Index:**		
TRU Alpha (nCi/g):	5.73267E+01	**NRC Class:**	C	
Pu-239 FGE:	2.53015E+00	**DOT Type:**	B	
Pu-239 FGE [2U]:	2.53015E+00	**LSA-I Fraction:**	1.23536E+02	N
Pu-239 Eq-Ci:	1.16303E-01	**LSA-II Fraction:**	2.51857E-02	Y
Pu-239 Eq-Ci [2U]:	1.16303E-01	**LSA-III Fraction:**	1.25928E-03	Y
TRU Pu-239 Eq-Ci:	1.14814E-01	**Reportable Quantity:**	1.68083E+01	Y
TRU Pu-239 Eq-Ci [2U]:	1.14814E-01	*** ALC Ratio:**	5.95897E+06	NE
Decay Heat [U] (W):	7.52086E-03	*** ACM Ratio:**	3.70609E+03	NE
Tritium (Ci/m3):	0.00000E+00	**Limited Quantity:**	4.34219E+03	N
TRU ECW PE-Ci:	1.14814E-01			

Weight/Volume Used:

1	Container Net Weight:	1.72407E+03 kg
2	Container Volume:	1.01950E+01 m3

**ALC (Activity Limit for Exempt Consignment)*
**ACM (Activity Concentration for Exempt Material)*
U = 1 Uncertainty, 2U = 2 Uncertainty

TASK HISTORY

Date/ Time	Task ID/ Status	Task Name/ Storage or Disposal Grid Location	Reject
12/05/1991 12:00 AM	1784398 EXECUTED	LANL:03-CMR » 54-G-DISP:SHAFT306	NO

Note: Highlighted row indicates container was output or receiving container for the indicated task

DOCUMENTATION

Doc. Number	Title	Uploaded By
1	S910327-TWSR	WCATS APPLICATION (000000)

COMMENTS

Date Time/ User Name	Comment
08/23/2013 9:37 AM WCATS APPLICATION (000000)	CELL 14 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538

EDIT LOG

Date Time/ User Name	Quality Record	Explanation

EDIT LOG

Date Time/ User Name	Quality Record	Explanation
08/23/2013 9:45 PM WCATS APPLICATION (000000)	NO	TRUP.TRUPKG TABLE (WASTEDB): [PKG_ID] = S910327, [ALPHA_CONT] = , [APPROVE_BY] = , [APPROVE_DATE] = , [BETA_GAMMA_CONT] = , [BLDG_CD] = 03-00029, [BX_SERIAL] = , [CERT_STATUS] = , [COLOR_CD] = , [COMMENTS] = CELL 14 STEEL ALPHA BOX IN STEEL BOX PUT IN RH SHAFT WPRF# 00538, [CONTENT_CODE] = , [CONTROL] = , [DATE_CLOSED] = , [GAMMA_DOSE] = , [GROSS_WT] = 5400.927, [GRP] = MST5, [NEUTRON_DOSE] = , [NORMAL] = , [OLDDRUMNUM] = B19336, [OLDVOL_UNIT] = F, [OLDWT_UNIT] = T, [ORG_VOL] = , [ORG_WT] = , [PKG_CD] = 04, [PKG_CD_DESC] = REMOTELY HANDLED CANISTER, [PKG_DATE] = 1991-12-05 00:00:00, [PKG_FISS_GRAMS] = 2.52130142757035818727189771001266944809, [PKG_LOT] = , [PKG_PE_ACT] = .11494486458425772027826523384953157325 4, [PKG_TARE_WT] = 1600, [PKG_VOLUME] = 10.195, [PROC_BTCH_CD] = , [PROG_CODE] = X77A, [ROOM] = X77A, [SAMPLE_ID] = , [THERMAL] = .00747985298473232893473084191695248158, [TOTAL_DOSE] = 650, [TOT_ANCG] = 57.57761973998050705962354883789049717 52, [TRUCON_CD] = , [WASTE_CD] = 52, [WPRF_CD] = , [YR_MFG] = , [WASTE_TYPE] = , [INSP_DATE] = , [AUA_VUA] = , [PROCESS_ID] = , [WGEN_CD] = , [DOT_TYPE] = , [BIR_ID] = LATR05, [RQ] = , [LSA_SCO_CD] = , [LSA] = , [A_START_DATE] = , [BIR_WS] = LA-RM14, [LA_WS] = TA-03-27, [SWBOP] = , [RETRIEVABLE] = , [OFFSITE] = , [LINER_CD] = , [NET_WT] = 3800.927, [SHIP_CD] = , [WASTE_STREAM] = , [OVERPACK] = N, [REPACKED] = , [INVENTORY_NO] = , [INVENTORY_DT] = , [CHCD_CC_CD] = , [CHCD_CA_CD] = , [CHCD_WP_CD] = , [DOT_DP] = , [WASTE_VERIF] = , [VERIF_COMPLETE] = , [HDL_CD] = , [UPD_WHEN] = 2004-07-02 12:08:37, [UPD_WHO] = 114644, [PHY_STATE] = S, [PKG_H3_ACT] = 0, [QTW] = N, [AK_REPORT] = , [STP] = 0
08/23/2013 12:33 PM WCATS APPLICATION (000000)	NO	TRUP.UPD_HISTORY TABLE: [UPD_ID]= 12684, [AUTH_BY]= 113199 -> CHRISTENSEN DAVIS V , [AUTH_NUM]= SR318, [PKG_ID]= S910327, [UPD_WHEN]= 03-26-1996, [UPD_WHO]= Z111142 -> LONGLEY JOHN M , [WHAT]= tgrams, tcuries, fiss_grams, thermal, pkg_pe_act,pkg_fiss_grams, [WHY]= Correct errors
08/23/2013 8:48 AM WCATS APPLICATION (000000)	NO	INITWORKPATH (C_ID=769769/PATH_ID=465): SKIPPED (NO WORKPATH UNITS)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 0327

2. Date (M M D D Y Y): 0 8 0 9 9 1

3. Retrievable Serial Number: 0 1 9 3 3 6

4. Origin of Waste

Group	TA	Building	Wing	Program Code
M S T	5	3	29	9 X 7 7 A

5. Waste Code: A 4 1

6. Waste Description: CELL 14 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)
3600	F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
650	50

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)
207	T

11. Additional Description of Packaging and Packaging Materials: TIME CAPSULE ATTACHED TO BOX
1 IN STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
U 238	3.1 E+0		m	1.8 E+0		A		
PU 55	7.8 E-1		m	4.5 E-1		A		
CS 137	5.95 E-1		C	. E		E		
SR 90	5.438 E-1		C	. E		E		
Y 90	5.438 E-1		C	. E		E		
RU 106	4.362 E-3		C	. E		E		

APPROVALS

Waste Generator *(Print Name Here)*	HSE-1/-10/-11 Area Representative *(Print Name Here)*	Additional Signatures *(Optional)*
Jim LEDBETTER	Kenneth L Ault	
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met *(Signature)*	Signature certifies that waste package or shipment is safe to handle and transport *(Signature)*	
	K. Ault	

13. Date Disposed (M M D D Y Y): 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	306		T		

15. Shaft Surface Dose (mr/hr):

HSE-7 Waste Management Representative *(Print Name Here)*	Received	Logbook	Computer	Verified
ANDREW J. CATANACH	AC	AC		
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*	Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 ~~0013~~ 0327 continuation

2. Date: M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste: Group | TA | Building | Wing | Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages: Plastic Bags | Card-Board Boxes | Drums: No. | Gal. | Wooden Crates: No. | Volume-ft³

8. Gross Volume: Amount | (M = meter³, F = foot³, G = gallon)

9. Package Radiation at: Surface (mr/hr) | 1 Meter (mr/hr)

10. Gross Weight: Amount | (K = kilogram, P = pound, T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie, M = gram)	Error on Amount	±	Amount Determined By: (A = analysis, M = measurement, E = estimate)	SS Materials Write-Off: Account	Project Code
Rb 106	4.362	E -3	C		E	E		
Sb 125	2.422	E -2	C		E	E		
Te 125m	1.006	E -2	C		E	E		
Ba 137m	5.581	E -1	C		E	E		
Pm 147	3.397	E -2	C		E	E		
Eu 155	1.113	E -2	C		E	E		

APPROVALS

Waste Generator *(Print Name Here)*	**HSE-1/-10/-11 Area Representative** *(Print Name Here)*	**Additional Signatures** *(Optional)*
Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed: M M D D Y Y — 1 2 0 5 9 1

14. Disposal/Storage Location: Area | Shaft | Pit | Post(s) | Layer | Pos.

G	306		T		

15. Shaft Surface Dose: mr/hr

HSE-7 Waste Management Representative *(Print Name Here)* ANDREW J. CATANACH	Received AC	Logbook AC	Computer	Verified
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*	Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 0 3 2 7	0 1 9 3 3 6

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 10 E + 1 | **Organic Material Volume (%)** 0

Internal Shielding

Type	Thickness (in.)
☒ None	
☐ Lead	• E
☐ Steel	• E
☐ Concrete	• E
☐ Other	• E

Nonradioactive Hazardous Materials

Name	EPA Code	Quantity (g)
None		• E
		• E
		• E
		• E

Internal Packaging

- ☑ Plastic bags
  - Number 1
  - Thickness 3 mil
- ☐ 90-mil HDPE Liner
- ☒ Blocking
- ☐ Other

Additional Information

Contaminated stainless steel alpha containment box wrapped in plastic and packed in a 6 ft x 6 ft x 10 ft steel box

WPRF Reference Number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name	Signature	Date
Jim LEDBETTER	Jim Ledbetter	8/9/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	6.5 E + 2	Survey Meter Model RO-3C	Property No. 002630
Neutron Dose Rate (mrem/h)	• 0 E + 0	Survey Meter Model PNR-4	Property No. 005231
Total Dose Rate (mrem/h)	6.5 E + 2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm^2)	1.5 E + 1	Printed Name Kenneth L Ault	Date 8/9/91
Beta-Gamma Cont. (dpm/100cm^2)	3.8 E + 2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name	Signature	Date
BRUCE T. REICH	Bruce T. Reich	8/12/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm^2)	• E +	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm^2)	• E +	Signature	

HS Form Number 10-5B (11/88)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number
00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: **ATTN: WPRF, MS K490**

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	WQ-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
ALPHA CONTAINMENT BOXES

General Description Of Waste (check at least one block for each column):

FORM	FLASH POINT (°F)	pH	REACTIVITY	PCBs
☒ Solid	☐ Less Than 100	☐ 2.0 or Less	☐ Unstable	☐ <50 ppm
☐ Cemented Sludge	☐ 100 to 139	☐ 2.1 to 12.4	☐ Reacts With Water	☐ 50-500 ppm
☐ Semi-Solid/Sludge	☐ 140 to 200	☐ 12.5 or Greater	☐ Cyanides	☐ >500 ppm
☐ Absorbed Liquid	☐ Greater Than 200	☒ Not Applicable	☐ Sulfides	☒ No PCBs
☐ Liquid	☒ None		☐ Shock Sensitive	
☐ Gas			☐ Class A or B Explosive	
☐ Multi-Layer			☒ Non-Reactive	
☐ Suspended Solids				
☐ Powder or Ash				

Indicate Known Radioactivity Of Your Waste:

☐ Not Radioactive (Go To Next Section)

☐ <2.0 nC/g	☒ Alpha
☐ >2.0 nC/g	☒ Beta
☐ >10.0 nC/g	☒ Gamma
☒ >100.0 nC/g	☐ Tritium

List Known Radioistopes:

☐ Determined By Assay ☐ Determined By Estimate

Radioisotope 1.	235 U	Activity/Unit of Measure	NA
Radiosotope 2.	239 Pu	Activity/Unit of Measure	
Radiosotope 3.	MFP	Activity/Unit of Measure	
Radiosotope 4.	MAP	Activity/Unit of Measure	

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067		6-27-9
If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)		Mail Stop
	GARCIA DARYLL		G 730 ~~738~~

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP		TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ →	☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ →	☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ →	☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ →	☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

Compound Name	Concentration		Compound Name	Concentration
1.			5.	
2.			6.	
3.			7.	
4.			8.	

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
J Hagen	7/1/91	

0019336

DATE: 7/2/91

TO: J. Ledbetter, MST-5, 6742

FROM: Juan C. Corpion, HSE-8, MS K490

SUBJ: **WASTE PROFILE REQUEST (WPR)**

The HSE-8 Hazardous and Solid Waste Section has reviewed and logged the information you provided on the attached WPR(s). Based on the information you provided, your waste(s) is:

A. Non-radioactive/Non-hazardous

- ☐ Solid waste
- ☐ Non-regulated chemical
- ☐ Sanitary waste
- ☐ Other non-disposable waste

B. Radioactive

- ☐ Low-level
- ☑ Transuranic
- ☐ Nuclear Material

C. Hazardous or Mixed

- ☐ Hazardous
- ☐ Mixed low-level
- ☐ Mixed transuranic

You are required to keep a copy of the WPR(s) in your files for at least 3 years. This WPR(s) is valid for one year or as long as the composition of the waste you have characterized remains the same. Should your waste change, submit a new WPR to HSE-8 and attach a copy of the WPR which is being replaced.

Attachment(s)

☞ **See Reverse Side for Handling Instruction**

0017356

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

TO : Jim Ledbetter, MST-5, MS G742 not at G724

DATE : May 7, 1991

FROM : Nate King, HSE-3

MAIL STOP/TELEPHONE : G726/7-4127

SYMBOL : HSE-3:HAZ:91-318

SUBJECT : PACKAGING AND TRANSPORTATION OF ALPHA BOXES

Based upon our meeting of April 29, 1991 and recent changes at the Laboratory regarding transfers of hazardous materials you will be required to follow the guidance indicated below.

1. Each steel container must be marked on the outside "Radioactive Material NOS UN2982".

2. A Hazardous Materials Transfer Form and a Radioactive Material Transfer Tag must be completed for each container.

3. A copy of the Radiation Work Permit must be sent to the HAZPACT Section for review and approval. Not required if Contact Reading is < 1 R/hr. @ Contact

4. Arrangements must be made through ES&H S² for road closure during the transfer.

These actions are necessary because it is not apparent that these alpha boxes can be declared Low Specific Activity. The metal containers are, at best, strong tight packaging, but have not been tested. From the best guess available it would appear that you have a type A quantity of ^{137}Cs and MFP. Therefore, I recommend that you proceed down the pathway laid out by the above steps. I would like to also suggest that the metal boxes be painted with some type of rustproof paint.

NK:icf

xc: W. Bradley, ES&H S², MS K303
E. Derr HSE-7, MS J592
S. Dalton, HSE-3, MS G726
HAZPACT File (2)

PACKAGING CONDITION INSPECTION

Waste Package Serial Number 0019336

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

I. GENERATOR'S PRE-USE VISUAL INSPECTION

		Inspection Items	Initials
Drum Lot Code	N/A	Ring, Bolt, & Nut	N/A
Year Of Mfgr.	N/A	Lid & Gasket	N/A
Box Serial No.	N/A	Chime	N/A
Comments: CONTAINER USED FOR TRANSPORTATION AND STORAGE AT TA-54 AREA 'G' ONLY		Dents	TJR
		Gouges	TJR
		Paint	TJR

This container has been visually inspected and has been found to be free of damage that would make it unsuitable for TRU waste packaging.

Name	Signature	Date
TOBIAS J ROMERO	Tobias J Romero	8/9/91

II. DRIVER'S VISUAL INSPECTION

Inspection Items	Initials
Filter	NA
Labels	PWM
Damage	PWM
Closure Ring	NA
TID Seal No.	NA

This waste package was visually inspected at time of pickup as required by approved procedures, and was found to be free of obvious damage or defects.

Comments

Name	Signature	Date
Paul W Montoya	Paul W Montoya	8-14-91

III. TA-54 INSPECTION

Weight (lbs.)	*This waste package was visually inspected for handling damage before shipping, and, if the package is a drum, the closure ring bolt was tightened as required by approved procedures.*
TID Seal No.	
Comments:	

Name	Signature	Date

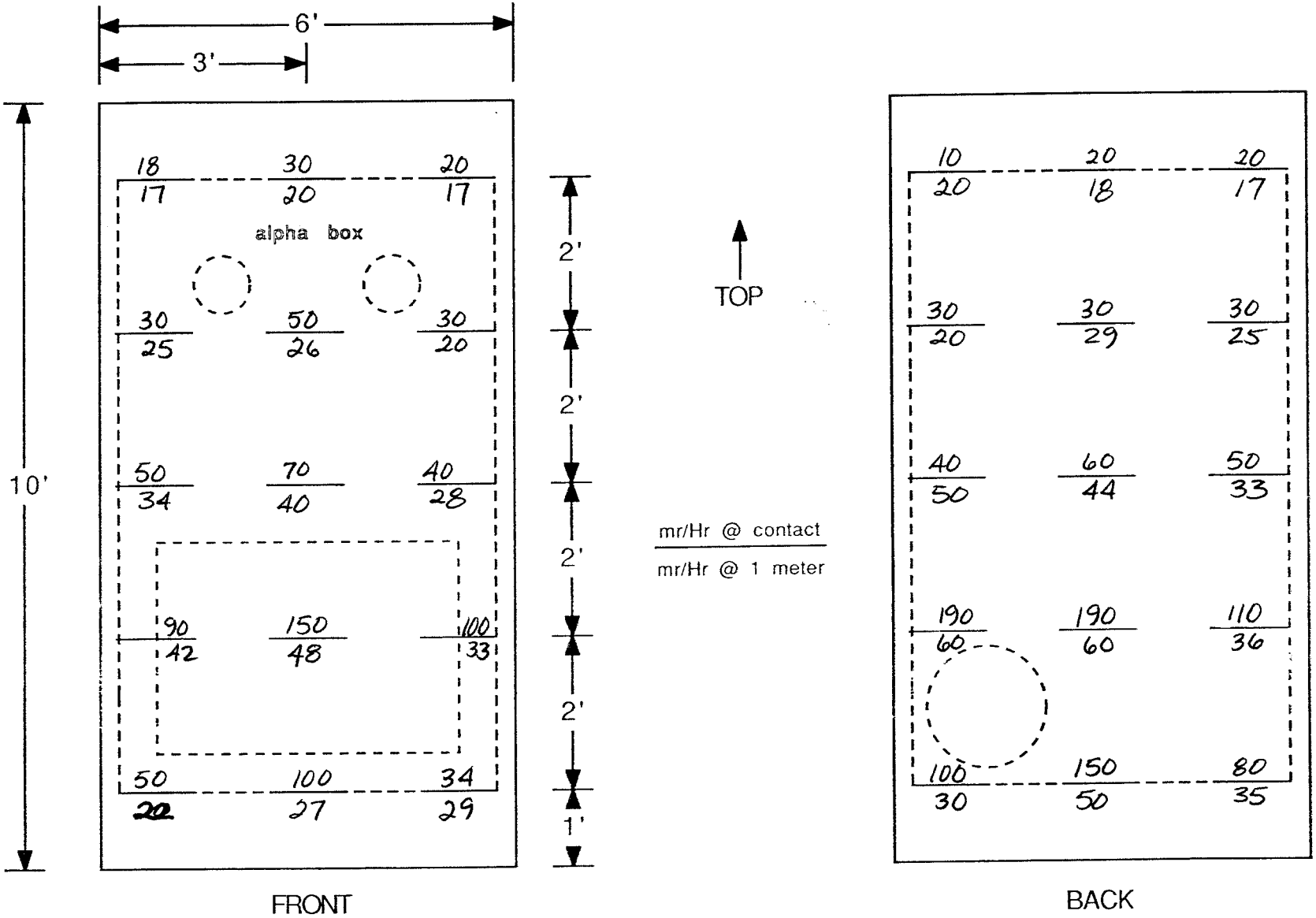
HS Form Number 10-5C (11/88)

0019336

ITEM & PACKAGING DESCRITION

ORIGINATING LOCATION: TA 03 SM 29 RM Wing 9 CELL 14

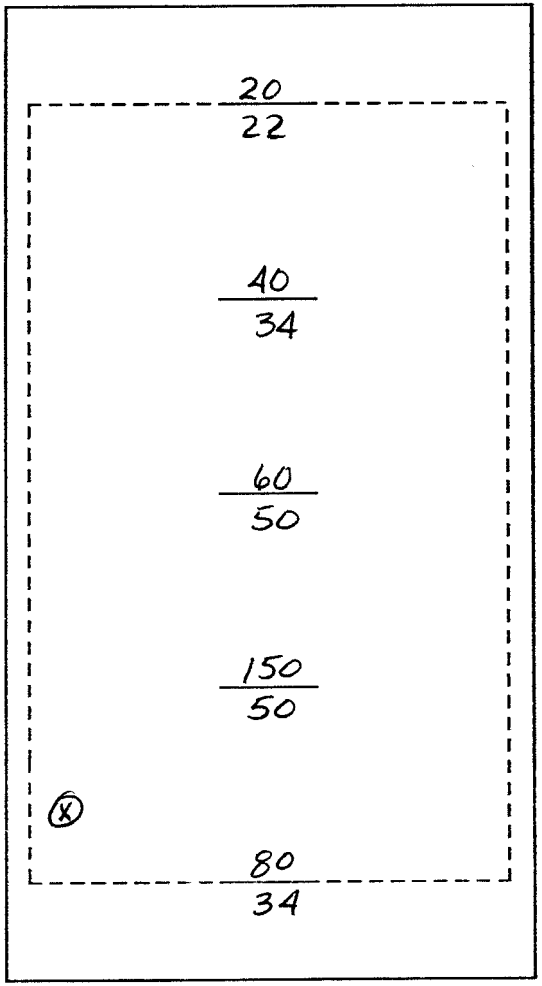
ORIGINATOR J. LEDBETTER GROUP MST-14 DATE 6/19/91



FRONT

BACK

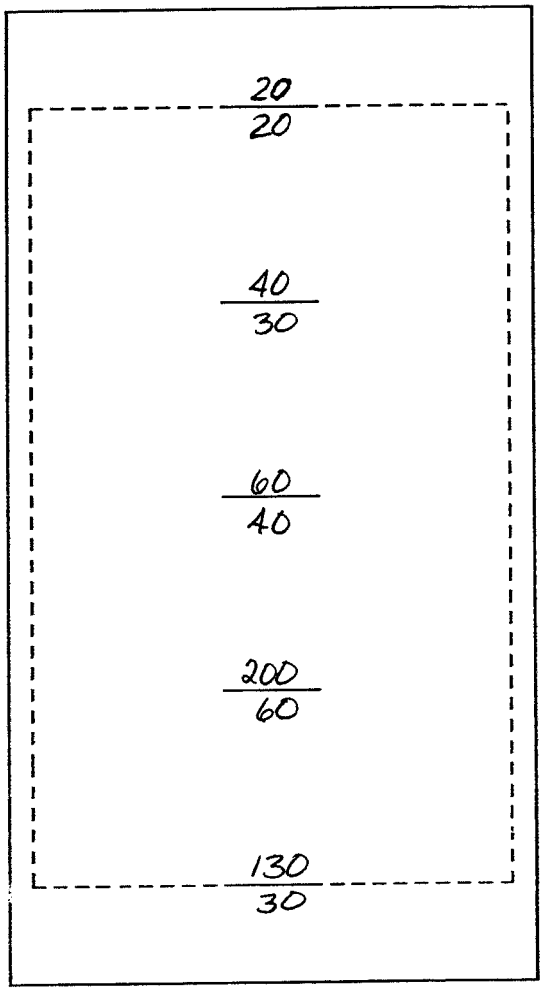
CELL 14



LEFT SIDE

TOP

mr/Hr @ contact
mr/Hr @ 1 meter



RIGHT SIDE

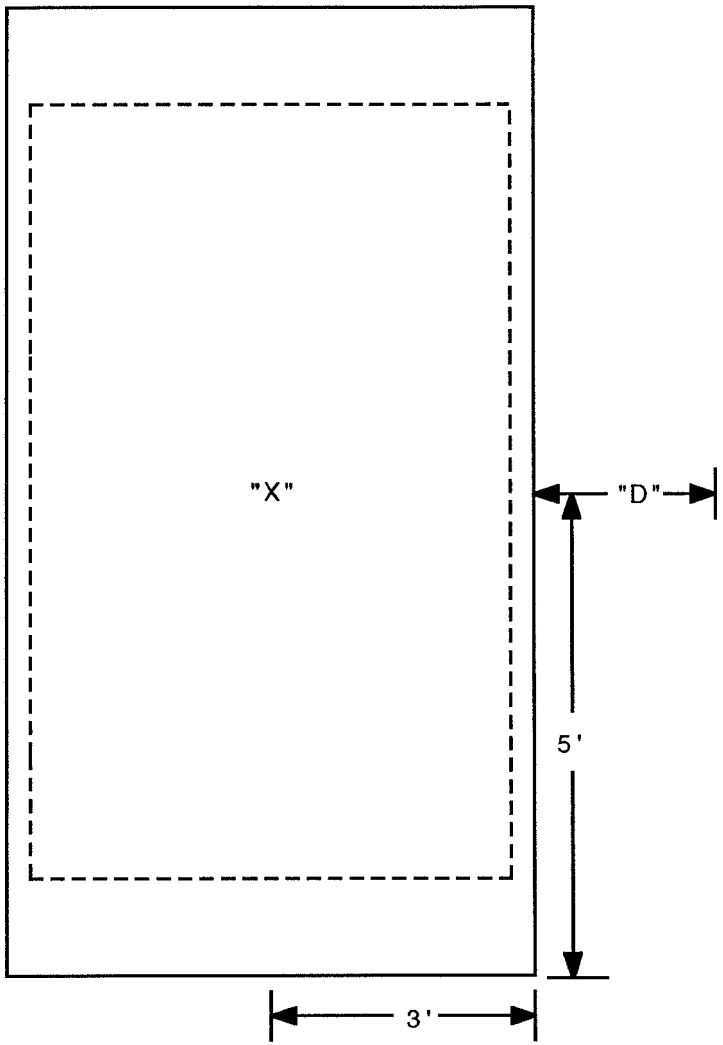
TOP of BOX 26/16

Bottom of BOX 230/70

X 650 mr/hr @ contact
50 mr/hr @ 1 meter

FISSILE CONTENT MEASUREMENT

CELL 14



"D" (Distance from surface of box)	"X" (mr/Hr)			
	Front	Back	Left side	Right side
* 10'	12	12	12	14
11'	8	8	9	9
12'	4.5	5	5	4.5
13'	3	4.5	4.5	3.5
14'	2.5	3.5	3.5	2.5
15'	2	2.5	3.0	2

* Point source readings are taken atthe centerline of the box. The total distance for calculation is 13 feet (4 meters). Background dose-rate = 0.6 mR/hr.

Instrument PIC-6A P/N 003113

Calibration Void 8/1/91

Survey By M.R. Lopez, MST-5 Date 7/9/91
T. Romero, MST-5

NARRATIVE
CELL 14

Contained within steel box #14 is cell 14 alpha box from Wing-9 of the CMR Building. The dimensions of the alpha box is 65" x 65" x 8' tall.

The gross weight of box #14 is 5300 lbs. The alpha box weight is 2550 lbs.

The box was installed 12 to 14 years ago as a wet chemistry cell. It served that purpose until ~ 1986, when it was used to package and characterize RH/TRU waste. It has been decontaminated remotely as well as possible. All loose equipment has been removed and all ports have been secured by plywood or metal plates. It was removed from service and packaged in June 1991.

The main contaminants are U^{235}, Pu^{239}, mixed fission products, and mixed activation products.

Estimates of gram weight shown on the RSWD form are calculated from measurements taken at 4 meters. A procedure for the calculation is included in this package.

The internal alpha box has been secured in a manner for easy removal. The lid has been welded at the 4 corners. Cut or grind the corners free and remove the lid. Remove the 4 bolts holding the brackets to the alpha box out. Attach a sling and 4 lifting eyes to the corner brackets. Exercise caution when removing the internal box to prevent striking the viewing window. It is located at the lower front side of the storage box. The storage box is labeled "front".

If further assistance is required contact the Wing-9 personnel in the CMR Building at 7-4653.

0014336

CELL 14 ALPHA BOX

A. 11.4, 11.4, 11.4, 13.4 } READINGS @ 4m - BG

A. Calculations for Plutonium and Uranium

11.90 MEAN
1.00 STD. DEV.

3.080 00 TOTAL U (g)
1.788 00 +/-

2.899 00 U^{235} (g)
1.683 00 +/-

7.791-01 TOTAL Pu (g)
4.523-01 +/-

6.704-01 Pu^{239} (g)
3.892-01 +/-

B. 5.95-01 Ci Cs^{137}

B. Calculations for Fission Products

5.4383-01 Ci Sr^{90}

5.4383-01 Ci Y^{90}

4.36135-03 Ci Ru^{106}

4.36135-03 Ci Rh^{106}

2.42165-02 Ci Sb^{125}

1.00555-02 Ci Te^{125m}

5.5811-01 Ci Ba^{137m}

3.39745-02 Ci Pm^{147}

1.11265-02 Ci Eu^{155}

TOTAL FISSION PRODUCT ACTIVITY
2.4385246 00 Ci
1.4157345 00 +/-

A. Calculations For Plutonium And Uranium

1. Calculate the mean dose-rate value ($\bar{x}1$) from the four measurements taken along a center-of-box axis at a center-of-box detector distance of 13 feet.
2. Calculate the standard deviation (one sigma) value on the mean value calculated in step 1. Call the standard deviation value Sa. Divide the standard deviation by the mean value and call this error term S1:

$$S1 = \frac{Sa}{\bar{x}1}$$

3. Correct the mean value x1 for gamma attenuation through 0.25 inches of steel as follows:

$$\bar{x}2 = \bar{x}1\ (1.45)$$

4. Correct x2 value for a worst-case distance (all material located in center-bottom or center-top of box) as follows

$$\bar{x}3 = \bar{x}2\ (1.05)$$

5. Convert the final, corrected dose-rate value $\bar{x}3$ to grams Pu as follows:

$$\text{grams Pu} = \bar{x}3\ (0.043)$$

6. Convert the final, corrected dose-rate value $\bar{x}3$ to grams 239 Pu as follows:

$$\text{grams 239 Pu} = \bar{x}3\ (0.037)$$

7. Convert the final corrected dose-rate value $\bar{x}3$ to grams U as follows:

$$\text{grams U} = \bar{x}3\ (0.17)$$

8. Convert the final, corrected dose-rate $\bar{x}3$ to grams 235 U as follows:

$$\text{grams 235 U} = \bar{x}3\ (0.16)$$

9. Calculate the relative overall measurement uncertainty as follows:

$$\text{Relative Overall Uncertainty} = \sqrt{0.33 + (S1)^2}$$

10. Multiply the Relative Overall Uncertainty value from step 9 times the gram Pu, 239 Pu, U, and 235 (steps 5, 6, 7, and 8) and report as the one sigma value for each element/isotope.

Justifications For Plutonium And Uranium

1. Point Source Model

A series of measurements were conducted to test the assumption that measurement of the dose rate of a 10' x 5' x 5' box using an uncollimated PIC-6 meter located 13 feet from the box centerline (10 feet from the front or rear face) and at the box horizontal axis, is reasonably represented by a point-source model.

The point-source model requires that the observed dose rate is inversely proportional to the square of the center-of-source to detector distance. To test compliance to this requirement, the box dose rate was measured at a 13 foot distance. The box was then rotated 90^0, three times, and measurements made on all four faces at the 13 foot distance. Without further box rotation, measurements were taken with one foot increases in the center-of-box to detector distance. At a final distance of 23 feet, the box was again rotated through 90^0 increments and measurements taken on each face.

The measurement data is presented in Table 1.

Table 1

Dose-Rate Measurements Box #14

PIC-6 Readings mR/hr (net)*	Center-of-box to Detector Distance, feet	Box Orientation
11.4	13	back
10.4	13	left side
9.4	13	front
11.4	13	right side
9.6	14	right side
8.9	15	right side
7.4	16	right side
6.9	17	right side
6.15	18	right side
5.4	19	right side
5.15	20	right side
4.65	21	right side
3.9	22	right side
3.4	23	right side
3.2	23	back
3.2	23	left side
3.2	23	front

*Background dose-rate = 0.6 mR/hr.

The Table 1 data was analyzed two ways to test the point source (inverse distance squared) model.

Method A. Thirteen and 23 foot distance measurements with box rotation.

Mean values and one sigma uncertainties were calculated on readings taken at box orientations back, left side, front, and right side, both at the 13 and 23 foot distances. Results of these calculations are listed in Table 2

Table 2

Center-of-box Detector distance, feet	Mean dose-Rate, mR/hr	One standard Deviation on Mean
13	10.65	0.96
23	3.25	0.10

To test the mean dose-rate value taken at 13 feet, the 23 foot mean dose-rate value is corrected for distance as follows:

$$3.25 \text{ mR/hr} \times \frac{(23)^2}{(13)^2} = 10.17 \text{ mR/hr}$$

This value compares with the observed 13 foot value as follows:

$$\frac{10.17 \text{ mR/hr@ 23 feet}}{10.65 \text{ mR/hr @ 13 feet}} = 0.96$$

2. Attenuation Correction

Spectra taken with a Geruanium detector and Canberra-35 MCA showed a very strong 137 Cs spectra. If other peaks were present, they were not disenable above the 137 Cs gamma peaks plus Compton continuum.

The hot cell gloveboxes has a wall thickness of 0.125 inches (steel) and the boxes housing the gloveboxes was of 0.125 inch wall thickness (steel). Total wall thickness is 0.250 inches (0.635 cm).

Attenuation correction for the 662 Kev, 137/Cs gamma through 0.635 cm of iron is:

$$T = e^{-\mu\rho x} = e^{-(0.0738)(7.86)(0.635)}$$

$$T = 0.69$$

A correction factor of $\frac{1}{T} = 1.45$ is used.

3. Worst-Case Distance Correction

The center-of-box to detector distance assumes the source of the gamma signal is at the very center of the box volume. Since the box was rotated and measurements taken at the four box faces (sides, front, and back), the worst-case location of the gamma source would be at the center of the box top or bottom. Distance from the detector to the box top or bottom center is 13.34 feet.

A worst-case bias correction for this distance effect is:

$$\text{Correction} = \frac{(13.34)^2}{(13.0)^2} = 1.05$$

4. Calibration Constant

Thirty-two cans of scrap representing the reactor fuel specimens handled in the hot cell gloveboxes, were measured for dose-rate with a PIC-6 instrument. Each of these cans had a know weight of fuel material. The attached table column F lists the dose-rates measured (at one meter) for the weight of scrap fuel listed in column I. The dose-rate were divided by the scrap fuel weight for each can and the mean value and one standard deviation for the mean determined. The values are: 67 mR/(hr)(gram), 38 mR/(hr)(gram) one sigma. The RSD is 0.57.

The fuel is of Mixed Oxide composition with the following makeup:

Pu:U ratio = 1:4
Weight fraction Pu = 0.18
Weight fraction 239 Pu = 0.155
Weight fraction = 0.70
Weight fraction 235 U = 0.65
Weight fraction 0 = 0.12

Dividing the weight fraction values for the elements and isotopes above by the nominal 67 mR/(hr)(g) and by 16 (adjusting

the 1 meter can measurement distance to the 4 meter box measurement distance), one obtains the following grams element or isotope per mR/hr constants listed below:

Calibration Constants

Isotope or Element	g Isotope or element per mR/hr
Pu	0.043
239 Pu	0.037
U	0.17
235 U	0.16

Note that the nominal 67 mR/(hr)(g) value is not corrected for attenuation. Attenuation correction for the cans of fuel scrap would be quite difficult because the can contents are very heterogeneous. By not performing attenuation corrections or the can dose-rates, we will overestimate the hot cell box fissile content.

5. Combined Error Terms

Two bias terms, the adjustment for worst-case distance and lack of attenuation correction on cans of fuel scrap, have been intensionally used to overstate the amount of fissile content of the hot-cell boxes. These terms will not be included in the combined error term.

Error terms to be included are for the mR/(hr)(g) factor for deriving calibration factors, the four measurements of the hot cell boxes, and the box attenuation correction. These terms discussed below:

a. Point Source Model.

The uncertainty on the point source model was estimated from the Table 3 data. The one standard deviation of 0.04 on the mean value of 0.99 is a relative error of 0.04.

b. Calibration Factor

The one standard deviation value on the mean 67 mR/(hr)(g), derived from the 32 can measurements, is 38 mR/(hr)(g). This translates to a relative error of 0.57.

c. Four Box Measurements

This error term is the one standard deviation on the mean value of the four box face mR/hr measured values. Call this term S1.

d. Attenuation Correction

This correction has uncertainties in both the nominal attenuating steel thickness and in the mass attenuation coefficient. Assuming the thickness can vary by 10% and the coefficient has a 20% uncertainty, these error terms introduce relative uncertainties into the mass of element or isotope as follows:

i) Thickness relative error = 0.03

ii) Attenuation coefficient relative error = 0.07

These uncertainty terms are combined in quadrature as follows:

$$\text{Overall Uncertainty} = \sqrt{(0.04)^2+(0.57)^2+(S1)^2+(0.03)^2+(0.07)^2}$$

$$\text{Overall Uncertainty} = \sqrt{0.33+(S1)^2}$$

The four percent difference from perfect agreement indicates very good agreement with the point-source model.

Method B. **Consistency of inverse-distance-squared correct measurements at increased distance.**

Eleven mR/hr measurements were performed while increasing the center-of-box to detector distance from 13 to 23 feet in one foot increments. The box remained in the "right side" orientation. Each mR/hr measurement value was "corrected" to the 13 foot distance and the "corrected" values listed in table 3.

Table 3

14-23 Foot mR/hr Values Corrected to 13 feet

Center-of-Box (11.4 to detector, feet value)	Net mR/hr observed	mR/hr corrected to 13 ft distance	13 ft value corrected
14	9.6	11.1	1.03
15	8.9	11.8	0.97
16	7.4	11.2	1.02
17	6.9	11.8	0.97
18	6.15	11.8	0.97
19	5.4	11.5	0.99
20	5.15	12.2	0.93
21	4.65	12.1	0.94
22	3.9	11.2	1.02
23	3.4	10.6	1.07

Reducing the right-hand column data from Table 3 yields a mean value of 0.99 and a one sigma value of 0.04. All values fell within one sigma except the 23 foot and 20 foot values which were within two sigma and on opposite "sides" of the mean value. This information indicates that the point-source model is appropriate for the 13 foot measurement distance.

B. Calculations for Fission Products

1. Multiply the mean PIC-6 value ($\bar{x}1$ from A.1) by 16 to estimate the point-source dose rate at one meter. Divide this value by 1000 to convert to Roentgans per hour at one meter (Rhm).

$$Rhm = (\bar{x}1)(16)/1000$$

2. Divide the Rhm from B.1 by 0.32 Rhm per Ci to convert to curies Cs-137.

3. Using the Ci Cs-137 value from B.2, multiply by the factors below to estimate the remaining fission product activities:

Ci Sr-90 = (Ci Cs-137)(0.914)
Ci Y-90 = (Ci Cs-137)(0.914)
Ci Ru-106 = (Ci Cs-137)(0.00733)
Ci Rh-106 = (Ci Cs-137)(0.00733)
Ci Sb-125 = (Ci Cs-137)(0.0407)
Ci Te-125m = (Ci Cs-137)(0.0169)
Ci Ba-137m = (Ci Cs-137)(0.938)
Ci Pm-147 = (Ci Cs-137)(0.0571)
Ci Eu-155 = (Ci Cs-137)(0.0187)

4. Calculate the total fission product activity from the Cs-137 activity as follows:

Total Fission Product Activity = (ci Cs-137)/0.244

Justifications For Fission Products

1. High-resolution gamma spectroscopy measurements on the hot cell liners showed the peaks and Compton continuum of Cs-137. No other peaks were observed. This observation is reasonable as the irradiated fuel samples examined in these cells had been out-of-reactor greater than 10 years and as the irradiated fuel radiation reaching the PIC-6 instrument was attenuated by 0.25 inches of steel. An assumption was made that the radiation measured with the PIC-6 was due solely to Cs-137.

2. Appendix B of report LA-4400 was used to convert the observed dose rates (measured at 4 meters) were multiplied by 16 (distance correction) prior to dividing by 0.32 Rhm per Ci.

3. Attached tables (Fission Products from U-235) supplied by R. Henderson (HSE-1) were use to estimate the curies associated with fission products other than Cs-137. Fuel residues the alpha boxes are conservatively estimated at 10-years-since-irradiation hence the "Ratio-to-Cs-137", "10 Years" table data was used.

Data from Logbook #23744

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	STEEL	LOGBOOK		WT.	RADIATION (R/hr)		ESTIMATED (g)		ASSAY	STD.	ASSAY	DRUM	CANISTER	?	STEEL CAN
2	CAN #	No.	PAGE	(Lbs.)	Contact	1meter	Pu	U	WT. (g)	DEV.	REPORT	No.	No.	?	LOCATION
49	151	23744	48	29	33	1.5	0.1	96	15.6	3.1	4/12/90			RU	CE5E3
50	152	23744	48	41	15	0.3	0.1	145	3.0	0.6	4/12/90			RU	CE5C3
51	159	23744	49	33	300	5	3	6	11.2	2.6	1/11/91			RU	CE4I6
52	171	23744	50	44	280	2.7	2	8	6.4	1.6	1/11/91			RU	CE4B2-2
53	173	23744	51	38.5	900	6	2	0.4	6.3	1.8	1/11/91			RU	CE4F4-2
54	351	23744	82	32	300	4	8	32	16.7	8.7	9/12/90			RU	CE5A3-2
55	352	23744	82	27	100	1	6	24	22.5	8.7	9/12/90			RU	CE5H6-2
56	353	23744	82	30	150	2	7	30	18.7	8.7	9/12/90			RU	CE5H2-2
57	354	23744	82	27	200	3	7	27	16.2	8.7	9/12/90			RU	CE5G4-2
58	355	23744	83	31	40	1	8	34	21.0	8.7	9/12/90			RU	CE5C3-2
59	356	23744	83	30	40	2	8	32	17.3	8.7	9/12/90			RU	CE5C5-2
60	357	23744	83	30	300	5	6	25	17.0	8.7	9/12/90			RU	CE5C4-2
61	358	23744	83	32	200	3	14	51	27.2	8.8	9/12/90			RU	CE5B4-2
62	360	23744	84	34	65	1	7	30	23.5	8.7	9/13/90			RU	CE5F6-2
63	361	23744	84	28	150	3	8	31	14.9	8.7	9/10/90			RU	CE5F5-2
64	437	23744	107	43	1	0.01	0.1	4	0.82	0.30	2/4/91			RU	CE4F9-3
65	123	23744	40	26	35	0.3	11	86	33	9	2/4/91			MS	CE7E9
66	124	23744	38	27	250	2.5	19	71	47	10	1/17/91			MS	CE7F9
67	125	23744	38	29	200	3	18	75	62	10	1/17/91			MS	CE4F8-2
68	126	23744	36	27	900	5.5	18	80	64	10	1/17/91			MS	CE4D4-2
69	127	23744	38	28	600	3	18	80	60	10	1/17/91			MS	CE4G3-2
70	128	23744	40	27	200	1.5	15	76	48	10	1/17/91			MS	CE4F1-3
71	129	23744	37	26	130	3	19	70	24.3	8.7	11/21/90			MS	CE4C6-2
72	130	23744	36	24	200	6	19	79	34	9	1/17/91			MS	CE4H8
73	131	23744	37	26.5	>1000	10.5	24	75	67	11	1/17/91			MS	CE4A8-2
74	132	23744	37	26	150	3	21	78	41	10	1/25/91			MS	CE7I9
75	133	23744	37	26	100	1.5	20	79	26.9	8.7	11/21/90			MS	CE4B7-2
76	134	23744	36	27	160	2.5	22	74	50	10	2/4/91			MS	CE7C9
77	135	23744	36	27.5	135	2.5	17	74	30.7	8.8	11/21/90			MS	CE4I5
78	137	23744	38	28	220	3	20	78	46	10	1/17/91			MS	CE4E8-2
79	138	23744	40	28	120	2	34	62	63	11	1/28/91			MS	CE4D8-2
80	139	23744	38	26	250	4	16	81	56	10	1/17/91			MS	CE4G8-2
81	140	23744	36	27	375	2.9	20	80	47	10	1/28/91			MS	CE4I1
82	141	23744	40	28	300	3	18	80	54	10	1/25/91			MS	CE7G9
83	142	23744	40	29	150	2	16	52	51	10	1/17/91			MS	CE7D9
84	143	23744	39	26	120	2	18	78	36	9	11/21/90			MS	CE4C7-2
85	144	23744	39	27	110	2	19	72	40	10	1/17/91			MS	CE7H9
86	145	23744	39	27	200	3	14	68	63	10	1/28/91			MS	CE4A7-2
87	146	23744	39	29	130	4	18	65	27.0	9.1	4/12/90			MS	CE5D3
88	147	23744	39	29	120	3.5	19	81	53.4	10.6	4/12/90			MS	CE5D8
89	148	23744	37	29	175	1.5	25	66	22.7	9.0	4/12/90			MS	CE5B8
90	267	23744	65	28	110	5	12	87	76	11	1/17/91			MS	CE4H6
91	268	23744	65	30	600	7	19	80	76	11	1/17/91			MS	CE4G5
92	273	23744	66	32	500	5	17	80	76	12	1/25/91			MS	CE4D9-3
93	274	23744	66	30	80	1.5	27	63	38	9	1/11/91			MS	CE4G1-3
94	275	23744	66	29.5	5	1.3	6	91	41	9	1/11/91			MS	CE4I3
95	276	23744	67	29	60	1.5	18	70	36	9	1/11/91			MS	CE4G5-2
96	277	23744	67	31	70	1.5	25	52	34	10	1/28/91			MS	CE4G4
97	285	23744	68	28	600	10	59	38	17.4	3.1	10/3/90			TH	CE4F5
98	286	23744	69	27	500	9	84	3	16.7	2.9	10/3/90			TH	CE4F2
99	287	23744	69	26	500	10	84	5	16.7	2.9	11/21/90			TH	CE4H3
100	288	23744	69	26	500	9	85	4	17.2	3.0	10/3/90			TH	CE4E2
101	289	23744	69	27	400	8	88	24	11.1	1.9	10/1/90			TH	CE4D9
102	290	23744	69	28	500	10	87	23	10.7	1.8	10/1/90			TH	CE4C8
103	291	23744	69	29	550	8	86	5	18.7	3.4	11/21/90			TH	CE4H1
104	292	23744	69	26	350	5.5	45	93	14.0	2.5	10/3/90			TH	CE4E3

Prompt Fission Products from U-235
Relative Curies

Nuclide	7 Years	10 Years	20 Years
Sr-90	9.74E-04	9.09E-04	7.11E-04
Y-90	9.74E-04	9.09E-04	7.11E-04
Ru-106	5.76E-05	7.29E-06	7.35E-09
Rh-106	5.76E-05	7.29E-06	7.35E-09
Sb-125	8.75E-05	4.05E-05	3.11E-06
Te-125m	3.62E-05	1.68E-05	1.29E-06
Cs-137	1.06E-03	9.95E-04	7.87E-04
Ba-137m	9.95E-04	9.33E-04	7.38E-04
Pm-147	8.11E-05	5.68E-05	2.62E-06
Eu-155	2.49E-05	1.86E-05	1.20E-05
Total	4.35E-03	3.89E-03	2.97E-03

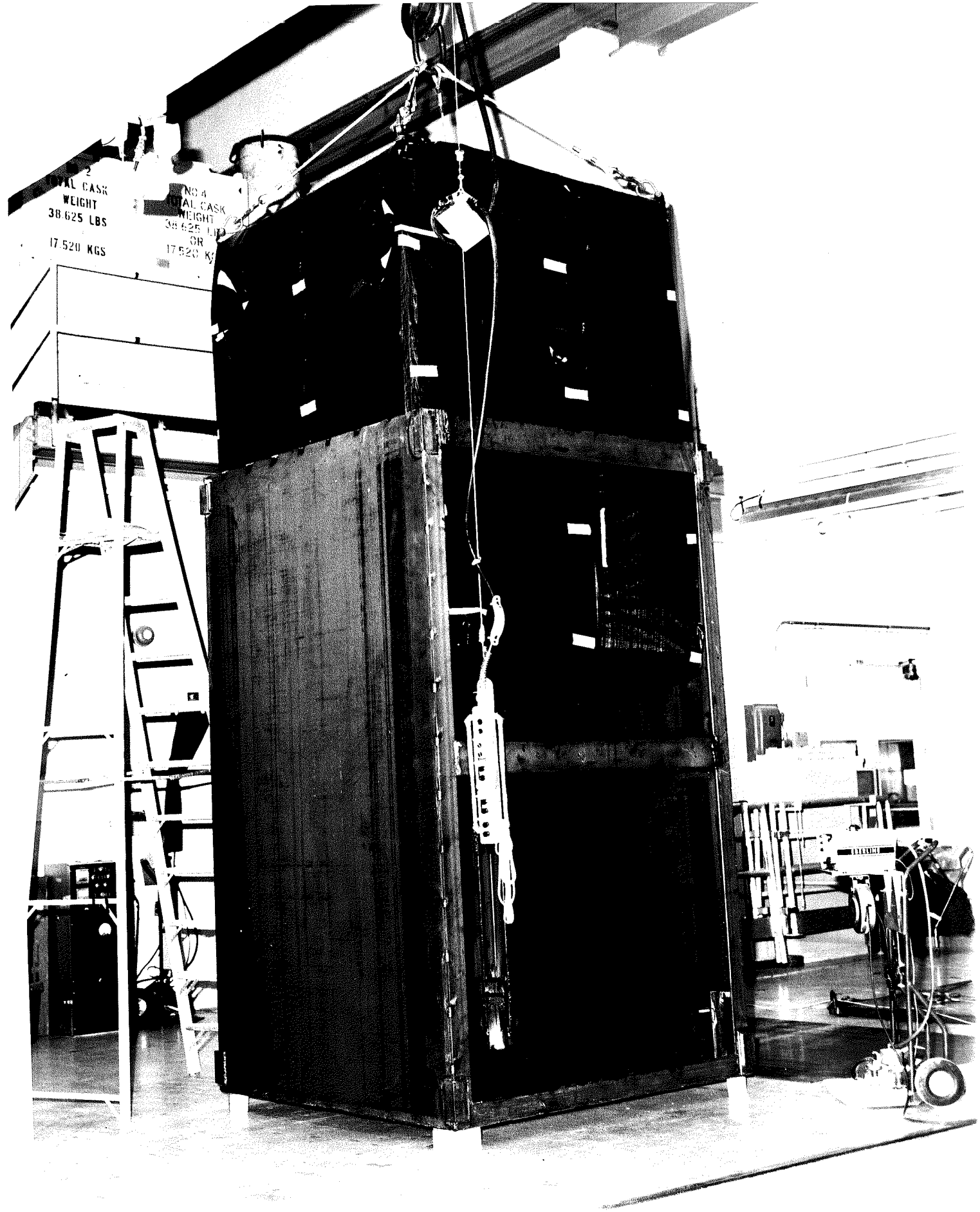
Ratio to Cs-137

Nuclide	7 Years	10 Years	20 Years
Sr-90	91.89%	91.36%	90.34%
Y-90	91.89%	91.36%	90.34%
Ru-106	5.43%	0.73%	0.00%
Rh-106	5.43%	0.73%	0.00%
Sb-125	8.25%	4.07%	0.40%
Te-125m	3.42%	1.69%	0.16%
Cs-137	100.00%	100.00%	100.00%
Ba-137m	93.87%	93.77%	93.77%
Pm-147	7.65%	5.71%	0.33%
Eu-155	2.35%	1.87%	1.52%

Ratio to total listed activity (>95%)

Nuclide	7 Years	10 Years	20 Years
Sr-90	22.40%	23.35%	23.97%
Y-90	22.40%	23.35%	23.97%
Ru-106	1.32%	0.19%	0.00%
Rh-106	1.32%	0.19%	0.00%
Sb-125	2.01%	1.04%	0.10%
Te-125m	0.83%	0.43%	0.04%
Cs-137	24.38%	25.56%	26.53%
Ba-137m	22.88%	23.96%	24.88%
Pm-147	1.87%	1.46%	0.09%
Eu-155	0.57%	0.48%	0.40%

Nuclide		
Sr-90	No Gammas	
Y-90	No Gammas	
Ru-106	.511 Mev	20 %
Rh-106	.622 MeV	10 %
Sb-125	.430 MeV	30 %
Te-125m	No Gammas	
Cs-137	No Gammas	
Ba-137m	.661 MeV	90 %
Pm-147	.474 MeV	36 %
Eu-155	.086 MeV	30 %
	.105 MeV	20 %


WEIGHT
38,625 LBS
17,520 KGS

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RH-TRU
RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S91 0327

WPRF # 00538

2. Date: M M D D Y Y: 08 09 91

3. Retrievable Serial Number: B19336

4. Origin of Waste

Group	TA	Building	Wing	Program Code
MST	53	29	9	X77A

5. Waste Code: A41

6. Waste Description: CELL 14 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume: Amount 360.0 (M = meter³, F = foot³, G = gallon) F

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)
650.	50.

10. Gross Weight: Amount 2.7 (K = kilogram, P = pound, T = ton) T

11. Additional Description of Packaging and Packaging Materials: ~~THIS CAPSULE APPROVED FOR~~ IN STEEL BOX WPRF 00538

12. Radionuclide Content

Nuclide	Amount	±	(C = curie, M = gram)	Error on Amount	±	Amount Determined By: (A = analysis, M = measurement, E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
U238	3.100E+0		m	1.800E+0		A		
PU55	7.800E-1		m	4.500E-1		A		
CS137	5.950E-1		C	. E		E		
SR90	5.438E-1		C	. E		E		
Y90	5.438E-1		C	. E		E		
RU106	4.362E-3		C	. E		E		

APPROVALS

Waste Generator (Print Name Here)	HSE-1/-10/-11 Area Representative (Print Name Here)	Additional Signatures (Optional)
Jim LEDBETTER	Kenneth L Ault	
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met (Signature) J. Ledbetter	Signature certifies that waste package or shipment is safe to handle and transport (Signature) K. Ault	

13. Date Disposed: M M D D Y Y: 12 05 91

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G	306		T		

15. Shaft Surface Dose: mr/hr

HSE-7 Waste Management Representative (Print Name Here)	Received	Logbook	Computer	Verified
ANDREW J. CATANACH	AC	AC		
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. (Signature)	Date 12-5-91	Date 12-5-91	Date 12/	Date

Form Number HS-10-2A (12/89)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number: S 9 1 0327

WPRF # 00538

2. Date	3. Retrievable Serial Number	4. Origin of Waste					5. Waste Code
M M D D Y Y		Group	TA	Building	Wing	Program Code	
0 8 0 9 9 1	0 1 9 3 3 6	M S T 5	3	2 9	9	X 7 7 A	A 4 1

6. Waste Description: CELL 14 STAINLESS STEEL ALPHA BOX PACKED

7. Numbers of Waste Packages						8. Gross Volume		9. Package Radiation at	
Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³	Amount	(M = meter³ F = foot³ G = gallon)	Surface (mr/hr)	1 Meter (mr/hr)
						3600	F	650	50

10. Gross Weight		11. Additional Description of Packaging and Packaging Materials
Amount	(K = kilogram P = pound T = ton)	TIME CAPSULE Attached to box
207	T	IN STEEL BOX WPRF 00538

12. Radionuclide Content									SS Materials Write-Off	
Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	Account	Project Code
U238	3.1 E	+0	m	1.8 E	+0	A		
PU55	7.8 E	-1	m	4.5 E	-1	A		
C51317	5.915 E	-1	C	. E		E		
SR90	5.438 E	-1	C	. E		E		
Y901	5.438 E	-1	C	. E		E		
RU106	4.3612 E	-3	C	. E		E		

APPROVALS

Waste Generator (Print Name Here)	HSE-1/-10/-11 Area Representative (Print Name Here)	Additional Signatures (Optional)
Jim LEDBETTER	Kenneth L Ault	
Signature certifies that the waste is as represented here and that ALL applicable acceptance and disposal/storage criteria have been met (Signature)	Signature certifies that waste package or shipment is safe to handle and transport (Signature)	

13. Date Disposed	14. Disposal/Storage Location						15. Shaft Surface Dose
M M D D Y Y	Area	Shaft	Pit	Post(s)	Layer	Pos.	mr/hr
1 2 0 5 9 1	G	306		T			

HSE-7 Waste Management Representative (Print Name Here)	Received	Logbook	Computer	Verified
ANDREW J. CATANACH	AC	AC		
Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. (Signature)	Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RADIOACTIVE SOLID WASTE DISPOSAL RECORD

NOTE: Read instructions on back carefully before completing this form.

HSE-7 Waste Management
Ext. 6095, MS J592

1. Form Number S 9 1 0327 CONTINUATION ~~0327~~

2. Date M M D D Y Y

3. Retrievable Serial Number

4. Origin of Waste

Group	TA	Building	Wing	Program Code

5. Waste Code

6. Waste Description

7. Numbers of Waste Packages

Plastic Bags	Card-Board Boxes	Drums No.	Drums Gal.	Wooden Crates No.	Wooden Crates Volume-ft³

8. Gross Volume

Amount	(M = meter³ F = foot³ G = gallon)

9. Package Radiation at

Surface (mr/hr)	1 Meter (mr/hr)

10. Gross Weight

Amount	(K = kilogram P = pound T = ton)

11. Additional Description of Packaging and Packaging Materials

12. Radionuclide Content

Nuclide	Amount	±	(C = curie M = gram)	Error on Amount	±	Amount Determined By: (A = analysis M = measurement E = estimate)	SS Materials Write-Off Account	SS Materials Write-Off Project Code
Rh 106	4.362	E -3	C		E	E		
Sb 125	2.422	E -2	C		E	E		
Te 125m	1.006	E -2	C		E	E		
Ba 137m	5.581	E -1	C		E	E		
Pm 147	3.397	E -2	C		E	E		
Eu 155	1.113	E -2	C		E	E		

APPROVALS

Waste Generator *(Print Name Here)*	**HSE-1/-10/-11 Area Representative** *(Print Name Here)*	**Additional Signatures** *(Optional)*
Signature certifies that the waste is as represented here and that **ALL** applicable acceptance and disposal/storage criteria have been met *(Signature)*	*Signature certifies that waste package or shipment is safe to handle and transport (Signature)*	

13. Date Disposed M M D D Y Y: 1 2 0 5 9 1

14. Disposal/Storage Location

Area	Shaft	Pit	Post(s)	Layer	Pos.
G1	306		T		

15. Shaft Surface Dose mr/hr

HSE-7 Waste Management Representative *(Print Name Here)*: ANDREW J. CATANACH

Signature certifies that all waste receiving, handling, and disposal/storage requirements were met. *(Signature)*

Received	Logbook	Computer	Verified
AC	AC		
Date 12-5-91	Date 12-5-91	Date	Date

Form Number HS 10-2A (12/89)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

RSWD Form Number	Retrievable Serial Number
S 9 1 0 3 2 7	0 1 9 3 3 6

NONCERTIFIED TRU WASTE SUPPLEMENTAL DATA SHEET

I. Waste Generator's Package Information

Organic Material Weight (lb.) 10 E + 1 | **Organic Material Volume (%)** 0

Internal Shielding Type	Thickness (in.)
☒ None	
☐ Lead	• E
☐ Steel	• E
☐ Concrete	• E
☐ Other	• E

Nonradioactive Hazardous Materials

Name	EPA Code	Quantity (g)
None		• E
		• E
		• E
		• E

Internal Packaging

- ☑ Plastic bags
  - Number 1
  - Thickness 3 mil
- ☐ 90-mil HDPE Liner
- ☒ Blocking
- ☐ Other

Additional Information

Contaminated stainless steel alpha containment box wrapped in plastic and packed in a 6ft x 6ft x 10ft steel box

WPRF Reference Number 00538

The waste described herein was prepared, packaged, and documented such that it meets all of the applicable requirements of AR 10-5 of the Los Alamos **Health and Safety Manual.** *The data are correct and complete to the best of my knowledge.*

Printed Name Jim LEDBETTER | **Signature** [signature] | **Date** 8/9/91

II. GENERATOR SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	6.5 E + 2	Survey Meter Model RO-3C	Property No. 002630
Neutron Dose Rate (mrem/h)	• E + 0	Survey Meter Model PNR-4	Property No. 005231
Total Dose Rate (mrem/h)	6.5 E + 2	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	1.5 E + 1	Printed Name Kenneth L Ault	Date 8/9/91
Beta-Gamma Cont. (dpm/100cm²)	3.8 E + 2	Signature K. Ault	

III. HSE-7 AUTHORIZATION

The data package for this waste has been reviewed by HSE-7. The generator is authorized to arrange transportation to TA-54.

Printed Name BRUCE T. REICH | **Signature** [signature] | **Date** 8/12/91

IV. RECEIVING SITE HEALTH PHYSICS INFORMATION

Gamma Dose rate (mrem/h)	• E	Survey Meter Model	Property No.
Neutron Dose Rate (mrem/h)	• E	Survey Meter Model	Property No.
Total Dose Rate (mrem/h)	• E	*The data in this section were collected as prescribed in approved procedures.*	
Alpha contamination (dpm/100cm²)	• E +	Printed Name	Date
Beta-Gamma Cont. (dpm/100cm²)	• E +	Signature	

HS Form Number 10-5B (11/88)

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

WASTE PROFILE REQUEST

HSE-8 USE ONLY
Reference Number 00538

Complete both sides of this form using a black or blue pen. Inadequate information will result in processing delays.
Send completed form to: **ATTN: WPRF, MS K490**

Division/Group	Telephone	Mail Stop	Technical Area	Building	Room
MST-5	667-4653	G-742	TA-3	SM-29	W9-9

☒ Knowledge of Process
☐ MSDS Attached

☐ Chemical/Physical Analyses (Specify Below)
☐ Request For Analysis ☐ Analysis Attached

Choose one or more of the items below which best describes your waste:

☐ Flammable	☐ Pesticide	☐ Photographic	☐ Spent Coolant	☐ Plastics
☐ Combustible	☐ Beryllium	☐ Sanitary	☐ Aerosol Cans	☐ Filter Media
☐ High Explosive	☐ Asbestos	☐ Radiochemistry	☐ Motor Oil	☐ Vacuum Filter Sludge
☐ Oxidizer	☐ Solvent	☐ Paint Waste	☐ Pump Oil	☐ Cement Paste
☐ Pyrophoric	☐ Waste Rags	☐ Laboratory Trash	☐ Capacitor Oil	☐ Non-Salvageable
☐ Cyanide	☐ Glass	☐ Metallurgic	☐ UST Remediation	☐ Non-Recyclable
☐ Heavy Metal	☐ Plating Solution	☐ Scrap Metal	☐ Soils	☐ Building Debris
☐ Corrosive	☐ Etchant	☐ Medical/Biological	☐ Environmental	☐ Firing Site Debris

Additional Description (Optional)
Alpha containment boxes

General Description Of Waste (check at least one block for each column):

FORM
☒ Solid
☐ Cemented Sludge
☐ Semi-Solid/Sludge
☐ Absorbed Liquid
☐ Liquid
☐ Gas
☐ Multi-Layer
☐ Suspended Solids
☐ Powder or Ash

FLASH POINT (°F)
☐ Less Than 100
☐ 100 to 139
☐ 140 to 200
☐ Greater Than 200
☒ None

pH
☐ 2.0 or Less
☐ 2.1 to 12.4
☐ 12.5 or Greater
☒ Not Applicable

REACTIVITY
☐ Unstable
☐ Reacts With Water
☐ Cyanides
☐ Sulfides
☐ Shock Sensitive
☐ Class A or B Explosive
☒ Non-Reactive

PCBs
☐ <50 ppm
☐ 50-500 ppm
☐ >500 ppm
☒ No PCBs

Indicate Known Radioactivity Of Your Waste:
☐ Not Radioactive (Go To Next Section)

☐ <2.0 nC/g
☐ >2.0 nC/g
☐ >10.0 nC/g
☒ >100.0 nC/g

☒ Alpha
☒ Beta
☒ Gamma
☐ Tritium

List Known Radioistopes:
☐ Determined By Assay ☐ Determined By Estimate

Radiosotope 1. 235 U — Activity/Unit of Measure NA
Radiosotope 2. 239 Pu — Activity/Unit of Measure
Radiosotope 3. MFP — Activity/Unit of Measure
Radiosotope 4. MAP — Activity/Unit of Measure

GENERATOR CERTIFICATION

Based upon my knowledge of the waste, and/or chemical/physical analysis, I certify that the information provided regarding the waste specified on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Print Generator's Name (Last, First Mi)	Z Number	Generator's Signature	Date
LEDBETTER JAMES M.	077067	J Ledbetter	6-27-91

If your Group's Waste Coordinator is the custodian of your waste management documentation, provide the name and mail stop of this person (optional).	Print Group Waste Coordinators Name (Last, First Mi)	Mail Stop
	GARCIA DARYLL	G 730 ~~738~~

Heavy Metals (indicate whether the following heavy metals exist in your waste, at the posted concentration):

	None			KOP		TCLP	Other
Arsenic	☒	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☒	☐ →	☐	☐
Barium	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Cadmium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Chromium	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Lead	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Mercury	☐	☐ <0.2 ppm	☐ ≥ 0.2 ppm	☐	☐ →	☐	☐
Nickel	☐	☐ <134.0 ppm	☐ ≥ 134.0 ppm	☐	☐ →	☐	☐
Selenium	☐	☐ < 1.0 ppm	☐ ≥ 1.0 ppm	☐	☐ →	☐	☐
Silver	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Thallium	☒	☐ <130.0 ppm	☐ ≥ 130.0 ppm	☒	☐ →	☐	☐

Organic Compounds (indicate if the following organic compounds exist in your waste, at the posted concentration):

	None			KOP	Analysis	TCLP	Other
Benzene	☒	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☒	☐ →	☐	☐
Carbon Tetrachloride	☐	☐ <0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Chlorobenzene	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Chloroform	☐	☐ <6.0 ppm	☐ ≥ 6.0 ppm	☐	☐ →	☐	☐
Cresol	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
1,4-Dichlorobenzene	☐	☐ < 7.5 ppm	☐ ≥ 7.5 ppm	☐	☐ →	☐	☐
1,2-Dichloroethane	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
1,1-Dichloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
2,4-Dinitrotoluene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobenzene	☐	☐ < 0.13 ppm	☐ ≥ 0.13 ppm	☐	☐ →	☐	☐
Hexachlorobutadiene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
Hexachloroethane	☐	☐ < 3.0 ppm	☐ ≥ 3.0 ppm	☐	☐ →	☐	☐
Methyl Ethyl Ketone	☐	☐ < 200.0 ppm	☐ ≥ 200.0 ppm	☐	☐ →	☐	☐
Nitrobenzene	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Pentachlorophenol	☐	☐ < 100.0 ppm	☐ ≥ 100.0 ppm	☐	☐ →	☐	☐
Pyridine	☐	☐ < 5.0 ppm	☐ ≥ 5.0 ppm	☐	☐ →	☐	☐
Tetrachloroethylene	☐	☐ < 0.7 ppm	☐ ≥ 0.7 ppm	☐	☐ →	☐	☐
Trichloroethylene	☐	☐ < 0.5 ppm	☐ ≥ 0.5 ppm	☐	☐ →	☐	☐
2,4,5-Trichlorophenol	☐	☐ < 400.0 ppm	☐ ≥ 400.0 ppm	☐	☐ →	☐	☐
2,4,6-Trichlorophenol	☐	☐ < 2.0 ppm	☐ ≥ 2.0 ppm	☐	☐ →	☐	☐
Vinyl Chloride	☒	☐ < 0.2 ppm	☐ ≥ 0.2 ppm	☒	☐ →	☐	☐

CHECK ONE

☐ Additional hazardous components in the waste are listed below: ☒ There are no additional hazardous constituents in this waste.

Compound Name	Concentration	Compound Name	Concentration
1.		5.	
2.		6.	
3.		7.	
4.		8.	

HSE-8/HSE-7 USE ONLY (Do Not Write Below This Line)

WASTE CLASSIFICATION

☐ Non-Radioactive, Non-Hazardous
- ☐ Solid Waste
- ☐ Non-Regulated Chemical Waste
- ☐ Sanitary Waste
- ☐ Other Non-Disposable Waste

☑ Radioactive
- ☐ Low-Level Radioactive Waste
- ☑ Transuranic Waste
- ☐ Special Nuclear Material

☐ Hazardous or Mixed
- ☐ Hazardous Waste
- ☐ Mixed Low-Level Waste
- ☐ Mixed Transuranic Waste

Hazardous or Mixed Waste Codification:

Waste Code 1	Waste Code 2	Waste Code 3	Waste Code 4	Waste Code 5	Waste Code 6	Waste Code 7

HSE-8 Reviewer's Signature	Date	Cost Center/ProgramCode For HSE Analysis Backcharge
J Hagen	7/1/91	

Appendix G

Radioassay Data Sheets for Hot Cell Liner Containers
April 2014

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Low Level Waste Batch Data Report

BDR # LALLW2140

Assay Summary Results

DrumID	File Reference	TRU nCi/g	LLW nCi/g	TRU/LLW Determination	Comments
S910321	031914yoda05		14.10	LLW	CMR High Cs Box in Shaft
S910322	031814yoda04		39.56	LLW	CMR High Cs Box in Shaft
S910327	031314yoda01		33.39	LLW	CMR High Cs Box in Shaft
S912717	031114yoda01		92.93	LLW	CMR High Cs Box in Shaft
S912719	031214yoda01		29.70	LLW	CMR High Cs Box in Shaft

Notes
1. TRU nCi/g sets to zero the activity of any isotope reported below the detection limit
2. LLW nCi/g uses the minimum detectable activity (MDA) when an isotope is reported below the detection limit.

Batch Narrative

These items were assayed on HPGe assay systems. This batch data report (BDR) contains the results of the analysis to determine whether the items are LLW or Suspect TRU waste.

Quality Assurance

The HPGe instruments undergo a quality assurance check each day of use.

Analyst K M Gruetzmacher — Kathleen M. Gruetzmacher — 6/3/14 (Date)

Reviewer Randy Lucero — Randy P. Lucero — 6/3/14 (Date)

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S910321	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031914yoda05.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/19/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	5	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Net Weight (kg):	2636.8		
Pu Mass (g):	2.48E-01	±	6.60E-03
Total Activity (Ci):	4.51E-01	±	6.47E-03
TRU Alpha Activity (Ci):	3.72E-02	±	6.42E-04
TRU Conc (nCi/g):	1.41E+01	±	2.44E-01
LLW Conc (nCi/g):	1.41E+01	±	2.44E-01
Pu239 Equivalent Activity (Ci):	3.90E-02	±	6.49E-04
Pu239 FGE (g):	8.12E-01	±	1.97E-02
Decay Heat (W):	2.02E-03	±	2.77E-05

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	3.86E-03	1.34E-02	4.15E-04	
Co60	8.53E-09	9.72E-06	8.57E-07	
Cs137	1.32E-03	1.16E-01	3.60E-03	
Eu154	1.28E-07	3.42E-05	3.05E-06	
Eu155	3.31E-07	1.56E-04	4.83E-06	
Np237	7.88E-05	5.62E-08	1.74E-09	
Pm147	3.04E-08	2.85E-05	8.85E-07	
Pu238	1.26E-04	2.18E-03	6.77E-05	
Pu239	2.09E-01	1.32E-02	4.09E-04	
Pu240	3.67E-02	8.45E-03	2.62E-04	
Pu241	8.75E-04	9.10E-02	2.83E-03	
Pu242	7.64E-04	3.03E-06	9.41E-08	
Rh106	8.75E-20	3.12E-10	9.67E-12	
Ru106	9.22E-14	3.12E-10	9.67E-12	
Sb125	2.47E-08	2.57E-05	7.97E-07	
Sr90	7.48E-04	1.03E-01	3.20E-03	
Te125m	2.92E-50	5.26E-46	1.63E-47	
U234	1.04E-02	6.55E-05	2.03E-06	
U235	9.32E-01	2.04E-06	6.34E-08	
U236	4.11E-03	2.69E-07	8.34E-09	
U238	5.54E-02	1.88E-08	5.84E-10	
Y90	1.90E-07	1.03E-01	3.20E-03	

Analyst: KM Trujillo Date: 4/16/14

Reviewer: Randy Lucero Date: 6/3/14

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S910321	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031914yoda05.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/19/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	5	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Comments

Evaluation Data for Analyst and Reviewer			
Limit Criteria			
TRU/LLW	100 nCi/g		
PECi	80 Ci		
FGE	200 g		
Correlations			
Suppress All	FALSE		
Suppress U	FALSE		
MDA w/Pu >LLD	TRUE		
Assay Evaluation		Values	
WIPP nCi/g	LLW	14.10 ±	0.24
LLW nCi/g	LLW	14.10 ±	0.24
PECI	OK	0.04 ±	0.00
FGE + 2 Sigma	OK	0.85	

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S910322	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031814yoda04.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/18/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	4	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Net Weight (kg):	2818.7		
Pu Mass (g):	7.43E-01	±	3.60E-02
Total Activity (Ci):	1.38E+00	±	3.61E-02
TRU Alpha Activity (Ci):	1.11E-01	±	3.50E-03
TRU Conc (nCi/g):	3.96E+01	±	1.24E+00
LLW Conc (nCi/g):	3.96E+01	±	1.24E+00
Pu239 Equivalent Activity (Ci):	1.17E-01	±	3.54E-03
Pu239 FGE (g):	2.48E+00	±	1.10E-01
Decay Heat (W):	6.12E-03	±	1.53E-04

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	1.16E-02	4.02E-02	2.27E-03	
Co60	6.15E-09	7.01E-06	1.74E-06	
Cs137	4.07E-03	3.58E-01	2.02E-02	
Eu154	6.52E-07	1.74E-04	1.22E-05	
Eu155	1.02E-06	4.80E-04	2.71E-05	
Np237	2.36E-04	1.69E-07	9.51E-09	
Pm147	9.39E-08	8.80E-05	4.97E-06	
Pu238	3.78E-04	6.54E-03	3.69E-04	
Pu239	6.28E-01	3.95E-02	2.23E-03	
Pu240	1.10E-01	2.53E-02	1.43E-03	
Pu241	2.63E-03	2.74E-01	1.54E-02	
Pu242	2.29E-03	9.11E-06	5.14E-07	
Rh106	2.71E-19	9.63E-10	5.43E-11	
Ru106	2.85E-13	9.63E-10	5.43E-11	
Sb125	7.63E-08	7.93E-05	4.48E-06	
Sr90	2.31E-03	3.18E-01	1.80E-02	
Te125m	9.13E-50	1.64E-45	9.27E-47	
U234	3.22E-02	2.03E-04	1.15E-05	
U235	2.86E+00	6.26E-06	3.53E-07	
U236	1.26E-02	8.27E-07	4.67E-08	
U238	1.70E-01	5.79E-08	3.27E-09	
Y90	5.85E-07	3.18E-01	1.80E-02	

Analyst: Kal Quetzsnacle Date: 4/16/14

Reviewer: Randy Lucero Date: 6/3/14

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S910322	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031814yoda04.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/18/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	4	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Comments

Evaluation Data for Analyst and Reviewer			
Limit Criteria			
TRU/LLW	100 nCi/g		
PECi	80 Ci		
FGE	200 g		
Correlations			
Suppress All	FALSE		
Suppress U	FALSE		
MDA w/Pu >LLD	TRUE		
Assay Evaluation		Values	
WIPP nCi/g	LLW	39.56 ±	1.24
LLW nCi/g	LLW	39.56 ±	1.24
PECI	OK	0.12 ±	0.00
FGE + 2 Sigma	OK	2.69	

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S910327	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031314yoda01.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/13/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	1	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Net Weight (kg):	2455.0		
Pu Mass (g):	5.46E-01	±	2.42E-02
Total Activity (Ci):	9.82E-01	±	2.34E-02
TRU Alpha Activity (Ci):	8.20E-02	±	2.35E-03
TRU Conc (nCi/g):	3.34E+01	±	9.59E-01
LLW Conc (nCi/g):	3.34E+01	±	9.59E-01
Pu239 Equivalent Activity (Ci):	8.60E-02	±	2.38E-03
Pu239 FGE (g):	1.78E+00	±	7.17E-02
Decay Heat (W):	4.42E-03	±	1.01E-04

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	8.50E-03	2.95E-02	1.52E-03	
Co60	1.68E-08	1.92E-05	1.34E-06	
Cs137	2.86E-03	2.52E-01	1.30E-02	
Eu154	5.02E-07	1.34E-04	7.66E-06	
Eu155	7.11E-07	3.34E-04	1.72E-05	
Np237	1.75E-04	1.25E-07	6.42E-09	
Pm147	6.44E-08	6.04E-05	3.12E-06	
Pu238	2.77E-04	4.80E-03	2.47E-04	
Pu239	4.62E-01	2.90E-02	1.50E-03	
Pu240	8.10E-02	1.86E-02	9.61E-04	
Pu241	1.92E-03	1.99E-01	1.03E-02	
Pu242	1.68E-03	6.69E-06	3.45E-07	
Rh106	1.78E-19	6.32E-10	3.26E-11	
Ru106	1.87E-13	6.33E-10	3.27E-11	
Sb125	5.24E-08	5.45E-05	2.81E-06	
Sr90	1.62E-03	2.24E-01	1.16E-02	
Te125m	4.09E-50	7.36E-46	3.80E-47	
U234	2.27E-02	1.43E-04	7.40E-06	
U235	2.04E+00	4.47E-06	2.30E-07	
U236	9.00E-03	5.89E-07	3.04E-08	
U238	1.21E-01	4.13E-08	2.13E-09	
Y90	4.12E-07	2.24E-01	1.16E-02	

Analyst: Karl Guetzmacher Date: 4/16/14

Reviewer: Randy Lucero Date: 6/3/14

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S910327	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031314yoda01.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/13/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	1	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Comments

Evaluation Data for Analyst and Reviewer			
Limit Criteria			
TRU/LLW	100 nCi/g		
PECi	80 Ci		
FGE	200 g		
Correlations			
Suppress All	FALSE		
Suppress U	FALSE		
MDA w/Pu >LLD	TRUE		
Assay Evaluation		Values	
WIPP nCi/g	LLW	33.39 ±	0.96
LLW nCi/g	LLW	33.39 ±	0.96
PECI	OK	0.09 ±	0.00
FGE + 2 Sigma	OK	1.92	

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S912717	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031114yoda01.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/11/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	1	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Net Weight (kg):	2455.0		
Pu Mass (g):	1.52E+00	±	7.34E-02
Total Activity (Ci):	2.78E+00	±	7.24E-02
TRU Alpha Activity (Ci):	2.28E-01	±	7.15E-03
TRU Conc (nCi/g):	9.29E+01	±	2.91E+00
LLW Conc (nCi/g):	9.29E+01	±	2.91E+00
Pu239 Equivalent Activity (Ci):	2.39E-01	±	7.23E-03
Pu239 FGE (g):	5.04E+00	±	2.23E-01
Decay Heat (W):	1.24E-02	±	3.10E-04

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	2.37E-02	8.22E-02	4.63E-03	
Co60	1.82E-07	2.08E-04	1.14E-05	
Cs137	8.15E-03	7.17E-01	4.04E-02	
Eu154	9.66E-07	2.58E-04	1.69E-05	
Eu155	2.02E-06	9.51E-04	5.35E-05	
Np237	4.86E-04	3.47E-07	1.95E-08	
Pm147	1.83E-07	1.72E-04	9.69E-06	
Pu238	7.71E-04	1.33E-02	7.50E-04	
Pu239	1.28E+00	8.08E-02	4.55E-03	
Pu240	2.25E-01	5.18E-02	2.92E-03	
Pu241	5.34E-03	5.56E-01	3.13E-02	
Pu242	4.69E-03	1.86E-05	1.05E-06	
Rh106	5.07E-19	1.81E-09	1.02E-10	
Ru106	5.34E-13	1.81E-09	1.02E-10	
Sb125	1.49E-07	1.55E-04	8.74E-06	
Sr90	4.62E-03	6.37E-01	3.59E-02	
Te125m	1.18E-49	2.12E-45	1.19E-46	
U234	6.45E-02	4.08E-04	2.30E-05	
U235	5.81E+00	1.27E-05	7.17E-07	
U236	2.56E-02	1.68E-06	9.44E-08	
U238	3.44E-01	1.17E-07	6.59E-09	
Y90	1.17E-06	6.37E-01	3.59E-02	

Analyst: Kal Quetzmacle Date: 4/16/14

Reviewer: Randy Lucero Date: 6/3/14

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S912717	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031114yoda01.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/11/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	1	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Comments

Evaluation Data for Analyst and Reviewer			
Limit Criteria			
TRU/LLW	100 nCi/g		
PECi	80 Ci		
FGE	200 g		
Correlations			
Suppress All	FALSE		
Suppress U	FALSE		
MDA w/Pu >LLD	TRUE		
Assay Evaluation	Values		
WIPP nCi/g	LLW	92.93 ±	2.91
LLW nCi/g	LLW	92.93 ±	2.91
PECI	OK	0.24 ±	0.01
FGE + 2 Sigma	OK	5.48	

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S912719	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031214yoda01.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/12/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	1	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Net Weight (kg):	2545.9		
Pu Mass (g):	5.04E-01	±	2.24E-02
Total Activity (Ci):	9.05E-01	±	2.16E-02
TRU Alpha Activity (Ci):	7.56E-02	±	2.18E-03
TRU Conc (nCi/g):	2.97E+01	±	8.55E-01
LLW Conc (nCi/g):	2.97E+01	±	8.55E-01
Pu239 Equivalent Activity (Ci):	7.93E-02	±	2.20E-03
Pu239 FGE (g):	1.65E+00	±	6.67E-02
Decay Heat (W):	4.07E-03	±	9.33E-05

Nuclide	Mass (g)	Activity (Ci)	Activity Uncertainty (Ci)	MDA (Ci)
Am241	7.84E-03	2.72E-02	1.41E-03	
Co60	2.66E-08	3.03E-05	2.00E-06	
Cs137	2.64E-03	2.32E-01	1.20E-02	
Eu154	5.77E-07	1.54E-04	9.19E-06	
Eu155	6.54E-07	3.07E-04	1.59E-05	
Np237	1.61E-04	1.15E-07	5.94E-09	
Pm147	5.93E-08	5.57E-05	2.88E-06	
Pu238	2.56E-04	4.43E-03	2.29E-04	
Pu239	4.26E-01	2.68E-02	1.39E-03	
Pu240	7.47E-02	1.72E-02	8.89E-04	
Pu241	1.77E-03	1.84E-01	9.53E-03	
Pu242	1.56E-03	6.18E-06	3.19E-07	
Rh106	1.64E-19	5.83E-10	3.02E-11	
Ru106	1.72E-13	5.83E-10	3.02E-11	
Sb125	4.82E-08	5.02E-05	2.60E-06	
Sr90	1.49E-03	2.06E-01	1.07E-02	
Te125m	3.76E-50	6.77E-46	3.50E-47	
U234	2.10E-02	1.33E-04	6.87E-06	
U235	1.89E+00	4.14E-06	2.14E-07	
U236	8.36E-03	5.47E-07	2.83E-08	
U238	1.13E-01	3.84E-08	1.98E-09	
Y90	3.79E-07	2.06E-01	1.07E-02	

Analyst: KM Guetzmacher Date: 4/16/14

Reviewer: Randy Lucero Date: 6/3/14

Radioassay Data Sheet

Assay Conclusion: LLW

Container ID:	S912719	*Site ID:*	LANL
Revision No:	0	*Procedure:*	Q2/SNAP
File Name:	031214yoda01.htm	*Software 1:*	SnapV1.13, Peak Doctor v1.0
Detector:	Yoda	*Software 2:*	
Assay Date and Time:	3/12/2014 12:00	*Assay Method:*	Gamma
Run Sequence:	1	*No. Isotopes:*	22
Batch Data Report:	LALLW2140	*Item Name:*	flat file

Comments

Evaluation Data for Analyst and Reviewer			
Limit Criteria			
TRU/LLW	100 nCi/g		
PECi	80 Ci		
FGE	200 g		
Correlations			
Suppress All	FALSE		
Suppress U	FALSE		
MDA w/Pu >LLD	TRUE		
Assay Evaluation		Values	
WIPP nCi/g	LLW	29.70 ±	0.86
LLW nCi/g	LLW	29.70 ±	0.86
PECI	OK	0.08 ±	0.00
FGE + 2 Sigma	OK	1.78	

Item: Glovebox in Shaft 302 - S910321
File ID: 031914yoda05.RPu

Model
Type: Box
Height (in): 65.00
Width (in): 65.00
Depth (in): 96.00
Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda
Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)
Waste Matrix Density (g/cm3): 9.909E-4
Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000
Waste Matrix Eff. Density: 9.910E-4
Item Weight: 4200.91 (lbs)

Wall Material
Primary: Iron 2004
Secondary: Lead
Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.000000
Tertiary: 0.000000

Wall Material Density (g/cm3)
Primary: 7.875E+0
Secondary: 1.140E+1
Tertiary: 0.000E+0

Count Time (sec): 14400
Altitude (ft): 7000.00
Rate Loss Correction Factor: 1.000
Lump Correction: None
Thickness (microns): 0

Analyst: Kathleen Gruetzmacher
Notes: lower energy Eu154 peaks less than minimum detectable activity

Item: Glovebox in Shaft 302 - S910321
File ID: 031914yoda05.RPu

Summary:

Nuclide	Uniform Activity (Ci)	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	9.72E-6	5.10E-3	N/A	17.63
Cs137	1.16E-1	6.10E+1	N/A	6.21
Eu154	3.42E-5	1.79E-2	N/A	17.86

Detail:

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts (counts)	Intrinsic Efficiency (cps/gps)	Uniform Activity (Ci)	Uniform MDA (Ci)	Uniform Conc (nCi/g)	Uniform MDA Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	1173.20	9.99E-1	228	322	6.575E-2	8.94E-6	3.39E-6	4.69E-3	1.78E-3	N/A	26.54
Co60	1332.50	1.00E+0	302	166	5.754E-2	1.05E-5	2.19E-6	5.51E-3	1.15E-3	N/A	17.63
Cs137	661.66	8.52E-1	959497	11874	1.186E-1	1.16E-1	6.18E-5	6.10E+1	3.24E-2	N/A	6.21
Eu154	1004.78	1.79E-1	139	418	7.698E-2	3.67E-5	2.59E-5	1.93E-2	1.36E-2	N/A	45.31
Eu154	1274.54	3.55E-1	311	190	6.032E-2	3.16E-5	6.83E-6	1.66E-2	3.58E-3	N/A	17.86

Analysis Report for Peak Doctor Version Version 1.0.13.M
Date of analysis: Mar 20, 2014
RobWin has to be here as a token string for SNAP.
Detector Calibration: Yoda
Spectrum ID: 031914yoda05
Analysis Energy Range: 42.055keV to 1999.8keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.81	0.76	168000	698	79765
74.97	0.77	298051	787	80179
84.80	1.01	128073	754	110170
87.37	0.94	38707	678	105332
609.19	0.79	714	147	5256
612.76	0.79	116	146	5303
661.45	1.36	959497	992	5937
723.08	0.97	91	31	211
727.08	0.96	86	30	208
910.91	1.64	447	35	200
964.44	1.74	114	30	192
968.89	1.56	228	30	172
996.42	1.68	89	28	174
1004.93	2.04	139	31	209
1120.22	1.76	236	28	138
1173.21	2.14	228	30	161
1237.90	1.57	115	23	106
1274.51	1.86	311	26	95
1332.58	2.24	302	25	83
1460.83	2.14	3116	57	45
1509.08	1.26	34	11	21
1588.17	2.32	59	14	36
1592.53	2.18	151	17	34
1729.46	2.23	62	13	25
1764.63	2.47	279	20	27
1847.30	2.35	47	12	26

Peak Analysis

Peak No.	Name	Energy	Branch Ratio	Peak Area	Cont. Counts	Corr. Energy
1	Pb-Kx	72.81	2.77E-01	168000	159530	72.810
2	Pb-Kx	74.97	4.62E-01	298051	160358	74.970
3	Pb-Kx	84.75	1.63E-01	128073	220340	84.800
4	Pb-Kx	87.30	3.91E-02	38707	210664	87.370
5	Bi214	609.31	4.61E-01	714	10512	609.190
6	S.F.	N/A	N/A	116	10606	612.760
7	Cs137	661.66	8.52E-01	959497	11874	661.450
8	Eu154	723.36	1.97E-01	91	422	723.080
9	Multi	N/A	N/A	86	416	727.080
10	Ac228	911.21	2.90E-01	447	400	910.910
11	Multi	N/A	N/A	114	384	964.440
12	Ac228	968.97	1.74E-01	228	344	968.890
13	Eu154	996.33	1.03E-01	89	348	996.420
14	Eu154	1004.78	1.79E-01	139	418	1004.930
15	Bi214	1120.27	1.50E-01	236	276	1120.220
16	Co60	1173.20	9.99E-01	228	322	1173.210
17	Bi214	1238.11	5.92E-02	115	212	1237.900
18	Eu154	1274.54	3.55E-01	311	190	1274.510
19	Co60	1332.50	1.00E+00	302	166	1332.580
20	K40	1460.83	1.07E-01	3116	90	1460.830
21	Bi214	1509.22	2.19E-02	34	42	1509.080
22	Ac228	1588.23	3.60E-02	59	72	1588.170
23	D.Esc.3	1592.35	1.00E+00	151	68	1592.530
24	Bi214	1729.58	3.05E-02	62	50	1729.460
25	Bi214	1764.49	1.59E-01	279	54	1764.630
26	Bi214	1847.41	2.12E-02	47	52	1847.300

3/19/14 Jeff Briggs TA-48 Robert B Ken Oshel

031914yodaQ1 300s QC CNT TA-54-2 Passed
031914yodaB1

031914yoda01 3600s CNT on ST-90# W801263
r.h. = 24"@36"
Matrix = Cellulose/Metal
GW = 136816s tare = 6401bs
2 sided CNT SKinnyB

031914yoda02 3600s CNT on ST-90# W798861
r.h. = 24"@144"
Matrix = cellulose/Metal
GW = 175616s tare = 7501bs
2 sided CNT SKinnyB

031914yoda03 3600s CNT on ST-90# W801261
r.h. = 24"@34"
Matrix = cellulose/Metal
GW = 171416s tare = 6881bs
2 sided CNT SKinnyB

031914yoda04 3600s CNT on ST-90# W801258
r.h. = 24"@516"
Matrix: Cellulose/Metal
GW = 166016s tare = 7021bs
2 sided CNT SKinnyB

3/14/14 Clare Bella shafts TA54

031914yodaB1 1800s BKG-CNT TA54 shaft302

031914yoda05 14400s CNT on shaft#302 591021
r.h. = @12'
Matrix = Glovebox
GW = tare =
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
Lid wall thickness = 1/4"
used 2 plates of lead = 1/2" each

Detector to lead filter.

1 plate = 4.5"
2 plates = 4"
3 plates = 3.5"

SB
3/19/14

SIGNATURE DATE 20
READ AND UNDERSTOOD DATE 20

Item: Glovebox in Shaft 303 - S910322
File ID: 031814yoda04.RPu

Model
Type: Box
Height (in): 65.00
Width (in): 65.00
Depth (in): 96.00
Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda
Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)
Waste Matrix Density (g/cm3): 9.909E-4
Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000
Waste Matrix Eff. Density: 9.910E-4
Item Weight: 4601.12 (lbs)

Wall Material
Primary: Iron 2004
Secondary: Lead
Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.500000
Tertiary: 0.000000

Wall Material Density (g/cm3)
Primary: 7.875E+0
Secondary: 1.140E+1
Tertiary: 0.000E+0

Count Time (sec): 14400
Altitude (ft): 7000.00
Rate Loss Correction Factor: 1.000
Lump Correction: None
Thickness (microns): 0

Analyst: Kathleen Gruetzmacher
Notes: Eu154 723 keV peak below minimum detectable activity.

Item: Glovebox in Shaft 303 - S910322
File ID: 031814yoda04.RPu

Summary:

Nuclide	Uniform Activity (Ci)	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	7.01E-6	3.36E-3	N/A	49.64
Cs137	3.58E-1	1.72E+2	N/A	11.28
Eu154	1.74E-4	8.34E-2	N/A	13.96

Detail:

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts (counts)	Intrinsic Efficiency (cps/gps)	Uniform Activity (Ci)	Uniform MDA (Ci)	Uniform Conc (nCi/g)	Uniform MDA Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	1173.20	9.99E-1	86	212	6.575E-2	8.70E-6	7.15E-6	4.17E-3	3.43E-3	N/A	53.46
Co60	1332.50	1.00E+0	66	96	5.754E-2	5.32E-6	3.91E-6	2.55E-3	1.87E-3	N/A	49.64
Cs137	661.66	8.52E-1	576908	9134	1.186E-1	3.58E-1	2.78E-4	1.72E+2	1.33E-1	N/A	11.28
Eu154	996.33	1.03E-1	138	366	7.764E-2	1.94E-4	1.29E-4	9.30E-2	6.20E-2	N/A	43.96
Eu154	1004.78	1.79E-1	228	356	7.698E-2	1.81E-4	7.19E-5	8.66E-2	3.45E-2	N/A	28.78
Eu154	1274.54	3.55E-1	604	146	6.032E-2	1.48E-4	1.45E-5	7.07E-2	6.93E-3	N/A	13.96

Analysis Report for Peak Doctor Version Version 1.0.13.M
Date of analysis: Mar 19, 2014
RobWin has to be here as a token string for SNAP.
Detector Calibration: Yoda
Spectrum ID: 031814yoda04
Analysis Energy Range: 42.051keV to 1999.9keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.81	0.80	454139	1016	144706
74.97	0.79	794758	1165	140608
84.80	1.03	332326	1053	193940
87.37	0.93	98301	900	177890
661.43	1.37	576908	771	4567
723.68	2.00	138	44	443
910.97	1.57	251	31	173
968.93	1.28	158	26	128
996.16	1.88	138	30	183
1004.54	1.88	228	31	178
1120.18	1.41	161	23	96
1173.06	1.75	86	23	106
1274.49	1.80	604	30	73
1332.35	1.69	66	16	48
1377.38	1.88	49	16	48
1460.83	2.08	2302	50	38
1592.20	2.07	106	15	31
1764.64	2.16	199	17	21

Peak Analysis

Peak No.	Name	Energy	Branch Ratio	Peak Area	Cont. Counts	Corr. Energy
1	Pb-Kx	72.81	2.77E-01	454139	289412	72.810
2	Pb-Kx	74.97	4.62E-01	794758	281216	74.970
3	Pb-Kx	84.75	1.63E-01	332326	387880	84.800
4	Pb-Kx	87.30	3.91E-02	98301	355780	87.370
5	Cs137	661.66	8.52E-01	576908	9134	661.430
6	Eu154	723.36	1.97E-01	138	886	723.680
7	Ac228	911.21	2.90E-01	251	346	910.970
8	Ac228	968.97	1.74E-01	158	256	968.930
9	Eu154	996.33	1.03E-01	138	366	996.160
10	Eu154	1004.78	1.79E-01	228	356	1004.540
11	Bi214	1120.27	1.50E-01	161	192	1120.180
12	Co60	1173.20	9.99E-01	86	212	1173.060
13	Eu154	1274.54	3.55E-01	604	146	1274.490
14	Co60	1332.50	1.00E+00	66	96	1332.350
15	Bi214	1377.66	4.02E-02	49	96	1377.380
16	K40	1460.83	1.07E-01	2302	76	1460.830
17	D.Esc.3	1592.35	1.00E+00	106	62	1592.200
18	Bi214	1764.49	1.59E-01	199	42	1764.640

23 | PROJECT NAME yoda | NOTEBOOK NO.

3/18/14 03181 4yoda Q1 300s QC CNT TA54-2 Passed
Pick up Briefing 03/814yoda B1 900s BKG CNT TA50-WCRRF
TA50 WCRRF Robert Burton John Guardado 03181 4yoda 01 900s QC CNT on 55 gallon drum # 69570 AB 3/18/14
r.h. = 17" @ 24"
Matrix = Metal / Paraffin
GW = 135.6 lbs tare = 62 lbs
4 sided CNT Scooby

03181 4yoda 02 900s CNT on 55 gallon drum # 69567
r.h. = 17" @ 36"
Matrix = Metal
GW = 120 lbs tare = 62 lbs
4 sided CNT Scooby

03181 4yoda 03 900s CNT on 55 gallon drum # 69566
r.h. = 17 @ 24"
Matrix = Metal / Paraffin
GW = 186.8 lbs tare = 62 lbs
4 sided CNT Scooby

3/18/14 03181 4yoda B2 1800s BKG CNT TA54-Shaft 303

03181 4yoda 04 14400s CNT on Shaft # 303
r.h. = @ 12"
Matrix = Glovebox
GW = tw =
Glove Box wall thickness = 1/8"
Container wall thickness = 1/8"
Lid wall thickness = 1/4"
used (3) plates of lead = 1/2" each

Scooby was used

BB
3/18/14

20 SIGNATURE DATE 20
20 READ AND UNDERSTOOD DATE 20

Item: Glovebox in Shaft 306 - S910327
File ID: 031314yoda01.RPu

Model
Type: Box
Height (in): 65.00
Width (in): 65.00
Depth (in): 96.00
Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda
Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)
Waste Matrix Density (g/cm3): 9.909E-4
Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000
Waste Matrix Eff. Density: 9.910E-4
Item Weight: 3800.93 (lbs)

Analyst: Kathleen Gruetzmacher
Notes: None

Wall Material
Primary: Iron 2004
Secondary: Lead
Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.000000
Tertiary: 0.000000

Wall Material Density (g/cm3)
Primary: 7.875E+0
Secondary: 1.140E+1
Tertiary: 0.000E+0

Count Time (sec): 14400
Altitude (ft): 7000.00
Rate Loss Correction Factor: 1.000
Lump Correction: None
Thickness (microns): 0

Item: Glovebox in Shaft 306 - S910327
File ID: 031314yoda01.RPu

Summary:

Nuclide	Uniform Activity (Ci)	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	1.92E-5	1.11E-2	N/A	13.92
Cs137	2.52E-1	1.46E+2	N/A	10.35
Eu154	1.34E-4	7.77E-2	N/A	11.43

Detail:

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts (counts)	Intrinsic Efficiency (cps/gps)	Uniform Activity (Ci)	Uniform MDA (Ci)	Uniform Conc (nCi/g)	Uniform MDA Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	1173.20	9.99E-1	485	314	6.575E-2	1.90E-5	3.35E-6	1.10E-2	1.94E-3	N/A	16.69
Co60	1332.50	1.00E+0	556	136	5.754E-2	1.93E-5	1.99E-6	1.12E-2	1.15E-3	N/A	13.92
Cs137	661.66	8.52E-1	2083320	22864	1.186E-1	2.52E-1	8.56E-5	1.46E+2	4.96E-2	N/A	10.35
Eu154	723.36	1.97E-1	324	1396	1.079E-1	1.39E-4	7.56E-5	8.04E-2	4.39E-2	N/A	35.93
Eu154	996.33	1.03E-1	297	544	7.764E-2	1.38E-4	5.18E-5	8.01E-2	3.01E-2	N/A	26.86
Eu154	1274.54	3.55E-1	1232	204	6.032E-2	1.25E-4	7.06E-6	7.27E-2	4.10E-3	N/A	11.43

Analysis Report for Peak Doctor Version Version 1.0.14
Date of analysis: Mar 18, 2014
RobWin has to be here as a token string for SNAP.
Detector Calibration: Yoda
Spectrum ID: 031314yoda01
Analysis Energy Range: 42.154keV to 1999.8keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.21	0.83	379502	616	154873
74.37	0.81	660724	813	150726
84.21	1.00	283209	532	201847
86.77	0.95	81962	286	195007
661.34	1.38	2083320	1443	11432
723.10	1.57	324	18	698
873.24	1.47	285	17	359
911.23	1.72	369	19	356
968.90	1.69	177	13	320
996.37	1.61	297	17	272
1004.81	1.78	516	23	294
1120.42	1.93	227	15	195
1173.39	1.78	485	22	157
1274.88	1.90	1232	35	102
1323.53	1.22	73	9	54
1333.02	2.13	556	24	68
1461.37	2.13	2628	51	46
1588.81	2.40	72	8	36
1593.00	2.41	135	12	36
1597.16	2.41	83	9	36
1765.38	2.57	261	16	27

Peak Analysis

Peak No.	Name	Energy	Branch Ratio	Peak Area	Cont. Counts	Corr. Energy
1	Pb-Kx	72.81	2.77E-01	379502	309746	72.810
2	Pb-Kx	74.97	4.62E-01	660724	301452	74.968
3	Pb-Kx	84.75	1.63E-01	283209	403694	84.800
4	Pb-Kx	87.30	3.91E-02	81962	390014	87.358
5	Cs137	661.66	8.52E-01	2083320	22864	661.457
6	Eu154	723.36	1.97E-01	324	1396	723.166
7	Eu154	873.23	1.15E-01	285	718	873.183
8	Ac228	911.21	2.90E-01	369	712	911.141
9	Ac228	968.97	1.74E-01	177	640	968.764
10	Eu154	996.33	1.03E-01	297	544	996.212
11	Eu154	1004.78	1.79E-01	516	588	1004.645
12	Bi214	1120.27	1.50E-01	227	390	1120.160
13	Co60	1173.20	9.99E-01	485	314	1173.086
14	Eu154	1274.54	3.55E-01	1232	204	1274.493
15	Sum Pk	N/A	N/A	73	108	1323.103
16	Co60	1332.50	1.00E+00	556	136	1332.585
17	K40	1460.83	1.07E-01	2628	92	1460.830
18	Ac228	1588.23	3.60E-02	72	72	1588.166
19	D.Esc.3	1592.35	1.00E+00	135	72	1592.352
20	Eu154	1596.58	1.83E-02	83	72	1596.509
21	Bi214	1764.49	1.59E-01	261	54	1764.591

3/11/14 031114yodaQ1 300s QC cnt TAS4-2 Passed
Pre job 031114yodaB1 1800s BKG CNT TAS4 S/N 5912717
Shielding 031114yoda01 10,800s CNT on shaft #305
Lead Brick
Lucas Kay r.h. = @12'
Gallegos 3/11/14 Matrix = Glovebox
shafts GW = 5500 lbs tare = 2700 lbs
TA 54 Glove wall thickness = 1/8"
b Container wall thickness 1/8"
600 lid wall thickness = 1/4"
used RB used three plates of lead
3/11/14 = 1/2" each

3/12/14 031214yoda01 300s QC CNT TAS4-2 Passed
Pre job 031214yodaB1 1800s BKG CNT TAS4
Reload B
Scott F 031214yoda01 10,800s CNT on shaft #304
TA 54 r.h. = @12'
Matrix = Glovebox
GW = tare =
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
lid wall thickness = 1/4"
Used 2 plates of lead = 1/2" each

3/13/14
Pre job 031314yoda01 300s QC CNT TAS4-2 Pass ed
Reload B 031314yodaB1 1800s BKG CNT TAS4-shafts S/N 0310327
Scott F 031314yoda01 14,400s CNT on shaft #306
TA 54 r.h. = @12'
Matrix = Glovebox
GW = tare =
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
lid wall thickness = 1/4"
Used 2 plates of lead = 1/2" each

SIGNATURE DATE 20
READ AND UNDERSTOOD DATE 20

Item: Glovebox in Shaft 305 - S912717
File ID: 031114yoda01.RPu

Model
Type: Box
Height (in): 65.00
Width (in): 65.00
Depth (in): 96.00
Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda
Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)
Waste Matrix Density (g/cm3): 9.909E-4
Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000
Waste Matrix Eff. Density: 9.910E-4
Item Weight: 3800.93 (lbs)

Wall Material
Primary: Iron 2004
Secondary: Lead
Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.500000
Tertiary: 0.000000

Wall Material Density (g/cm3)
Primary: 7.875E+0
Secondary: 1.140E+1
Tertiary: 0.000E+0

Count Time (sec): 10800
Altitude (ft): 7000.00
Rate Loss Correction Factor: 1.000
Lump Correction: None
Thickness (microns): 0

Analyst: Kathleen Gruetzmacher
Notes: Eu154 723 keV peak below minimum detectable activity.

Item: Glovebox in Shaft 305 - S912717
File ID: 031114yoda01.RPu

Summary:

Nuclide	Uniform Activity (Ci)	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	2.08E-4	1.20E-1	N/A	10.92
Cs137	7.17E-1	4.16E+2	N/A	11.28
Eu154	2.58E-4	1.49E-1	N/A	13.07

Detail:

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts (counts)	Intrinsic Efficiency (cps/gps)	Uniform Activity (Ci)	Uniform MDA (Ci)	Uniform Conc (nCi/g)	Uniform MDA Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	1173.20	9.99E-1	1606	240	6.575E-2	2.17E-4	1.01E-5	1.26E-1	5.87E-3	N/A	11.48
Co60	1332.50	1.00E+0	1850	98	5.754E-2	1.99E-4	5.27E-6	1.15E-1	3.05E-3	N/A	10.92
Cs137	661.66	8.52E-1	865303	14616	1.186E-1	7.17E-1	4.68E-4	4.16E+2	2.72E-1	N/A	11.28
Eu154	996.33	1.03E-1	146	384	7.764E-2	2.74E-4	1.77E-4	1.59E-1	1.02E-1	N/A	42.67
Eu154	1274.54	3.55E-1	741	138	6.032E-2	2.41E-4	1.88E-5	1.40E-1	1.09E-2	N/A	13.07

Analysis Report for Peak Doctor Version Version 1.0.14
Date of analysis: Mar 13, 2014
RobWin has to be here as a token string for SNAP.
Detector Calibration: Yoda
Spectrum ID: 031114yoda01
Analysis Energy Range: 42.042keV to 1999.8keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.36	0.85	643819	802	237775
74.52	0.83	1129288	1063	231639
84.36	1.02	480400	693	310339
86.93	0.99	142008	377	307788
510.29	2.41	1378	37	26263
661.59	1.39	865303	930	7308
723.19	1.14	108	10	511
727.23	0.93	94	10	410
873.60	1.48	166	13	322
911.39	1.28	169	13	235
969.45	1.10	74	9	187
996.54	1.42	146	12	192
1005.17	1.73	305	17	224
1120.84	1.75	166	13	124
1173.87	1.83	1606	40	120
1275.18	1.84	741	27	69
1333.31	2.01	1850	43	49
1461.78	2.08	1632	40	33
1593.85	2.71	88	9	31
1765.83	1.57	152	12	11

Peak Analysis

Peak No.	Name	Energy	Branch Ratio	Peak Area	Cont. Counts	Corr. Energy
1	Pb-Kx	72.81	2.77E-01	643819	475550	72.810
2	Pb-Kx	74.97	4.62E-01	1129288	463278	74.968
3	Pb-Kx	84.75	1.63E-01	480400	620678	84.798
4	Pb-Kx	87.30	3.91E-02	142008	615576	87.365
5	Annih.	511.00	1.00E+00	1378	52526	510.299
6	Cs137	661.66	8.52E-01	865303	14616	661.446
7	Eu154	723.36	1.97E-01	108	1022	722.984
8	Bi212	727.25	6.65E-02	94	820	727.020
9	Eu154	873.23	1.15E-01	166	644	873.243
10	Ac228	911.21	2.90E-01	169	470	910.995
11	Ac228	968.97	1.74E-01	74	374	968.996
12	Eu154	996.33	1.03E-01	146	384	996.059
13	Eu154	1004.78	1.79E-01	305	448	1004.680
14	Bi214	1120.27	1.50E-01	166	248	1120.234
15	Co60	1173.20	9.99E-01	1606	240	1173.210
16	Eu154	1274.54	3.55E-01	741	138	1274.418
17	Co60	1332.50	1.00E+00	1850	98	1332.490
18	K40	1460.83	1.07E-01	1632	66	1460.830
19	D.Esc.3	1592.35	1.00E+00	88	62	1592.767
20	Bi214	1764.49	1.59E-01	152	22	1764.574

3/11/14 Arejas, B Wilkins, Richard Brooks, Lucas, Gallegos, shafts, TA 54 — Good, used b
Reviewed 3/11/14

031114yodaQ1 300s QC CNT TA54-2 Passed

031114yodaQ1 10,800s CNT on shaft # 305 5912717
ch. = @12'
Matrix = Glovebox
GW = 5500 lbs tare = 2700 lbs
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
lid wall thickness = 1/4"
this used three plates of lead 1/2" thick × 3 = 1.5" lead

3/12/14 Arejas, Richard B, Scott P, TA 54

031214yodaQ1 300s QC CNT TA54-2 Passed

031214yodaQ1 10,800s CNT on shaft # 304 5912719
ch. = @12'
Matrix = Glovebox
GW = tare =
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
lid wall thickness = 1/4"
used 2 plates of lead = 1/2" each

SIGNATURE DATE 20
READ AND UNDERSTOOD DATE 20

[redacted]

Item: Glovebox in Shaft 304 - S912719
File ID: 031214yoda01.RPu

Model
Type: Box
Height (in): 65.00
Width (in): 65.00
Depth (in): 96.00
Volume (ft^3): 234.72

Detector Location
Distance (in): 156.25
Height (in): 32.50
Left of Center (in): 0.00

Detector: Yoda
Collimator: Yoda: ScooBy @356

Waste Matrix: Air (100.00%)
Waste Matrix Density (g/cm3): 9.909E-4
Secondary Matrix: N/A
Package Weight (lbs): 14.52
Packing Efficency: 1.000
Waste Matrix Eff. Density: 9.910E-4
Item Weight: 4000.92 (lbs)

Analyst: Kathleen Gruetzmacher
Notes: None

Wall Material
Primary: Iron 2004
Secondary: Lead
Tertiary: None

Wall Thickness (in)
Primary: 0.500000
Secondary: 1.000000
Tertiary: 0.000000

Wall Material Density (g/cm3)
Primary: 7.875E+0
Secondary: 1.140E+1
Tertiary: 0.000E+0

Count Time (sec): 10800
Altitude (ft): 7000.00
Rate Loss Correction Factor: 1.000
Lump Correction: None
Thickness (microns): 0

Item: Glovebox in Shaft 304 - S912719
File ID: 031214yoda01.RPu

Summary:

Nuclide	Uniform Activity (Ci)	Uniform Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	3.03E-5	1.67E-2	N/A	13.23
Cs137	2.32E-1	1.28E+2	N/A	10.35
Eu154	1.54E-4	8.50E-2	N/A	11.94

Detail:

Nuclide	Energy (keV)	Yield (gps/dps)	Net Counts (counts)	Bkg Counts (counts)	Intrinsic Efficiency (cps/gps)	Uniform Activity (Ci)	Uniform MDA (Ci)	Uniform Conc (nCi/g)	Uniform MDA Conc (nCi/g)	Uniform SNM mass (g)	+2s Error (%)
Co60	1173.20	9.99E-1	596	252	6.575E-2	3.11E-5	4.01E-6	1.72E-2	2.21E-3	N/A	14.60
Co60	1332.50	1.00E+0	633	126	5.754E-2	2.94E-5	2.56E-6	1.62E-2	1.41E-3	N/A	13.23
Cs137	661.66	8.52E-1	1435877	17284	1.186E-1	2.32E-1	9.93E-5	1.28E+2	5.47E-2	N/A	10.35
Eu154	723.36	1.97E-1	259	694	1.079E-1	1.48E-4	7.16E-5	8.14E-2	3.94E-2	N/A	32.95
Eu154	996.33	1.03E-1	289	498	7.764E-2	1.79E-4	6.62E-5	9.87E-2	3.65E-2	N/A	26.62
Eu154	1274.54	3.55E-1	1000	190	6.032E-2	1.36E-4	9.10E-6	7.47E-2	5.02E-3	N/A	11.94

Analysis Report for Peak Doctor Version Version 1.0.14
Date of analysis: Mar 18, 2014
RobWin has to be here as a token string for SNAP.
Detector Calibration: Yoda
Spectrum ID: 031214yoda01
Analysis Energy Range: 42.000keV to 2000.0keV

Egy(keV)	FWHM	Area	+/-Area	Background
72.75	0.82	252110	502	126511
74.90	0.80	445647	668	123576
84.73	1.01	185531	431	170734
87.32	0.93	54214	233	159182
353.92	0.81	1421	38	64690
661.34	1.38	1435877	1198	8642
671.08	0.84	119	11	476
723.09	0.91	259	16	347
873.14	1.21	255	16	261
910.94	1.66	301	17	302
968.83	1.70	199	14	254
995.97	1.80	289	17	249
1004.57	1.89	430	21	253
1120.05	1.69	176	13	157
1173.07	1.69	596	24	126
1274.29	1.89	1000	32	95
1332.31	2.05	633	25	63
1460.67	2.13	2391	49	46
1592.32	2.54	103	10	33
1596.55	2.34	55	7	30
1764.41	2.27	160	13	19

Peak Analysis

Peak No.	Name	Energy	Branch Ratio	Peak Area	Cont. Counts	Corr. Energy
1	Pb-Kx	72.81	2.77E-01	252110	253022	72.810
2	Pb-Kx	74.97	4.62E-01	445647	247152	74.960
3	Pb-Kx	84.75	1.63E-01	185531	341468	84.791
4	Pb-Kx	87.30	3.91E-02	54214	318364	87.381
5	S.F.	N/A	N/A	1421	129380	354.000
6	Cs137	661.66	8.52E-01	1435877	17284	661.442
7	S.F.	N/A	N/A	119	952	671.183
8	Eu154	723.36	1.97E-01	259	694	723.197
9	Eu154	873.23	1.15E-01	255	522	873.258
10	Ac228	911.21	2.90E-01	301	604	911.060
11	Ac228	968.97	1.74E-01	199	508	968.955
12	Eu154	996.33	1.03E-01	289	498	996.096
13	Eu154	1004.78	1.79E-01	430	506	1004.697
14	Bi214	1120.27	1.50E-01	176	314	1120.186
15	Co60	1173.20	9.99E-01	596	252	1173.209
16	Eu154	1274.54	3.55E-01	1000	190	1274.437
17	Co60	1332.50	1.00E+00	633	126	1332.461
18	K40	1460.83	1.07E-01	2391	92	1460.830
19	D.Esc.3	1592.35	1.00E+00	103	66	1592.489
20	Eu154	1596.58	1.83E-02	55	60	1596.720
21	Bi214	1764.49	1.59E-01	160	38	1764.592

3/11/14 031114yodaQ1 300s QC CNT TAS4-2 Passed
Proj lab 031114yodaB1 1800s BKG CNT TAS4 cyl# 5912717
Bldg 031114yoda01 10,800s CNT on shaft #305
Rad Prot r.h. = @12'
Lucas Matrix = Glovebox
Galleges 3/11/14 GW = 5500 lbs tare = 2700 lbs
shaft Glove wall thickness = 1/8"
TA 54 Container wall thickness 1/8"
lid wall thickness = 1/4"
RB used three plates of lead
3/11/14 = 1/2" each
~~6000~~ used

3/12/14 031214yodaQ1 300s QC CNT TAS4-2 Passed
Proj lab 031214yodaB1 1800s BKG CNT TAS4
Rad Prot B
Scott F 031214yoda01 10,800s CNT on shaft #304
TA 54 r.h. = @12'
Matrix = Glovebox
GW = tare =
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
lid wall thickness = 1/4"
Used 2 plates of lead = 1/2" each

3/13/14
Proj lab 031314yodaQ1 300s QC CNT TAS4-2 Passed
Rad Prot B 031314yodaB1 1800s BKG CNT TAS4-shafts
Scott F 031314yoda01 14,400s CNT on shaft #306
TA-54 r.h. = @12'
Matrix = Glovebox
GW = tare =
Glove wall thickness = 1/8"
Container wall thickness = 1/8"
lid wall thickness = 1/4"
Used 2 plates of lead = 1/2" each

SIGNATURE _____ DATE _____ 20
READ AND UNDERSTOOD _____ DATE _____ 20