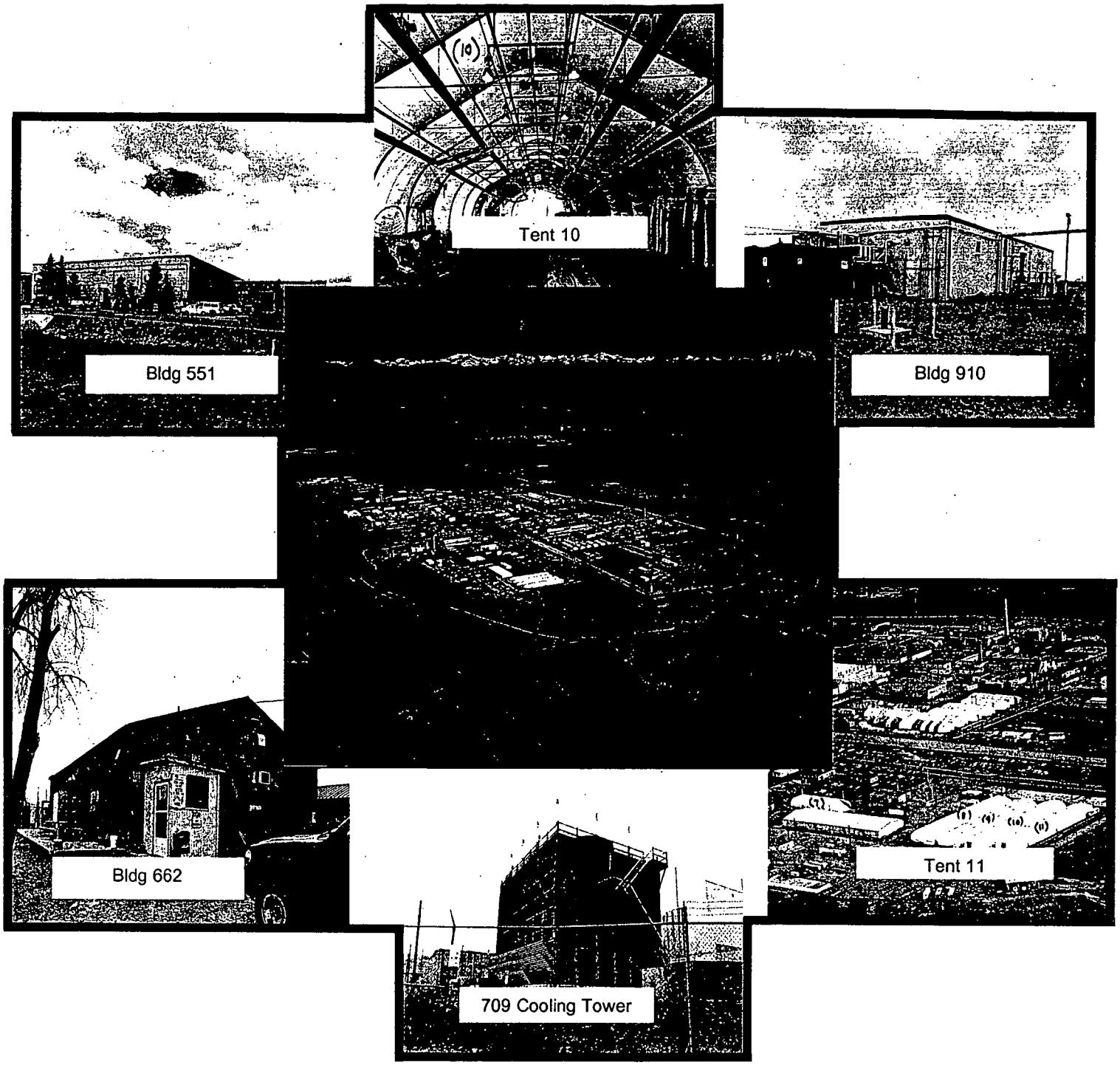


# RECONNAISSANCE LEVEL CHARACTERIZATION REPORT FOR GROUP A FACILITIES

## REVISION 0

## VOLUME 1 OF 2

**October 14, 1999**

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# RECONNAISSANCE-LEVEL CHARACTERIZATION REPORT FOR GROUP A FACILITIES

## REVISION 0

**October 14, 1999**

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## ABBREVIATIONS/ACRONYMS

| | |
|---|---|
| ACM | asbestos-containing material |
| ASD | Analytical Services Division |
| Be | beryllium |
| CHWA | Colorado Hazardous Waste Act |
| CBDPP | Chronic Beryllium Disease Prevention Program |
| D&D | decontamination and Decommissioning |
| DDCP | Decontamination and Decommissioning Characterization Protocol |
| DOE | U.S. Department of Energy |
| dpm | disintegrations per minute |
| DQOs | data quality objectives |
| EPA | U.S. Environmental Protection Agency |
| K-H | Kaiser-Hill |
| LDR | Land Disposal Restrictions |
| LBP | lead-based paint |
| LCS | laboratory control samples |
| LLW | low-level waste |
| LSDW | life safety disaster warning |
| MARSSIM | Multi-Agency Radiation Survey and Site Investigation Manual |
| MDA | minimum detectable activity |
| MDC | minimum detectable concentration |
| OSHA | Occupational Safety and Health Administration |
| Pb | lead |
| PCB | polychlorinated biphenyls |
| RCRA | Resource Conservation and Recovery Act |
| RDL | required detection limit |
| RFCA | Rocky Flats Cleanup Agreement |
| RFETS | Rocky Flats Environmental Technology Site |
| RLC | reconnaissance level characterization |
| RLCP | Reconnaissance Level Characterization Plan |
| RPD | relative percent difference |
| SVOC | semi-volatile organic compound |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TSI | thermal system insulation |
| TRU | transuranic |
| TSCA | Toxic Substances Control Act |
| VOC | volatile organic compound |

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## EXECUTIVE SUMMARY

A Reconnaissance Level Characterization (RLC) was performed to assess physical, chemical and radiological hazards associated with Group A Facilities (i.e., Buildings 551, 662, and 910; Tents 10 and 11; and the 709 Cooling Tower). Hazards were assessed based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate the presence of some radioactive contamination and asbestos but no other significant chemical or physical hazards. Some beryllium contamination was also detected in the Tent 10 Permacon. Contaminated areas, hazards and facility classifications based on contamination and hazards are summarized in Table ES-1. Even though no surface chemical contamination was identified in any of the buildings (except for some beryllium contamination in the Tent 10 Permacon), slabs/floors associated with the Building 551 chemical dispensary, Building 662, Building 910, and Tents 10 and 11 may contain residual contamination from historical spills and releases. For example, the 904 Pad may contain residual chemical contamination (RCRA-listed spent solvents and electroplating wastes containing heavy metals) from the release of pondcrete and saltcrete that occurred on the pad prior to the tents being erected. Also, the Building 662 pad was previously used to store a variety of wastes, and historical spills/releases are documented. Therefore, it is recommended that the slab/floor media associated with these structures be sampled and analyzed during future characterizations (e.g., in-process and/or environmental restoration). Based upon this characterization, Building 551, 662, the 709 Cooling Tower and Tent 10 are considered Type 2 Facilities. Buildings 910 and Tent 11 are considered Type 1 Facilities.

The demolition of Group A facilities will generate primarily sanitary wastes. The Site will be able to recycle some waste materials, such as structural metal. A small amount will have to be disposed off-site as low-level radioactive or chemical (i.e., RCRA- and asbestos containing-) waste.

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## Table ES-1 Summary of Hazards and/or Contamination Indicated by the RLC

| Bldg/ Facility | Chemical Contamination Indicated? | Contamination Type | Location | Radiological Contamination Indicated? | Contamination Type | Location | Building Classification[1] |
|---|---|---|---|---|---|---|---|
| 551 | **Yes** | Asbestos | South Roof and Flashing w/in black tar | **Yes** | Total (Fixed) Alpha | Roof and Roof Drains | Type 2 |
| 662 | No | None | NA[2] | **Yes** | Total (Fixed) Alpha | Roof Perimeter and West-central side of Floor | Type 2 |
| 709 | **Yes** | Asbestos | Thermal Systems Insulation (TSI) Piping adjacent to Bldg 799 | **Yes** | U233/234, U235, U238 | Sediment in Sump | Type 2 |
| 910 | **Yes** | Asbestos | TSI Piping associated w/ steam heating system | No | None | NA | Type 1 |
| 904 Pad Tent 10 | **Yes** | Beryllium | Permacon Floor | **Yes** | Total (Fixed) Alpha | Permacon Floor | Type 2 |
| 904 Pad Tent 11 | No | None | NA | No | None | NA | Type 1 |

[1]Building classification does not include environmental media or bulk media beneath the immediate surface of the floors.

[2]NA = Not Applicable

Radiological Engineering recommends surveys where significant configuration changes are implemented in the building prior to demolition due to unknowns associated w/ movement of bulk material or equipment.

Type 1 facilities are considered "free of contamination," and Type 2 facilities contain some radiological or hazardous substance contamination.

The presence of asbestos does not make a facility a Type 2 as long as asbestos is removed pursuant to Site asbestos abatement procedures.

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# 1.0 INTRODUCTION

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous buildings and structures will be removed. Among these is a group referred to as the Group A Facilities, which include Building 551, 662, and 910; Tents 10 and 11; and the 709 Cooling Tower. Tents 10 and 11 are located on the east side of the 904 Pad, which is located in the southeastern part of the Industrial Area. Building 551 is located in the central part of the Industrial Area on Central Avenue, Building 662 is located north of Building 850, and Building 910 is located in the northeastern part of the Industrial Area. The 709 Cooling Tower is located southeast of Building 707. The locations of these facilities are shown on following site plan. These facilities will no longer support the RFETS mission, and will need to be demolished to reduce Site hazards, risks and operating costs.

Before the facilities can be demolished, hazards must first be identified. Hazards identified will be used to plan the decommissioning and demolition work, including addressing worker health and safety and waste management issues. This document presents the existing physical, radiological and chemical hazards associated with the eight facilities, and classifies the facilities pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a). The hazards assessment is based on facility/process knowledge, operating and spill records, and results of the reconnaissance level characterization (RLC) conducted. The document also presents estimated decommissioning waste types and volumes. The RLC was conducted pursuant to the RFETS Decontamination and Decommissioning Characterization Protocol (DDCP). The content and general outline of this report is consistent with Kaiser-Hill (K-H) guidance on composition of decontamination and decommissioning (D&D) documentation (FDPM, K-H, 1998b).

## 1.1 Purpose

The purpose of this report is to communicate and document the results of the RLC effort. The purpose includes both summarizing the data into concise, usable formats and interpreting the data for use in management decisions, primarily:

- definition of individual hazards and overall risk associated with facility D&D and managing resulting wastes;
- preliminary waste classification based on RLC results; and
- classification of buildings based on hazards identified.

Characterization of facilities is necessary as a prelude to job hazard analyses associated with worker health and safety in the field and to ensure compliance with waste regulations.

## 1.2 Scope

This report covers physical, radiological and chemical characterization of the six Group A facilities. Chemical characterization was conducted using Colorado hazardous waste

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management regulations as a means to segregate materials as either hazardous or non-hazardous waste. Environmental media beneath and surrounding the facilities, including the non-surficial portions of building floors and pads, are not within this scope. Environmental media and building pads/foundations will be dispositioned pursuant to Rocky Flats Cleanup Agreement (RFCA).

# 2.0 OPERATING HISTORY AND PHYSICAL DESCRIPTION

## 2.1 Building 551

Building 551 consists of two main sections, the original south section and a north addition. The south section is constructed of concrete block, and structural framing consists of concrete columns and beams. The floor is a concrete slab, and the roof deck is concrete. The dimensions are 122'x180'x25' high. Insulated boards and 4" steel strips (to hold boards in place) have been installed to replace windows. However, there are some small windows in the southwest corner. The north addition is sheet metal (both the walls and roof) and the floor is a concrete slab. The dimensions are 90'x202'x25' high. The roof is a gable, standing-seam metal roof with ridge vents and roof exhausters. The structural framing consists of steel columns and trusses. The walls and the roof are insulated, and the inside exterior walls have flat metal panels. Another addition is on the east side of the original building, constructed of concrete block. The dimensions are 45'x65'x20' high, and the structural framing consists of steel columns and beams. The original building and the east-side addition have built-up roofs. The building is heated by steam unit heaters, and includes ventilation, steam/condensate piping, a fire protection system, water, electrical, and gas. There are several docks with roll-up doors (electrical/chain-driven). Several electrical hoist systems are also present. The east wing of the south side has a door with a wooden platform and stairs on the outside. The northeast corner of the building has a door with exterior concrete steps and metal railing. All concrete foundations are approximately 4' above grade, and all floor elevations are the same.

Door 10 on the west side of the building leads to T551A, an office trailer housing non-RFCSS personnel. A wooden structure joins the two buildings. Also on the west side of the building, to the north of T551A, is a large metal platform/catwalk on which cargo containers are located. This structure is connected to B551 via a metal ramp. In addition, railroad tracks are located on the west side of B551. Outside on the east side there is a transformer in a concrete pad. The transformer is labeled as PCB contaminated.

The building has been primarily used as a warehouse. The south side was constructed in the 1950's, and the north addition was constructed in the 1960's. The north side includes a fabrication and service shop, and an area used for mock-up testing and training (e.g., clean gloveboxes and piping used to simulate liquid stabilization processes and activities to be performed in B371). The main building entry is at the south side. There are offices, men/women restrooms, and a mezzanine area above the offices. The south side also includes a chemical dispensary and a flammable storage room. There are large storage racks bolted to the floor. The south side racks are protected from forklifts by L-shaped steel rails bolted to the floor. The north side includes a large, metal equipment/tool crib/cage. There have been chemical product spills in the flammable storage room, but they have been cleaned up by the Fire Department Hazardous Materials Team. This room has an exterior door, a wall vent, and a roof vent.

Building 551 has no radiological postings on the interior or exterior of the building. There are also no routine historical or special radiological surveys (total and/or removable) available for the interior and exterior of Building 551. There are no radioactive sources in the radioactive source registry for Building 551. The building is designated as an "exempt building" per HSP 18.02, and therefore, contents may be free-released without surveys. However, the north side of the building had been previously radiologically contaminated (see Historical Release Report, PAC Reference No. 500-158), although past contamination reportedly has been cleaned up.

## 2.2 Building 662

Building 662 is an unpainted, galvanized, corrugated sheet-metal structure on a concrete slab. Its dimensions are 40'x 65'x 15' (eave height). The roof has a gable design, approximately 6' higher at the ridge, with a single roof exhauster in the ridge. The structural system consists of steel trusses supported by welded back-to-back steel channel columns. The building is insulated in the ceiling and walls. The building has five exterior doors, three man doors and two sliding doors. The main doors are located at the northeast corner, the southeast corner, and the middle of the south wall. The two sliding doors are located in the middle of the north wall and in the middle of the south door. The north door is inactive. There is a painted, corrugated metal vestibule for the northeast door, on concrete with a single window and storm-door entry. There is a wooden lean-to at the southeast door. Three windows are located on the east walls. The north exterior wall has a mercury-vapor light.

The building possesses sheet-rock ceiling and wallboard panels in various locations, as well as exposed fiberglass and foam insulation. The wallboard material is fastened to the building girts. There is a restroom with a shower and a hot water heater overhead, two hard-wall offices, and a small testing chamber. One office has vinyl paneling. The concrete pad is covered with 12"x12" vinyl tile. There is one floor drain filled with concrete. The building is cooled with two wall air conditioners, and heated with five ceiling-hung electrical unit heaters and two baseboard units, one located in the office and the other in the restroom. There are wall exhausters in the east and west walls. The building has a water line, fluorescent lighting (~25), and lots of electrical conduit. The south wall contains a lockout/tagout panel, three alarm panels, 9 electrical disconnect boxes, 3 light panels, and a transformer. The east wall has one disconnect box.

The original building slat contained a wooden structure, and after the structure was removed (prior to 1954), the slab was used for outdoor staging and storage of radioactive, hazardous and mixed waste containers. During the late 1950s and early 1960s container leaks and spills occurred on the pad, resulting in contamination of the pad. The building also was used in the past for beryllium storage. Another concrete layer may have been poured on the original pad.

The current structure was erected in the mid 1960s. The building is currently used by plant power personnel for testing and maintenance of electrical equipment, and for related small parts storage. No radiological material or hazardous chemicals are

currently stored or used in the building. There are also no routine historical or special radiological surveys (total and/or removable) available for the interior and exterior of Building 662. There are no radiological postings on the structure.

## 2.3 709 Cooling Tower

The 709 cooling tower is a wooden structure, square in shape, consisting of a concrete basin, a redwood superstructure, an interior lattice of wood lathe, cooling water pumps, a chemical addition shed located on the west side, and a valve vault for configuring the cooling water return. The building structure is condemned and no entry to the top is permitted. The wooden steps attached to the cooling tower structure are barricaded to deny access to the top of the tower. The concrete basin is approximately 40'x 50'x 3' thick, and approximately 6" thick. The wooden structure sits within the basin and is approximately 35 feet high. The cooling tower has two cells, which have separate fan motors and gearboxes for each fan. The gearboxes are located directly beneath the fan blades and are below the top deck and have poor access. The fans are located on the top deck and are surrounded by shrouds. The lower exterior portion, on the north and south sides, consist of 3 sheet-metal slats approximately 3' wide. Approximately 17 lamps surround the perimeter of the top of the tower and the access stairs to the top deck. The top deck of the cooling tower also houses the return water distribution manifolds and two security post fighting positions. The west side of the structure contains a metal ladder to the platform. The pumps and a generator are located on a steel platform west of structure. Also, electrical systems, a hoist system, and the shed (sheet metal approximately 5'x8'x7') are located on west side. The raw water line comes in from the south side. The north side contains cooling water lines (14") and fire water lines. Valve pits are located on the north and south sides of structure.

This structure was built in 1969 to service Building 707 cooling water requirements. It has been out of service since 1988 or 1989. Cooling Tower 709 poses a fire hazard. There are no radiological postings on the structure. There are also no routine historical or special radiological surveys (total and/or removable) available for the interior and exterior of the cooling tower.

## 2.4 Building 910

Building 910 is a two level structure. The upper level consists of a large process room, an office, an electrical room, and a smaller process room. The lower level consists of one large, open area. The upper level walls are constructed of 12" concrete block, and the lower level is constructed of 12" thick concrete. The building dimensions are 47'x102'. The first floor walls are 14' high, at top of masonry on the north side, and 12' high, at top of masonry on the south side. Four feet of the lower level walls are above grade, and 15 feet of wall are below grade. The building is on a pier system, ranging from 15' to 28' deep, and there are three 24"square concrete columns on the lower level, at mid-span of the building. Both floors have poured concrete slabs. The building concrete block walls are reinforced vertically and horizontally. The roof system consists of twin tees, 8' wide x 20"deep, bearing on top of the concrete block walls at each end. The roof cover is built-up with over 1" thick rigid insulation board on top of 2" perlite. The

perlite is on top of the concrete twin tees. The top of the roof is covered with tar and pea gravel. Metal flashing is located at the top of the walls. Inside of the building are 6" concrete block partitions, approximately 120 linear feet, and there is an access floor hatch in the first floor. Metal steps also lead to the first level. There are three man doors and one roll-up door in the exterior walls of the building. There are also exhaust fans and louvers in the exterior walls, and conduit and lighting on the exterior walls.

There are related outdoor systems. On the west side there are three natural-gas-fired electrical generators on a concrete pad and related gas systems. On the north side, there is an off-specification distillate line to the solar pond(s), an evaporator feed line from the pond(s), three self-contained metal cooling towers on a concrete pad, electrical systems, an emergency shower, a chemical storage tank (800 gal., labeled asbestos-free) on a concrete/steel cradle in concrete secondary containment, and truck overhead dispensing pad/system with concrete secondary containment. On the east side, there is a metal door and a concrete platform with concrete stairs and metal railing, a transformer platform, a concrete pit, an empty nitric acid storage tank on a concrete/steel cradle in concrete secondary containment, and an empty concrete sludge drying bed. On the south side there are concrete steps to a metal door and a concrete platform/loading dock with a roll-down door, and 4" pipes entering building.

Building 910 was constructed in 1977. Its intended function was to process excess liquids from the solar evaporation ponds 207A, 207B, and 207C north of the building. The reverse osmosis system in the basement treated effluent from the sanitary treatment plant. The evaporator system in Rm101 treated 300,000 gal. of Interceptor Trench System water. The building was shutdown in 1993, because it was considered too expensive and too labor-intensive to operate. The building currently has equipment on both levels (i.e., tanks, process control panels, instrumentation, large quantities of piping and conduit, etc.). Systems have been emptied but were not drained 100%. The lower level has floor drains. The building also has a fire protection system and lighting, and is connected to the Site Life Safety Disaster Warning (LSDW) system.

Building 910 has no radiological postings on the interior or exterior of the building. There are no routine historical or special radiological surveys (total and/or removable) available for the interior or exterior of Building 910. There are no radioactive sources in the radioactive source registry for Building 910.

## 2.5 Tents 10 and 11

Tents 10 and 11 are constructed on an asphalt pad, sloped to drain with a 6-12 inch berm around the pad to collect potential spills. The pad is referred to as the 904 pad, and it has two other tents constructed on it. The tents were constructed in January 1990 for the controlled storage of low-level mixed waste, hazardous waste, and for waste inspection, sampling and repackaging activities. The open pad area and the tents were used for the controlled storage of pondcrete and saltcrete, and a lesser amount of process-generated waste, containing a wide variety of radioactive and other hazardous contaminants. Pondcrete and saltcrete are, respectively, sediments from the solar evaporation ponds and the Building 374 evaporator, which have been mixed with

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cement to create a solid waste form. The structures consist of ground-anchored, steel-arched, rigid-frame members, with tension prevention bars, that spans the width of the arch, attached underneath, about at the shoulders of the arch. The bars have turnbuckles in the center of their spans, and they screw into anchors at each end. The anchors are attached to the rigid frame members bottom webs. The tents enclosure are weatherproof fabric membrane panels, that spans from frame to frame. The membrane panels are attached at each rigid frame, and on top of the panels are cables that spans from frame to frame for additional hold down. There are man doors in the side walls of the tents, and large 10' wide, vehicle accessways. Tents #10 and 11 have overhead heat, lighting, plant LSDW system, and wind turbine ventilators.

Tent 10 is 60' wide x 362' long x 21' high, and is used to package waste crates and to store investigation derived waste (primarily soil). It also contains a sheet-metal Permacon unit used to treat waste. The unit is a Radioactive Work Permit area. There is a groundwater well casing situated in the middle of the tent (#1087). The tent includes a great deal of equipment and supplies and electrical panels. The Permacon equipped with an external HEPA system, and includes external metal berming. Tent 11 is 60' wide x 334' long x 21' high. It also includes an empty Permacon unit. The interiors of Tents 10 and 11 are radiologically posted as "Radioactive Material Areas", as well as the exterior areas around the tents. An area within Tent 10 is radiologically posted as a "Contamination Area." Routine radiological surveys are available for both tents. There are no radiological surveys available for the "Contamination Area" in Tent 10.

# 3.0 SUMMARY OF CHARACTERIZATION ACTIVITIES

## 3.1 Data Quality Objectives (DQOs)

### The Problem

Several contaminants are suspected within the Group A buildings, but the quantities of contaminated media and contaminant concentrations are unknown relative to the requirements associated with the D&D program. Determination of the types and quantities of radiological and chemical contamination, and the associated consequent waste streams, are required for successful implementation of the project DQOs. Based upon historical process knowledge of the Group A buildings, the potential contaminants of concern are: radionuclides, RCRA metals (specifically chromium and lead), beryllium, asbestos, and polychlorinated biphenyls (PCBs).

### The Decisions

The critical technical decisions for the project were as follows:

- What floors, walls, ceilings, materials, media, and/or equipment are radiologically and/or chemically contaminated?
- What are the radiological and chemical waste streams that will result from D&D, and what are the associated volumes?

### Inputs to the Decisions

Inputs are quantitative data produced from the radiological survey of surfaces for removable and total contamination as well as the analysis of cooling tower wood and basin sediment samples, and paint and surface smear samples for radiological and chemical contamination. Historical data and process knowledge were also reviewed for use. In addition, applicable action levels, unrestricted release criteria, transportation requirements, waste management regulations, pollution prevention/ waste minimization criteria, ALARA and WAC were used.

### Decision Boundaries

Buildings and all materials and equipment contained therein, excluding the slab, were considered as within the project boundaries. The slab and environmental media were not considered within the project boundaries. However, some observations as to potential future sampling and survey requirements on the slab are included in this report. Slab characterization is necessary since most radiological and chemical contamination events occurred on the slab. Contamination found on the slab should be indicative of contamination within the facility.

## Decision Rules

Radiological decision rules are listed below. Decision rules for chemicals are listed for hazardous waste constituents, beryllium, PCBs and asbestos. Radiological and chemical decision rules are based on the premise that the Reconnaissance Level Characterization is an initial characterization for waste management purposes.

Radionuclides

1. If the Historical Site Assessment and/or current building configuration indicate that no radiological hazards may be present due to process knowledge and history, then the potential does not exist for radioactive material to be present above the surface contamination limits in DOE Order 5400.5 and RFETS Radiological Control Manual. The initial characterization is that the building and/or area are considered sanitary waste or may be free-released.
2. If the Historical Site Assessment and/or current building configuration indicate that a radiological hazard may be present, then the potential exists that radioactive material could be above the surface contamination limits listed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The initial characterization is that the building and/or area are considered low level waste.
3. If all radiological survey measurements are below the surface contamination thresholds provided in DOE Order 5400.5 and the RFETS Radiological Control Manual, and/or if soil and sediment concentrations are within background concentrations for volume contamination presented in RFETS Radiological Safety Practices 09.03 (Unrestricted Release of Bulk and Volume Material), no significant amounts of radioactive material are present. The building and/or area are considered sanitary waste or may be free-released.
4. If any radiological survey measurement exceeds the surface contamination thresholds provided in DOE Order 5400.5 and the RFETS Radiological Control Manual, and/or if soil and sediment concentrations exceed background concentrations for volume contamination presented in RFETS Radiological Safety Practices 09.03 (Unrestricted Release of Bulk and Volume Material), radioactive material are present. The building and/or area are considered low level waste.
5. If all radiological sample measurements are below the volume contamination threshold provided in the No-Rad-Added (NRA) Verification Program, the building, area and/or volume are considered sanitary waste or may be free-released.
6. If any radiological sample measurements are above the volume contamination threshold provided in the No-Rad-Added (NRA) Verification Program, the building, area and/or volume are considered as low level waste.

RCRA Constituents

If the waste is mixed with or contains a listed hazardous waste, or if the waste exhibits a characteristic of a hazardous waste, then the waste is considered RCRA-regulated hazardous waste in accordance with 6 CCR 1007-3, Parts 261 and 268.

CERCLA Hazardous Substances

If the waste contains a listed hazardous substance above the CERCLA reportable quantity (40 CFR 302.4), notify the receiving disposal facility of the hazardous substance and the estimated quantity prior to shipment.

Beryllium

If detectable beryllium contamination can be shown through process knowledge to consist of beryllium powder (P015 under RCRA), then the contaminated materials will be treated as RCRA waste and subject to treatment standards under 40 CFR 268.40.

If concentrations of beryllium are equal to or greater than 0.2 ug/100 $cm^2$, the material is considered beryllium contaminated per the Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program. If the concentrations are below 0.2 ug/100 $cm^2$, the material is considered non-beryllium contaminated.

PCBs

If material meets the definition of PCB Bulk Product Waste, it may be disposed of at a facility that is permitted, licensed, or registered by a State to manage municipal solid waste subject to 40 CFR 258, or non-municipal, non-hazardous waste subject to 40 CFR 257.5 through 257.30. For most bulk product wastes, implementing this strategy precludes the need for PCB characterization prior to or during Facility Disposition. However, notification to the disposal facility is required at least 15 days in advance of shipping wastes to the facility if that disposal facility does not possess a commercial PCB storage or disposal approval.

Management strategy for PCB remediation waste will be determined on a case-by-case basis. If PCB contamination is suspected, or if a PCB spill is discovered that has not been cleaned up, the area will be treated as directed by the most recent versions of 40 CFR 761 through 766, the RFETS Polychlorinated Biphenyls Management Plan (PRO-673-EWQA-1.5), and the WSRIC standards. For each planned cleanup, PCB regulations under TSCA will be evaluated as potentially applicable or relevant and appropriate requirements (ARARs), including the disposal options for PCB remediation waste listed under 40 CFR 761.61.

Asbestos

In accordance with 40 CFR 763 and 5 CCR 1001-10, if any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., >1% by volume), then material is considered ACM; otherwise the material is considered non-ACM.

### Tolerable Limits on Decision Error

Decision errors do not apply to radionuclides because no statistically based sampling program was developed or required for radionuclide characterization of the Group A buildings. A 95% confidence limit was used for Resource Conservation and Recovery Act (RCRA) and Toxic Substance Control Act (TSCA) waste characterization. No modifications were made to these decision rules.

### Optimization of Design

Radionuclide characterization was performed in a subjective manner to initially classify areas for waste purposes. Radionuclide sampling and analysis were not optimized to include pre-demolition survey criteria based on the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). No modifications were made to these criteria.

## 3.2 Radiological Characterization

Radiological characterization was performed to understand the nature and extent of radioactive materials that may be present in Buildings 551, 662, 709, 910 and Tents 10 and 11 at the 904 Pad. Data quality objectives (DQOs) were developed to focus radiological characterization so that these facilities can be initially classified. This section discusses historical radiological data on these facilities and discusses RLC conducted. Radiological hazards and RLC data are discussed in Section 4.0. Historical and RLC radiological data are presented in Appendixes A – F. Survey/scan data are presented in Appendixes A.2.1, B.2.1, C.1.1, D.1.1, E.2.1, and F.2.1 for the six facilities, respectively. Sample data are presented in Appendixes A.2.2, C.1.2, and D.1.2. Appendixes present documentation on sample chain-of-custody, sample locations, and laboratory results.

### 3.2.1 Summary of Historical Data

Historically, no routine radiological surveys were taken in Buildings 551, 662, 709 or 910. No radiological samples were taken in Buildings 551, 662, 709, 910 and Tents 10 & 11 at the 904 Pad. Routine radiological surveys were taken of Tents 10 and 11 to assure that radiological contamination was being controlled. Routine radiological surveys were reviewed for the period from 1/1/98 to 12/1/98. The survey types and results are summarized in Table 3-1. Historical radiological survey data for Tent 10 and Tent 11 are presented in Appendix E.1.1 and Appendix F.1.1, respectively. Results are compared with the surface contamination limits prescribed in DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

No special (one-time) radiological surveys were taken in Buildings 551, 709, 910 and Tents 10 & 11 at the 904 Pad. Building 662 had one special survey performed on the interior contents and floor of the building on 2/3/97. Forty surface contamination surveys were taken for alpha and beta-gamma, removable and total contamination. All survey results were below the Minimum Detectable Concentration (MDC) for the survey instrument. Building 662 survey data are presented in Appendix B.1.1.

**Table 3-1 Types and Results of Recent Historical Radiological Surveys (1/98 – 12/98)**

| | Number of Radiological Survey Points Taken per Survey Frequency | | Results Below Surface Contamination Limits? | |
|---|---|---|---|---|
| | Weekly Surveys - Interior Floor (1) | Annual Surveys - Interior Floor (2) | Weekly Surveys - Interior Floor (1) | Annual Surveys - Interior Floor (2) |
| Tent 10 - 904 Pad | 15 | 19 | YES | YES |
| Tent 11 - 904 Pad | 15 | 15 | YES | YES |

(1) - Only removable, alpha and beta-gamma surveys were performed at each location.
(2) - Both total and removable, alpha and beta-gamma surveys were performed at each location.

### 3.2.2 Reconnaissance Level Characterization

Radiological conditions were evaluated in Buildings 551, 662, 709, and 910 and Tents 10 and 11 through the use of radiological surveys, scans and samples. Direct radiological surveys were performed on the interior and exterior of all buildings for removable and total, gross alpha and beta-gamma contamination. Scan surveys were also performed on the interior of buildings for gross alpha and beta-gamma contamination. Radiological samples were taken on the interior/exterior of buildings.

**Assessment of Radiological Surveys/Scans**

Radiological survey and scan results were evaluated with respect to the potential for contamination being present. Survey and scan results were examined to determine if the data exceeded limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. An initial waste classification was then made based on the radiological posting for the areas and the results of this assessment. In addition to the survey/scan data, the following assumptions were made when determining waste volume estimates:

1. All areas and their contents that are not radiologically posted or posted as Radiological Buffer Areas or Radioactive Material Areas are considered sanitary waste or free-releasable.
2. All areas and their contents that are radiologically posted as a Contamination Area or Fixed Contamination Area are considered LLW.
3. All areas and their contents that are radiologically posted as a High Contamination Area or Airborne Radioactivity Area are considered LLW or TRU waste.

**Assessment of Radiological Samples**

Radiological sample results from painted surfaces were evaluated with respect to the potential for contamination being present in the area. All paint samples were obtained

from locations suspected of being contaminated (i.e., biased locations). Sample results were examined to determine if data exceeded limits prescribed in DOE 5400.5. Cooling tower basin sediment samples were taken from the same general area based on the assumption that sediment concentrations are uniform throughout the basin. These results were examined to determine if data exceeded background limits (mean plus two standard deviations) in 3-PRO-140-RSP-09.03, Unrestricted Release of Bulk or Volume Material. If data are below, then the presence of radioactive contamination is not indicated. If data exceed the background limits, then radioactive material is present.

An initial waste classification for the specific media sampled was made based upon the sample results and the following assumptions:

1. All paint that contains radioactive material below the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual is considered sanitary waste.
2. All paint that contains radioactive material above the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual is considered LLW.
3. All "cooling tower" sediment that contains radioactive material within the background range of sediments, subsurface soils and surface soils is considered sanitary waste.
4. All "cooling tower" sediment that contains radioactive material above the background range of sediments, subsurface soils or surface soils is considered LLW.

### 3.2.3 Sampling and Field Measurement Methods, Procedures and Equipment

Radiological surveys, scans and samples were taken per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. All radiological surveys and scans were taken in accordance with the requirements in procedure 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements." All radiological samples were taken in accordance with Analytical Services Division (ASD) requirements.

### 3.2.4 Laboratory Analysis

Radiological samples were analyzed per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. All radiological samples were analyzed in accordance with ASD requirements.

## 3.3 Chemical Characterization

Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present in the Group A facilities. Characterization was based on a review of historical and process knowledge, historical data, and RLC data. This section discusses the historical data on these facilities and RLC activities undertaken. All characterization data and related hazards are discussed in Section 4.0. Historical and RLC data are presented in Appendixes A – G.

### 3.3.1 Summary of Historical Data

Limited historical data exist on chemical contamination of Site buildings. The RFETS Historical Release Report discusses past building operations and releases to the environment. This document and discussions with building personnel on historical and process knowledge were used to identify potential chemicals and areas of concern. The following contaminants were considered:

- lead and other RCRA metals;
- volatile and semi-volatile organic compounds (VOCs/SVOCs);
- beryllium;
- PCBs; and
- asbestos.

Paints in some buildings were previously evaluated for RCRA metals, and some buildings were sampled to identify asbestos-containing material (ACM). All older transformers were also previously tested for PCB-containing oils. In addition, most buildings where beryllium was used or stored in the past have been assessed for industrial hygiene purposes. Data on Group A facilities from these previous assessments are summarized below and in Table 3-2.

**Table 3-2 Summary of Historical Data**

| Building | Above release limit? | | | | |
|---|---|---|---|---|---|
| | Pb/Metals | VOC/SVOC | Beryllium | PCBs | Asbestos |
| 551 | Below (paint)[2] | Indeterminate | Indeterminate | Indeterminate[1] | ***Above*** |
| 662 | Indeterminate | Indeterminate | Indeterminate | Indeterminate[1] | Indeterminate |
| 709 | Indeterminate | Indeterminate | Indeterminate | Indeterminate | Indeterminate |
| 910 | Below (paint)[2] | Indeterminate | Indeterminate | Indeterminate[1] | ***Above*** |
| Tent 10 + Permacon | Indeterminate | Indeterminate | ***Above (Permacon only)*** | Indeterminate | Indeterminate |
| Tent 11 + Permacon | Indeterminate | Indeterminate | Below | Indeterminate | Indeterminate |

1 Some PCB-containing ballasts exist in the lighting systems of buildings that contain fluorescent lights.

2 Debris containing Pb/metals in paint may be managed as non-hazardous (solid) waste as long as it is not scabbled or otherwise made to constitute a separate waste stream.

#### 3.3.1.1 Lead (Pb) and Other Metals in Paint

Analyses for Pb and other metals in paint were performed on Building 551 in 1998 and Building 910 in 1997. Ten paint samples in Building 551 and 11 paint samples in Building 910 were taken from walls, floors, tanks, and other surfaces, and subjected to the Toxicity Characteristic Leaching Procedure (TCLP) and total metals analysis. These results show lead and other RCRA metals in paint in these buildings (refer to Table 4-6 and Table 4-18).

#### 3.3.1.2 PCBs

Transformer T556 exists on a concrete pad 20 feet east of Building 551, and is known to have leaked oil containing PCBs directly onto the soil beneath it. It was retro-filled in 1987, and continues to leak. However, analysis of the soil in 1991 showed no significant contamination (*Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs): Preliminary Assessments/ Site Description*, EG&G).

#### 3.3.1.3 Beryllium in the 904 Pad Tents

Historical data suggest that beryllium may be present in pondcrete and saltcrete, and these wastes were handled and stored in the Pad 904 Tents and associated Permacons. RFETS has determined through process knowledge that beryllium associated with these wastes is not the chemical process powder form and therefore does not fit the criteria for a P015 RCRA listed waste. The RFETS List of Known Beryllium Areas listed the 904 Pad tents. The RFETS Chronic Beryllium Disease Prevention Program (CBDPP) has extensively sampled Tents 7 through 11 and the Permacons in Tents 10 and 11. All smear results were below the detection limit ($0.1 \mu g/100\ cm^2$).

#### 3.3.1.4 Asbestos in Buildings 551 and 910

Asbestos inspection and sampling were previously carried out on two Group A buildings. Building 551 was characterized by SITEX in 1996 and by RFETS in 1998, and results are summarized in SITEX *Asbestos Inspection and Operations and Maintenance Plan for Building 551*, Project No. 108230, and in RF/RMRS-98-272.UN, *Asbestos, Polychlorinated Biphenyls, and Paint Characterization Report, Building 551*, respectively. Bldg. 910 was characterized in 1997, and results are summarized in RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*. Additional sampling of roof material was required for both buildings.

### 3.3.2 Reconnaissance Level Characterization

Historical data and process knowledge for each of the facilities were reviewed based upon the following potential contaminants of concern: metals, volatile and semi-volatile organic chemicals, beryllium, PCBs, and asbestos. RLC data were collected only in those instances in which data gaps were identified.

Since a chromium-based fungicide was suspected of being used in the Building 709 Cooling Tower, wood slats and sludge were sampled for metals. The potential for beryllium contamination exists in areas used for storage and in units that processed solar pond water, so beryllium sampling was conducted in Buildings 551 and Bldg. 910, respectively. Finally, several buildings contain suspected asbestos-containing material, and were inspected and sampled accordingly.

#### 3.3.2.1 Metals

Historical data and process knowledge indicate the use of a hexavalent chromium-containing fungicide/algicide in the Building 709 cooling tower. Also, some of the wooden slats and beams in the tower are greenish-tinted, arsenical-treated ("wolmanized") wood, which contains chromium due to the wood treatment process. Solid waste that consists of discarded arsenical-treated wood or wood products and that exceeds the TCLP threshold for RCRA hazardous waste codes D004 through D017 is not considered hazardous waste, per 40 CFR 261.4(b)(9). However, because not all of the wood in the tower is arsenical-treated wood, it was important to assess whether or not a significant amount of chromium (i.e., above the TCLP threshold) is present from fungicide/algicide use in non-treated wood, which would not be exempt from RCRA.

Potential contamination of the wood slats and beams within this structure was examined by collecting wood chip samples from 4 separate wood beams or walls within the structure (i.e., from wolmanized and non-wolmanized wood), plus one field duplicate. Additionally, 7 samples of the sediment present in the basin at the base of the structure were collected, plus one field duplicate. All wood and sediment samples were subjected to TCLP analyses to determine content and leachability of chromium and other RCRA metals.

No further characterization for lead or other metals in paint was conducted. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, has directed that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

Because evidence of metal spills and stains were not observed during building walkdowns, no metal sampling of surfacial media was conducted during RLC. However, process and historical knowledge indicate that process, product and/or waste releases have or may have occurred on the floor/slab in the Building 551 chemical dispensary, Building 662, Building 910, and the 904 Pad tents, and therefore, VOCs/SVOCs may have permeated into the floors/slabs. However, characterization of floors/slabs (below the surface) was not within the scope of RLC, and therefore, floors/slabs were not sampled.

#### 3.3.2.2 VOCs/SVOCs

Because evidence of VOCs/SVOCs spills and stains were not observed during building walkdowns, no VOC/SVOC sampling of surfacial media was conducted during RLC. However, process and historical knowledge indicate that process, product and/or waste releases have or may have occurred on the floor/slab in the Building 551 chemical dispensary, Building 662, Building 910, and the 904 Pad tents, and therefore, VOCs/SVOCs may have permeated into the floors/slabs. However, characterization of floors/slabs (below the surface) was not within the scope of RLC, and therefore, floors/slabs were not sampled.

#### 3.3.2.3 Beryllium

Historical data and process knowledge indicate the use and storage of beryllium and beryllium-containing materials at various locations at RFETS. For example, pondcrete and saltcrete potentially containing beryllium from the solar ponds were stored in the 904 Pad tents. Because extensive beryllium surface smears from these tents and their associated Permacons were analyzed by the CBDPP, RLC did not take additional smears. However, because solar pond liquid was processed by equipment in Building 910 and no beryllium smears had been taken within the building, beryllium surface smears from three different locations within the building were taken and analyzed. Also, while no record of beryllium material storage has been located for Building 551, its use as a general warehouse with a chemical dispensary prompted collection of beryllium surface smears at three different locations within the building. Similarly, because of known waste releases in Building 662 and the potential for past storage of beryllium material, beryllium surface smears were collected at three different locations within Building 662.

#### 3.3.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. Because transformers were repaired in the Building 662 yard and PCB spills occurred in the yard, PCBs could have been tracked into Building 662 and permeated into the floor. However, characterization of floors/slabs (below the surface) was not within the scope of RLC, and therefore, floors/slabs were not sampled. Also, some PCB-containing ballasts exist in the lighting systems of buildings that have fluorescent lights, and hydraulic systems in Buildings 551 and 910 may have contained PCBs, however, there is no evidence or history of any PCB leakage/release associated with Group A buildings.

There is no reason to suspect that any specialized paints or coatings associated with PCBs were applied to any of the Group A buildings. However, even if such paints or coatings were present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, has directed that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

#### 3.3.2.5 Asbestos

Based on historical use of asbestos in various building materials, various asbestos sampling was conducted during RLC. Even though Buildings 551 and 910 had been previously inspected for asbestos, data gaps were identified, and additional sampling of roofing material was conducted. Building 662 is a steel structure built on a concrete slab with sheet metal siding and metal roof panels. Suspect ACM was identified and sampled on the interior of the building. Building 709 and its associated pump station

and water lines were inspected and sampled. The Pad 904 Tents 10 and 11 were inspected, and samples were taken of tar at the base of each tent. All pipe insulation was fiberglass.

### 3.3.3 Sampling and Field Measurement Methods, Procedures, and Equipment

#### 3.3.3.1 Chromium and Other RCRA Metals

For determination of chromium and other RCRA metal concentrations in wood slats and beams in the Building 709 Cooling Tower, wood chips were collected utilizing a drill and a spade bit as described in Section 5.1.2 of the RLCP. For determination of chromium and other RCRA metal concentrations in the Building 709 cooling tower basin sediment, sediment was collected utilizing a scoopula as described in Section 5.1.2 of the RLCP.

#### 3.3.3.2 Beryllium

For determination of surface beryllium contamination in Buildings 551, 662, and 910, judgment samples consisting of smears of 100 $cm^2$ areas were taken using Whatman 41 filter papers as described in Section 5.3.2 of the RLCP.

#### 3.3.3.3 Asbestos

For determination of asbestos in building materials, samples of materials were taken using a Wondermaker™, razor knife, or similar appropriate sampling tool as described in Section 5.5.2 of the RLCP.

### 3.3.4 Laboratory Analysis

#### 3.3.4.1 Chromium and Other RCRA Metals

Samples were analyzed by EPA SW-846 Method 1311 (Toxicity Characteristic Leaching Procedure) and Method 6010B (Inductively Coupled Plasma Atomic Emission Spectroscopy).

#### 3.3.4.2 Beryllium

Samples were analyzed by EPA SW-846 Method 3051 (Microwave-assisted Acid Digestion) and OSHA Method ID-121 (Flame Atomic Absorption Spectroscopy).

#### 3.3.4.3 Asbestos

All bulk samples collected during RLC were analyzed utilizing EPA 600/M4-82020, December 1982 (Interim Method for the Detection of Asbestos in Bulk Insulation Samples) by an NVLAP-accredited laboratory. The laboratory participates in both the NVLAP and the AIHA Bulk Asbestos Sampling Quality Assurance Programs.

# 4.0 FACILITY HAZARDS

Based on facility/process knowledge, operating and spill records, and survey and analytical data collected, radiological and chemical hazards were identified and are presented below by building. Wastes, equipment and supplies will be removed prior to project initiation, and therefore, will not present any hazards.

In general, most of the radiological survey points were below the Minimum Detectable Concentration (MDC) of the instrument. Many of the survey points were above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There were a few points that were above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Many of the radiological sample results were above the Minimum Detectable Activity (MDA) of the instrument.

Some buildings possess asbestos-containing materials. Also, some beryllium contamination was detected in the Tent 10 Permacon.

Physical hazards associated with the Group A facilities consist of those common to standard industrial environments and include hazards associated with energized systems, utilities, gas cylinders, trips and falls, and forklift operations. There are no unique hazards associated with the different facilities, except that the 709 cooling tower is an old, deteriorating structure. The structure is condemned, and no entry to the top is permitted. The wooden steps leading to the top of the structure are barricaded to deny access. The structure also presents a fire hazard. The other facilities have been relatively well maintained and are in good physical condition, and therefore, do not present hazards associated with building deterioration. Physical hazards are controlled by the Site Safety and Industrial Hygiene Program, which is based on OSHA regulations and standard industry practices.

## 4.1 Building 551

### 4.1.1 Radiological Hazards

Radiological survey results on the interior indicate that radiological hazards should be minimal. Survey results on the exterior indicate that a radiological hazard may exist on the roof and in roof drains. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

All radiological survey results on the interior of Building 551 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, the interior of Building 551 is not posted for radiological control purposes. Therefore, the contents of Building 551 and associated building materials may be considered free-releasable property or sanitary waste. However, there were three locations on the exterior of Building 551 where the radiological survey results were

elevated above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. All other radiological survey results on the exterior were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, a small portion of the exterior surface of the building is LLW, and the rest is free-releasable property or sanitary waste.

Radiological sample results for paint were elevated but were below the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors on the interior of the building can be managed as free-releasable property or sanitary waste. Pre- and post-paint sampling survey results were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Results support the decision not to radiologically post the interior of Building 551.

**Radiological Surveys**

Radiological surveys were performed in Building 551 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 7-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 62 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 22 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 31 surveys on equipment present on the floor and interior walls < 2 meters from the floor; 4) 31 surveys on equipment present > 2 meters from the floor; and 5) 30 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-1.

There are 86 radiological survey points for the interior floor and walls < 2 meters from the floor. The 1 $m^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 84 points less than the MDC of the instrument for total alpha contamination. There are nine points less than the MDC of the instrument for total beta-gamma contamination. There are four elevated total alpha survey points at 54, 90, 78 and 60 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There were 77 elevated total beta- gamma survey points ranging from 540 to 1443 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 55 combined survey points for the interior ceiling and walls > 2 meters from the floor and with interior equipment located > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are 43 points less than the MDC of the instrument for total beta-gamma contamination. There are 12 elevated total beta- gamma survey points ranging from 381 to 1053 dpm/100 $cm^2$, which are

above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

**Table 4-1 Radiological Survey Results for Building 551**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 86 | <20 | <20 | <200 | <200 | <49 | 90 | <313 | 1443 |
| Interior Ceiling & Walls > 2 meter | 55 (2) | <20 | <20 | <200 | <200 | <35 | <55 | <312 | 1053 |
| Interior Equipment on Floor & Walls < 2 meter | 33 | <20 | <20 | <200 | <200 | <60 | <60 | <313 | 1038 |
| Interior Equipment > 2 meter high | 55 (2) | <20 | <20 | <200 | <200 | <35 | <55 | <312 | 1053 |
| Exterior Walls and Roof | 30 | <20 | <20 | <200 | <200 | <43 | 228 | <311 | 1071 |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.
(2) - 55 total surveys were taken > 2 meters high. See survey results for details.

There are 33 survey points for the interior equipment on floors and walls < 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are 24 points less than the MDC of the instrument for total beta-gamma contamination. There are nine elevated total beta- gamma survey points ranging from 372 to 1038 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 30 radiological survey points for the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 25 points less than the MDC of the instrument for total alpha contamination. There are 10 points less than the MDC of the instrument for total beta-gamma contamination. There are two elevated total alpha survey points at 60 and 66 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are three elevated total alpha survey points at 102, 156 and 228 dpm/100 $cm^2$, which are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The three elevated total alpha survey points were re-surveyed and confirmed to be above the free-release criteria. There are twenty elevated total beta- gamma survey points ranging from 453 to 1071 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

## Radiological Samples

Radiological samples were taken in Building 551 per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. Ten biased paint samples were required on the floor. Pre- and post-sampling radiological surveys were taken in the areas where the paint samples were taken for both removable and total, alpha and beta-gamma contamination. Table 4-2 presents the results of the radiological samples taken in the sampling areas. Table 4-3 presents the results of the pre- and post-sampling surveys performed in the sampling areas.

### Table 4-2 Radiological Sample Results for Building 551

| Sample ID | Isotopic Sample Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | U-233/234 | | U-235 | | U-238 | | Pu-239/240 | | Am-241 | |
| | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? |
| 001.002 | 0.282 | Yes | 0.037 | No | 0.504 | Yes | 0.231 | Yes | 0.086 | No |
| 002.002 | 0.149 | Yes | 0.000 | No | 0.350 | Yes | 0.024 | No | 0.048 | No |
| 003.002 | 0.138 | Yes | -0.006 | No | 0.267 | Yes | 0.129 | Yes | 0.085 | No |
| 004.002 | 1.27 | Yes | 0.030 | No | 2.01 | Yes | 0.103 | Yes | 0.076 | No |
| 005.002 | 0.286 | Yes | 0.019 | No | 0.312 | Yes | 0.010 | No | -0.005 | No |
| 006.002 | 0.313 | Yes | -0.006 | No | 0.374 | Yes | 0.033 | No | 0.060 | No |
| 007.002 | 0.936 | Yes | 0.049 | Yes | 0.856 | Yes | 0.036 | Yes | -0.004 | No |
| 008.002 | 0.261 | Yes | 0.000 | No | 0.397 | Yes | 0.053 | No | 0.063 | Yes |
| 009.002 | 0.459 | Yes | 0.042 | No | 0.602 | Yes | 0.014 | No | 0.111 | Yes |
| 010.002 | 0.212 | Yes | 0.000 | No | 0.170 | Yes | 0.022 | No | -0.006 | No |

### Table 4-3 Radiological Survey Results for Building 551, Pre- and Post-Sampling Surveys

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Paint Sample - Pre Survey | 10 | <20 | <20 | <200 | <200 | <49 | <49 | 660 | 1443 |
| Paint Sample - Post Survey | 10 | <20 | <20 | <200 | <200 | <55 | <55 | <324 | 1674 |

Ten biased floor samples were taken. All 10 sample results are greater than the MDA of the counting instrument for U-233/234 and U-238. One sample result is greater than the MDA of the counting instrument for U-235. Four sample results are greater than the MDA of the counting instrument for Pu-239. Two sample results are greater than the MDA of the counting instrument for Am-241. A conversion of the radiochemistry results from pCi/g to dpm/100 cm$^2$ yields results approximately one order of magnitude less than free-release limits (DOE Order 5400.5 and the RFETS Radiological Control Manual) and indicate that paints within Building 551 are not radiologically contaminated (refer to Table 4-4).

## Table 4-4 Group A Buildings Paint/Surface Media Sample Results (dpm/100 cm$^2$)

| LOCATION DESCRIPTION | SAMPLE LOCATION NUMBER | SITE SAMPLE ID | NUCLIDE | pCi/g | APPROXIMATE WEIGHT (g) | APPROXIMATE SURFACE AREA (in$^2$) | INDIVIDUAL NUCLIDE (dpm/100cm$^2$) | URANIUM TOTAL (dpm/100cm$^2$) Limit=*5000* | TRANSURANIC TOTAL (dpm/100cm$^2$) Limit=*100* |
|---|---|---|---|---|---|---|---|---|---|
| BLDG 551 | from Table 4-2 | highest values of each actinide throughout sample set | U-233/234 | 1.270 | 5.00 | 20 | 10.9 | | |
| | | | U-235 | 0.049 | | | 0.4 | | |
| | | | U-238 | 0.856 | | | 7.4 | **18.7** | |
| | | | Pu-239/240 | 0.231 | | | 2.0 | | |
| | | | Am-241 | 0.111 | | | 1.0 | | **2.9** |
| BLDG 910 | from Table 4-15 | highest values of each actinide throughout sample set | U-233/234 | 0.875 | 8.00 | 20 | 7.5 | | |
| | | | U-235 | 0.066 | | | 0.6 | | |
| | | | U-238 | 1.060 | | | 9.1 | **17.2** | |
| | | | Pu-239/240 | 0.780 | | | 6.7 | | |
| | | | Am-241 | 0.527 | | | 4.5 | | **11.2** |

There are 10 pre- and post-sampling survey points. Both removable and total, alpha and beta-gamma radiological surveys were required. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There were 10 elevated total beta- gamma survey points for the pre-paint sampling survey ranging from 660 to 1443 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are two points less than the MDC of the instrument for total beta-gamma contamination for the post-paint sampling survey. There are eight elevated total beta- gamma survey points for the post-paint sampling survey ranging from 540 to 1674 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### 4.1.2 Chemical Hazards

Building 551 is a warehouse that additionally contains several offices and a chemical dispensary. Historical data show lead and other RCRA metals in paint. This does not preclude disposal of the building debris as non-hazardous (solid) wastes as long as the paint does not constitute its own waste stream (see Section 4.1.2.1). Also, the slab of the chemical dispensary could be contaminated with metals and VOCs/SVOCs. Chemical spills potentially containing these contaminants occurred in the past. No evidence of spills was observed during RLC building walkdowns, and historical spills have been cleaned up. However, residual contamination could be present below the surface, and therefore, contamination of the slab should be considered during in-process characterization. Surface smears for beryllium contamination were below free-release criteria. A transformer outside and east of the building is known from historical data to be free of PCB contamination. A hydraulic lift within the building should be evaluated for PCBs during stripout. Past and present asbestos sampling shows a significant amount of ACM throughout the building. Chemical hazards associated with Building 551 are summarized in Table 4-5.

**Table 4-5 Summary of Building 551 Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | TCLP and total metals in paint Future sampling suggested; see Section 4.1.2.1 | Historical | Below (*unless scabbled*; see Section 4.1.2.1) |
| VOC/SVOC | NA (future sampling suggested; see Section 4.1.2.2) | NA | NA |
| Beryllium | Surface smears | RLC | Below |
| PCBs | Transformer outside and east of bldg.<br><br>(Hydraulic lift should be assessed during stripout.) | Historical<br><br>NA | Below<br><br>NA |
| Asbestos | Inspection; sampling of transite, floor tile, pipe insulation, elbows, and fittings.<br><br>Sampling of south roof. | Historical<br><br>RLC | **Above**<br><br>**Above** |

NA = no analysis was performed.

### 4.1.2.1 Lead and Other RCRA Metals

Analyses for Pb in paint in Building 551 were conducted in 1998. The results are summarized in Table 4-6 and were previously reported in RF/RMRS-98-272.UN, *Asbestos, Polychlorinated Biphenyls, and Paint Characterization Report, Building 551*. Laboratory reports are attached as Appendix A.3.1.3.

Some results from toxicity characteristic leaching procedure (TCLP) analysis of paint chips are above land disposal restrictions (LDR). However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, directs that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes, and analysis for characteristics of hazardous waste derived from LBP is not a requirement for disposal. LBP debris within currently identified HCA's and LBP removed from infrastructure by scabbling will still require such analysis. **Therefore, the TCLP data given on metals analysis of paint in Building 551 apply to LDRs ONLY if the paint is to constitute its own separate waste stream.** Data for total metals analysis may be applied for Safety and Industrial Hygiene use.

**Table 4-6 Metals in Paint from Building 551**

| Paint Type | Location | Sample ID, Total Metals | Total Metals Detectable by ICP | Sample ID, TCLP Metals | Metals with TCLP result above LDR |
|---|---|---|---|---|---|
| Dark blue | South interior wall | ND | ND | 98A5236-001.007 | None |
| Light gray | Concrete walls, SW corner office area | 98A5236-002.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-002.003 | Hg, Zn |
| Light tan | Concrete walls, SW office area | 98A5236-003.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-003.003 | Hg |
| Battleship gray | Floor, S half of bldg. | 98A5236-004.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-004.003 | Pb |
| Gray - green | Columns, concrete walls, window panels, S half | 98A5236-005.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-005.003 | Hg |
| Battleship gray | Floor, N half of bldg. | 98A5236-006.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-006.003 | Pb, Zn |
| White | Drywall, office area | 98A5236-007.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-007.003 | None |
| Light blue | Concrete, outside walls of restrooms and office areas | 98A5236-015.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-015.003 | None |
| Tan-brown, textured | Exterior coating, S half of bldg | 98A5236-012.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-012.003 | None |
| Tan-yellow | Corrugated sheet metal exterior, N half of bldg | 98A5236-013.002 | As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others | 98A5236-013.002 | Zn |

As = arsenic, Ba = barium, Cd = cadmium, Cr = chromium, Pb = lead, Hg = mercury, Se = selenium, Ag = silver, other = metals not listed in 40 CFR 261.24, ND = no sample taken.

Because no evidence of chemical spills was observed, and media sampling of the slab (or ground floor when such is equivalent to the slab) was not considered within the scope of RLC for Group A buildings, no additional metals characterization was conducted during RLC. However, it is recommended that additional characterization of the chemical dispensary floor/slab be conducted for metals during in-process characterization. Chemicals containing metals could have been spilled in the past.

#### 4.1.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the chemical dispensary floor/slab be conducted for VOCs/SVOCs during in-process characterization. Chemicals containing VOCs/SVOCs could have been spilled in the past.

#### 4.1.2.3 Beryllium

Surface smear samples were taken from interior locations not likely to be cleaned by housekeeping. Two were taken in the chemical dispensary (one in a corner on the floor, and one from the top of a door assembly) and one from the surface of a pipe assembly on the east wall of the north warehouse area (Room 111). All yielded non-detect results (i.e., $\leq$ 0.1 µg/100 $cm^2$). The DOE free-release criterion is 0.2 µg/100 $cm^2$. Laboratory data from these analyses and a map of sample coordinates are included as Appendix A.4.1.4 and A.4.1.2, respectively.

#### 4.1.2.4 PCBs

Transformer T556 exists on a concrete pad 20 feet east of Building 551, and is known to have leaked PCB-containing oil directly onto the soil beneath it (see Appendix A.3.2). It was retro-filled in 1987, and continues to leak. However, analysis of the soil in 1991 showed no significant contamination (*Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs): Preliminary Assessments/ Site Description*, EG&G).

There is a hydraulic lift at Door 11D that may contain PCB oil. It is recommended that this unit be analyzed for PCB-containing oil during stripout.

#### 4.1.2.5 Asbestos

Asbestos inspection and sampling were carried out on Building 551 by SITEX in 1996, and additional inspections were performed in 1998 and as part of this RLC.

The SITEX inspection report is attached as Appendix G. It revealed:

- asbestos-containing cemetitious board in the office area at the southern-most end of the building (total of 425 $ft^2$);
- 850 $ft^2$ of asbestos-containing floor tile under the carpet in Rooms 105, 105A, and 106;
- 1,116 linear ft of asbestos-containing pipe insulation throughout the structure; and
- 339 asbestos-containing pipe fittings and elbows throughout the structure.

The 1998 RFETS inspection (Appendix G) assumed the following to be asbestos-containing without sampling:

- approximately 3,500 $ft^2$ of cementitious board located in 22 window openings in the south half of the building;

- 200 linear ft of pipes and insulation associated with the HVAC system in the north end of the building.

Additionally, drywall, tape, and joint compound were sampled from three areas, and found **NOT** to be asbestos-containing:

- Room 109, NW office, SE corner, 4 ft from floor;
- Room 109, W main office, W wall, 3 ft S of NW corner, 4 ft from floor; and,
- Room 201, S wall, 20 ft E of W wall, 5 ft from floor.

Finally, during this RLC, the following was found (report attached as Appendix G):

- 1 of 4 samples from the south roof (24,000 $ft^2$) was asbestos-containing (10% chrysotile in the black tar); and
- All 3 flashing samples were asbestos-containing in the black tar layer. Two were 10% chrysotile, while the third was 25% chrysotile.

The total estimated volume of ACM is thus: 24,000 $ft^2$ roofing; 3,925 $ft^2$ cementitious wall; 1,316 linear ft pipe insulation; 855 $ft^2$ floor tile; and 334 elbows and fittings.

## 4.2 Building 662

### 4.2.1 Radiological Hazards

Radiological survey results on the interior indicate that radiological hazards should be minimal, except for the west-central portion of the floor where fixed alpha contamination was indicated. Survey results on the exterior indicate that a radiological hazard may exist on the roof perimeter. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

Most radiological survey results on the interior of Building 662 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, the interior of Building 662 is not posted for radiological control purposes. Therefore, the contents of Building 662 and associated building materials (except the west-central portion of the floor) can be considered free-releasable property or sanitary waste. There are four locations on the exterior of Building 662 (on the roof perimeter) where the radiological survey results are elevated above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. All other radiological survey results on the exterior are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, a small portion of the metal panels on the exterior of the building is LLW, and the rest is free-releasable property or sanitary waste.

No radiological samples were required for Building 662.

## Radiological Surveys

Radiological surveys were performed on Building 662 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required for both removable and total, alpha and beta-gamma contamination: 1) 32 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 15 surveys on equipment present on the floor and interior walls < 2 meters from the floor; 4) 15 surveys on equipment present > 2 meters from the floor; and 5) 34 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-7.

**Table 4-7 Radiological Survey Results for Building 662**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 32 | <20 | <20 | <200 | <200 | <49 | 288 | <322 | 1116 |
| Interior Ceiling & Walls > 2 meter | 10 | <20 | <20 | <200 | <200 | <43 | <43 | <316 | <316 |
| Interior Equipment on Floor & Walls < 2 meter | 15 | <20 | <20 | <200 | <200 | <49 | <49 | <322 | <322 |
| Interior Equipment > 2 meter high | 15 | <20 | <20 | <200 | <200 | <43 | <43 | <316 | <316 |
| Exterior Walls and Roof | 34 | <20 | <20 | <200 | <200 | <43 | 330 | <316 | <316 |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

There are 32 radiological survey points for the interior floor and walls < 2 meters from the floor. The 1 $m^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 29 points less than the MDC of the instrument for total alpha contamination. There are 10 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total alpha survey points at 96 dpm/100 $cm^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological

Control Manual. There are two total (fixed) alpha survey points at 126 and 288 dpm/100 $cm^2$ that are above the contamination limits. The two survey points were re-surveyed and confirmed above the free-release criteria. There are 22 elevated total beta-gamma survey points ranging from 342 to 1116 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 10 radiological survey points on the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 15 radiological survey points for the interior equipment located on the floor and walls < 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 15 radiological survey points for the interior equipment located > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 34 radiological survey points on the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total beta-gamma contamination. There are 15 points less than the MDC of the instrument for total alpha contamination. There are 15 elevated total alpha survey points ranging from 48 to 96 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are four elevated total alpha survey points at 210, 226, 232 and 330 dpm/100 $cm^2$, which are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The four elevated total alpha survey points were re-surveyed and confirmed above the free-release criteria.

### 4.2.2 Chemical Hazards

Building 662 is a steel structure built on a concrete slab with sheet metal siding and metal roof panels. It is presently used by electricians as an office and equipment storage area. Because no evidence of chemical spills were observed during RLC building walkdowns and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, sampling and analysis for metals, VOCs/SVOCs and PCBs were not conducted during this RLC. Also, part of the floor was covered. However, based on the building history, it is recommended that additional characterization of the floor/slab be conducted for metals, VOCs/SVOCs and PCBs during in-process and environmental restoration characterization. Beryllium surface samples yielded non-detect results. No asbestos-containing material was identified. Chemical hazards associated with Building 662 are summarized in Table 4-8.

#### 4.2.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, sampling and analysis for metals were not conducted during this RLC. Also, part of the floor was covered. However, based on the building history, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process and environmental restoration characterization.

Any LBP debris from Building 662 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

**Table 4-8 Summary of Building 662 Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | NA (future sampling suggested; see Section 4.2.2.1) | NA | NA |
| VOC/SVOC | NA (future sampling suggested; see Section 4.2.2.2) | NA | NA |
| Beryllium | Surface smears | RLC | Below |
| PCBs | NA (future sampling suggested; see Section 4.2.2.4) | NA | NA |
| Asbestos | Inspection; sampling of floor tile, ceiling tile, and drywall. | RLC | Below |

NA = no analysis was performed.

#### 4.2.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, sampling and analysis for VOCs/SVOCs were not conducted during this RLC. Also, part of the floor was covered. However, based on the building history, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process and environmental restoration characterization.

#### 4.2.2.3 Beryllium

Surface smear samples were taken from interior locations not likely to be cleaned by housekeeping. One was taken from the top surface of a locker on the north side of the building, one from the top of a light fixture, and a third from the top surface of a tall office partition on the south side of the building. All yielded non-detect results (i.e., $\leq 0.1$ µg/100 $cm^2$). The DOE free-release criterion is 0.2 µg/100 $cm^2$. Laboratory data from these analyses and a map of sample coordinates are included as Appendix B.3.1.4 and B.3.1.2, respectively.

#### 4.2.2.4 PCBs

Media sampling of the slab (or ground floor when such is equivalent to the slab) was not considered within the scope of RLC for Group A buildings. However, due to PCB spill incidents in the yard and the fact that transformers were repaired in the yard, PCBs could have been tracked inside onto the floor. Therefore, it is recommended that samples be taken from the floor/slab inside the building and analyzed for PCBs during in-process characterization. The floor has been painted and parts are covered with tile.

#### 4.2.2.5 Asbestos

No asbestos-containing material was identified. Three suspect asbestos containing materials (ACM) were sampled:

- Three samples of 12 in x 12 in white floor tile with yellow mastic were collected. No asbestos was detected.
- Three samples of 2 ft x 4 ft white ceiling tile were collected. No asbestos was detected.
- Three drywall samples were collected. No asbestos was detected.

## 4.3 Building 709

### 4.3.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal. Radiological sample results show that a radiological hazard may exist because uranium results exceed background limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

All radiological survey results on the interior and exterior of Building 709 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, Building 709 is not posted for radiological control purposes. Therefore, the contents of Building 709 and associated building materials may be considered free-releasable property or sanitary waste.

Radiological sample results were elevated above the MDA of the counting instrument for U-233/234, U-235, U-238, Pu-239/240 and Am-241 in all or a portion of the basin sediment samples. Radiological sample results are above the background range for sediments, subsurface soils or surface soils for U-233/234, U-235, U-238, Pu-239/240 and Am-241 in all or a portion of the basin sediment samples. Therefore, the sediment is considered LLW. Pre-sediment sampling survey results are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Post-sediment sampling survey results are not available due to standing water.

## Radiological Surveys

Radiological surveys were performed on Building 709 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; and 3) 30 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-9.

**Table 4-9 Radiological Survey Results for Building 709**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 31 | <20 | <20 | <200 | <200 | <49 | 60 | <307 | 2055 |
| Interior Ceiling & Walls > 2 meter | 10 | <20 | <20 | <200 | <200 | <59 | <59 | <316 | <316 |
| Exterior Walls and Roof | 30 | <20 | <20 | <200 | <200 | <59 | <59 | <316 | 1137 |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

There are 31 radiological survey points for the interior concrete floor and walls < 2 meters from the floor. The 1 $m^2$ scan around each survey point is below the MDC of the survey instrument. Due to standing water in the cooling tower, the 10 pre-sampling surveys were used to satisfy this survey requirement. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 27 points less than the MDC of the instrument for total alpha contamination. There are 20 points less than the MDC of the instrument for total beta-gamma contamination. There are three elevated total alpha survey points at 54, 54 and 60 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 10 elevated total beta-gamma survey points ranging from 915 to 2055 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 10 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 30 radiological survey points of the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are 25 points less than the MDC of the instrument for total beta-gamma contamination. There are five elevated total beta-gamma survey points ranging from 357 to 1137 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### Radiological Samples

Radiological samples were taken in Building 709 per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. Six sediment samples were required from the concrete floor for radiological analysis. Pre- and post-sampling surveys were taken in the area where the sediment samples were taken for both removable and total, alpha and beta-gamma contamination. Table 4-10 presents the results of the radiological samples taken in the sampling areas. Table 4-11 presents the results of the pre- and post-sampling surveys performed in the sampling areas.

**Table 4-10 Radiological Sample Results for Building 709**

| Sample ID | Sediment Isotopic Sample Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | U-233/234 | | U-235 | | U-238 | | Pu-239/240 | | Am-241 | |
| | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? |
| 006.003 | 4.99 | Yes | 0.219 | Yes | 3.96 | Yes | 0.151 | Yes | 0.167 | Yes |
| 007.003 | 8.13 | Yes | 0.345 | Yes | 8.24 | Yes | 0.260 | Yes | 0.118 | Yes |
| 008.003 | 5.14 | Yes | 0.218 | Yes | 4.16 | Yes | 0.055 | No | 0.151 | Yes |
| 009.003 | 4.59 | Yes | 0.000 | No | 3.24 | Yes | 0.177 | Yes | 0.079 | No |
| 010.003 | 4.14 | Yes | 0.294 | Yes | 3.92 | Yes | 0.051 | Yes | 0.031 | No |
| 012.003 | 4.38 | Yes | 0.145 | Yes | 4.20 | Yes | 0.101 | Yes | 0.113 | Yes |

**Table 4-11 Radiological Survey Results for Building 709, Pre- and Post-Sampling Surveys**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Sediment Sample - Pre Survey | 7 | <20 | <20 | <200 | <200 | <49 | 60 | <307 | 2055 |
| Sediment Sample - Post Survey | 0 (1) | NA | NA | NA | NA | NA | NA | NA | NA |

(1) - Post surveys were not performed in the sediment sampling areas due to rain accumulation in the concrete basin. Radiological surveys taken on the concrete lip of the basin could be used as a surrogate for these surveys.

(2) – NA – not available

Some of the sediment sample results exceeded the background upper limits (mean plus two standard deviations) for sediments, subsurface soils and surface soils in 3-PRO-140-RSP-09.03, *Unrestricted Release of Bulk or Volume Material* (based on the *RFETS Geochemical Characterization Report*, 9/30/93). Even though some results are within the background range for sediments, they exceed the range for subsurface and surface soils, and therefore, indicate radiological contamination per the procedure.

For purposes of comparison, 3-PRO-140-RSP-09.03, *"Unrestricted Release of Bulk or Volume Material,"* presents the upper level of the background range of stream sediments, subsurface soils and surficial soils for U-233/234, U-235, U-238, Pu-239/240 and Am-241. For stream sediments this upper level is 3.967, 0.158, 3.461, 3.757 and 1.141 pCi/g for U-233/234, U-235, U-238, Pu-239/240 and Am-241, respectively. For subsurface soils this upper level is 2.64, 0.12, 1.49, 0.02 and 0.02 pCi/g for U-233/234, U-235, U-238, Pu-239/240 and Am-241, respectively. For surface soils this upper level is 2.253, 0.094, 2.000, 0.066 and 0.0227 pCi/g for U-233/234, U-235, U-238, Pu-239/240 and Am-241, respectively.

There are seven pre-sampling survey points for the sediment sampling. Removable and total, alpha and beta-gamma radiological surveys were required. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are four total alpha survey points that are below the MDC of the instrument. There are three elevated total alpha survey points ranging from 54 to 60 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There is one point less than the MDC of the instrument for total beta-gamma contamination. There are six elevated total beta-gamma survey points ranging from 1647 to 2055 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### 4.3.2 Chemical Hazards

Building 709 is a cooling tower constructed primarily of wood. Adjacent to the building is a pump station with insulated pipelines and several large insulated water lines. It was suspected that a chromium-based anti-fungal agent was used to treat the tower periodically and that the wood could be contaminated with chromium. Also, some of the wood appeared to have been treated with an arsenic compound. However, no chromium or arsenic contamination was found above hazardous waste thresholds in wood-core samples or sediment samples from the bottom of the tower. Also, historical data and process knowledge give no reason to suspect contamination by VOCs/SVOCs, beryllium, or PCBs. The tower itself contains no ACM, but asbestos-containing insulation was found on the insulated lines leading from the pump station. Chemical hazards associated with Building 709 are summarized in Table 4-12.

**Table 4-12 Summary of Bldg. 709 Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | TCLP of wood-core samples from cooling tower slats | RLC | Below |
| | TCLP of sediment at base of tower | RLC | Below |
| VOC/SVOC | NA | NA | NA |
| Beryllium | NA | NA | NA |
| PCBs | NA | NA | NA |
| Asbestos | Inspection; Sampling of pipe insulation from pipes leading to pump station on exterior of tower. | RLC | ***Above*** |

NA = no analysis was performed.

#### 4.3.2.1 Chromium and Other RCRA Metals (Including Lead)

Potential chromium and arsenic contamination of the wood slats and beams within the Building 709 Cooling Tower was examined by collecting wood-chip samples from four separate wood beams and walls within the structure, plus one field duplicate (Appendix C.2.1). Samples from both greenish, arsenical-treated wood and wood without a noticeable green tint were collected. TCLP results for chromium ranged from 23 to 3,900 µg/L, all less than the 5,000 µg/L regulatory level in 40 CFR 261.24 (Table 4-13). A water rinsate sample of the bit used to collect the wood samples contained 1.40 µg/L chromium. Likewise, levels of arsenic and other RCRA metals were below regulatory limits (i.e., 5,000 µg/L for arsenic).

Potential chromium and arsenic contamination of the Building 709 cooling tower basin sediment was examined by collecting seven samples of the sediment in the basin at the base of the structure, plus one field duplicate (Appendix C.2.1). TCLP results for chromium ranged from 30 to 147 µg/L, all less than the 5,000 µg/L regulatory level given by 40 CFR 261.24 (Table 4-13). A water rinsate sample of the scoopula used to collect the sediment samples contained no detectable chromium. Likewise, levels of arsenic and other RCRA metals were below regulatory limits (i.e., 5,000 µg/L for arsenic).

Any LBP debris from the Building 709 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

**Table 4-13 TCLP Metal Results for Building 709 Cooling Tower**

| Description | Sample ID | Chromium (µg/L) | Arsenic (µg/L) |
|---|---|---|---|
| Wood chips: | | | |
| West panel wall | 99A6333-001.002 | 3350 | 1840 |
| West beam, not green tint | 99A6333-002.002 | 23 | 137 |
| East beam, green tint | 99A6333-003.002 | 1750 | 1040 |
| East panel wall | 99A6333-004.002 | 3050 | 1780 |
| Field duplicate of 99A6333-004.002 | 99A6333-005.002 | 3900 | 2140 |
| Water rinsate sample of drill bit used to collect samples | 99A6333-014.002 | 1.40 | ND |
| | | | |
| Cooling tower sediment | 99A6333-006.002 | 30 | 1610 |
| " | 99A6333-007.002 | 30.8 | 1930 |
| " | 99A6333-008.002 | 82.1 | 1710 |
| " | 99A6333-009.002 | 110 | 3690 |
| " | 99A6333-010.002 | 62.3 | 3130 |
| " | 99A6333-011.002 | 143 | 3700 |
| Field duplicate of 99A6333-011.002 | 99A6333-013.002 | 147 | 3490 |
| Water rinsate sample of scoop used to collect sediment samples | 99A6333-015.002 | ND | ND |

ND = not detected

#### 4.3.2.2 VOCs/SVOCs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for VOCs/SVOCs to be present, therefore no sampling and analysis was conducted.

#### 4.3.2.3 Beryllium

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for beryllium to be present, therefore no sampling and analysis was conducted.

#### 4.3.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, therefore no sampling and analysis was conducted.

#### 4.3.2.5 Asbestos

No suspect ACM was present on the Building 709 structure. However, adjacent to the structure are several large insulated water lines and a pump station with insulated pipelines. Samples were collected from the thermal systems insulation (TSI) on the pipelines, and 3 of 5 of these samples had positive detections for asbestos. All TSI should be considered asbestos-containing. The total estimated volume of ACM is approximately 30 linear ft of asbestos-containing TSI.

## 4.4 Building 910

### 4.4.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal because no survey or sample results exceeded free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

All radiological survey results on the interior and exterior of Building 910 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, Building 910 is not posted for radiological control purposes. Therefore, the contents of Building 910 and associated building materials may be considered free-releasable property or sanitary waste.

Radiological sample results for paint were below the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, floors can be managed as free-releasable property or sanitary waste. Pre- and post- paint sampling survey results were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Results support the decision not to radiologically post the interior of Building 910

**Radiological Surveys**

Radiological surveys were performed on Building 910 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 60 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 20 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 30 surveys on equipment

present on the floor and interior walls < 2 meters from the floor; 4) 30 surveys on equipment present > 2 meters from the floor; and 5) 30 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-14.

There are 60 radiological survey points on the interior floor and walls < 2 meters from the floor. The 1 $m^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are three points less than the MDC of the instrument for total beta-gamma contamination. There are 57 elevated total beta-gamma survey points ranging from 378 to 1278 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

**Table 4-14 Radiological Survey Results for Building 910**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 60 | <20 | <20 | <200 | <200 | <59 | <60 | <323 | 1278 |
| Interior Ceiling, Walls & Equipment > 2 meter | 50 | <20 | <20 | <200 | <200 | <43 | 90 | <307 | 1047 |
| Interior Equipment on Floor & Walls < 2 meter | 15 | <20 | <20 | <200 | <200 | <59 | 66 | <323 | <323 |
| Exterior Walls and Roof | 30 | <20 | <20 | <200 | <200 | <34 | 90 | <303 | 1101 |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

There are 50 combined survey points for the interior ceiling and walls > 2 meters from the floor and with interior equipment located > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There were 43 points less than the MDC of the instrument for total alpha contamination. There are 25 points less than the MDC of the instrument for total beta-gamma contamination. There are seven elevated total alpha survey points ranging from 48 to 90 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 25 elevated total beta-gamma survey points ranging from

366 to 1047 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 15 radiological survey points on the interior equipment on floor and walls < 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total beta-gamma contamination. There are 14 points less than the MDC of the instrument for total alpha contamination. There is one elevated total alpha survey point at 66 dpm/100 $cm^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 30 radiological survey points for the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 17 points less than the MDC of the instrument for total alpha contamination. There are eight points less than the MDC of the instrument for total beta-gamma contamination. There are 13 elevated total alpha survey points ranging from 42 to 90 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 17 elevated total beta- gamma survey points ranging from 477 to 1101 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

**Radiological Samples**

Radiological samples were taken in Building 910 per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. Thirty paint samples in total were required on and in the building. Ten paint samples were taken outside the building, and 20 paint samples were taken on the interior floors. Pre- and post-sampling surveys were taken in the areas where the paint samples were taken for both removable and total, alpha and beta-gamma contamination. Table 4-15 presents the results of the radiological samples taken in the sampling areas. Table 4-16 presents the results of the pre- and post-sampling surveys performed in the sampling areas.

## Table 4-15 Radiological Sample Results for Building 910

| Sample ID | Isotopic Sample Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | U-233/234 | | U-235 | | U-238 | | Pu-239/240 | | Am-241 | |
| | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? | Activity (pCi/g) | Result > MDA? |
| 001.002 | 0.606 | Yes | 0.018 | No | 0.651 | Yes | 0.780 | Yes | 0.266 | Yes |
| 002.002 | 0.640 | Yes | 0.056 | Yes | 0.517 | Yes | 0.125 | Yes | 0.107 | No |
| 003.002 | 0.495 | Yes | 0.017 | No | 0.480 | Yes | 0.047 | Yes | 0.041 | No |
| 004.002 | 0.669 | Yes | 0.019 | No | 0.870 | Yes | 0.053 | Yes | 0.185 | Yes |
| 005.002 | 0.735 | Yes | 0.009 | No | 0.727 | Yes | 0.054 | Yes | 0.100 | No |
| 006.002 | 0.875 | Yes | 0.046 | Yes | 1.06 | Yes | 0.020 | No | 0.034 | No |
| 007.002 | 0.513 | Yes | 0.047 | Yes | 0.486 | Yes | 0.080 | Yes | 0.080 | No |
| 008.002 | 0.475 | Yes | 0.029 | No | 0.520 | Yes | 0.078 | No | 0.240 | Yes |
| 009.002 | 0.731 | Yes | 0.000 | No | 0.864 | Yes | 0.024 | No | 0.123 | Yes |
| 010.002 | 0.415 | Yes | 0.016 | No | 0.546 | Yes | 0.053 | No | 0.073 | No |
| 011.002 | 0.178 | Yes | 0.048 | Yes | 0.438 | Yes | 0.157 | Yes | 0.527 | Yes |
| 012.002 | 0.179 | Yes | 0.000 | No | 0.083 | Yes | 0.190 | Yes | 0.097 | No |
| 013.002 | 0.120 | Yes | 0.015 | No | 0.099 | Yes | 0.207 | Yes | 0.043 | No |
| 014.002 | 0.282 | Yes | 0.020 | No | 0.271 | Yes | 0.014 | No | 0.008 | No |
| 015.002 | 0.381 | Yes | 0.016 | No | 0.294 | Yes | 0.100 | Yes | -0.033 | No |
| 016.002 | 0.390 | Yes | 0.000 | No | 0.624 | Yes | 0.247 | Yes | -0.045 | No |
| 017.002 | 0.205 | Yes | 0.016 | No | 0.126 | Yes | 0.170 | Yes | 0.210 | Yes |
| 018.002 | 0.229 | Yes | 0.047 | Yes | 0.139 | Yes | 0.042 | No | 0.140 | No |
| 019.002 | 0.164 | Yes | 0.017 | No | 0.212 | Yes | 0.035 | No | 0.030 | No |
| 020.002 | 0.166 | Yes | 0.000 | No | 0.250 | Yes | 0.543 | Yes | 0.490 | Yes |
| 021.002 | 0.414 | Yes | 0.019 | No | 0.278 | Yes | 0.000 | No | 0.028 | No |
| 022.002 | 0.171 | Yes | 0.017 | No | 0.197 | Yes | 0.272 | Yes | -0.038 | No |
| 023.002 | 0.134 | Yes | 0.000 | No | 0.401 | Yes | -0.013 | No | 0.074 | No |
| 024.002 | 0.047 | No | 0.016 | No | 0.091 | Yes | 0.199 | Yes | 0.004 | No |
| 025.002 | 0.188 | Yes | 0.000 | No | 0.138 | Yes | 0.010 | No | 0.074 | No |
| 026.002 | 0.214 | Yes | 0.000 | No | 0.184 | Yes | 0.071 | Yes | 0.045 | No |
| 027.002 | 0.242 | Yes | 0.016 | No | 0.150 | Yes | 0.054 | No | -0.021 | No |
| 028.002 | 0.099 | Yes | 0.000 | No | 0.098 | Yes | 0.019 | No | -0.013 | No |
| 029.002 | 0.148 | Yes | 0.066 | Yes | 0.147 | Yes | 0.021 | No | -0.033 | No |
| 030.002 | 0.151 | Yes | 0.000 | No | 0.071 | Yes | 0.144 | Yes | 0.090 | No |

## Table 4-16 Radiological Survey Results for Building 910, Pre- and Post-Sampling Surveys

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Paint Sample - Pre Survey | 30 | <20 | <20 | <200 | <200 | <49 | 78 | 327 | 1167 |
| Paint Sample - Post Survey | 30 | <20 | <20 | <200 | <200 | <52 | <67 | <315 | 671 |

The results for these paint samples indicate that all 30 sample results exceed the MDA of the counting instrument for U-238. Twenty nine sample results exceed the MDA of the counting instrument for U-233/234. Six sample results exceed the MDA of the counting instrument for U-235. Seventeen sample results exceed the MDA of the counting instrument for Pu-239/240. Seven sample results exceed the MDA of the counting instrument for Am-241. A conversion of the radiochemistry results from pCi/g to dpm/100 cm$^2$ yields results approximately one order of magnitude less than free-

release limits (DOE Order 5400.5 and the RFETS Radiological Control Manual) and indicates that paints within Building 910 are not radiologically contaminated (refer to Table 4-4).

There were 30 pre- and post-sampling survey points. Both removable and total, alpha and beta-gamma radiological surveys were required. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 23 points less than the MDC of the instrument for total alpha contamination for the pre-paint sampling survey. No points are less than the MDC of the instrument for total beta-gamma contamination for the pre-paint sampling survey. There are 30 points less than the MDC of the instrument for total alpha contamination. There are 18 points less than the MDC of the instrument for total beta-gamma contamination. There are seven elevated total alpha survey points ranging from 54 to 78 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 30 elevated total beta-gamma survey points for the pre-paint sampling survey ranging from 327 to 1167 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 12 elevated total beta-gamma survey points ranging from 436 to 671 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### 4.4.2 Chemical Hazards

Building 910 is a chemical treatment facility that additionally contains several offices. Historical data show lead and other RCRA metals in paint, although this does not preclude disposal of the building debris as non-hazardous (solid) wastes, as long as the paint does not constitute its own waste stream (see Section 4.3.4.1). Surface smears for beryllium contamination were below present DOE free-release criteria. Historical and process knowledge gives no reason to suspect PCB contamination. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC building walkdowns, but contamination of the floor/slab should be considered during in-process characterization. No signs of spills were observed, but residual contamination from any historical release could be present below the surface (i.e., outside the scope of RLC). Thermal systems insulation throughout the building was inspected and assumed to be asbestos-containing without sampling. Chemical hazards associated with Building 910 are summarized in Table 4-17.

#### 4.4.2.1 Lead and Other RCRA Metals

Analyses for Pb in paint in Building 910 were previously conducted in 1997 and were reported in RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*. Laboratory reports are attached as Appendix D.2.1 and are summarized in Table 4-18.

Some results from TCLP analysis of paint chips are above LDR. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, directs that LBP debris generated outside of currently

identified high contamination areas shall be managed as non-hazardous (solid) wastes, and analysis for characteristics of hazardous waste derived from LBP is not a requirement for disposal. LBP debris within currently identified high contamination areas and LBP removed from infrastructure by scabbling will still require such analysis. **Therefore, the TCLP data given on metals analysis of paint in Bulding 910 apply to LDRs ONLY if the paint is to constitute its own separate waste stream.** Data for total metals analysis may be applied for Safety and Industrial Hygiene use.

**Table 4-17 Summary of Building 910 Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | TCLP and total metals in paint (future sampling suggested; see Section 4.4.2.1) | Historical | Below (*unless scabbled*; see Section 4.4.2.1) |
| VOC/SVOC | NA (future sampling suggested; see Section 4.4.2.2) | NA | NA |
| Beryllium | Surface smears | RLC | Below |
| PCBs | NA | NA | NA |
| Asbestos | Inspection; thermal systems insulation throughout the building was inspected and assumed to be asbestos-containing without sampling<br><br>Roof inspection and sampling | Historical<br><br>RLC | ***Above***<br><br>Below. |

NA = no analysis was performed.

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no additional metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Chemicals containing metals could have been spilled/released in the past.

#### 4.4.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Chemicals containing VOCs/SVOCs could have been spilled/released in the past.

#### 4.4.2.3 Beryllium

Surface smear samples were taken from interior locations not likely to be cleaned by housekeeping. One was taken on skids beneath machinery on the first floor, another was taken in the basement on the floor near a drain, and a third was taken on the surface of piping and machinery with spill stains, located on the east side of the basement. All yielded non-detect results (i.e., $\leq$ 0.1 µg/100 $cm^2$). The DOE free-release criterion is 0.2 µg/100 $cm^2$. Laboratory data from these analyses and a map of sample coordinates are included as Appendix D.3.1.4 and D.3.1.2, respectively.

**Table 4-18 Metals in Paint from Building 910**

| Paint Type | Location | Sample ID, Total Metals | Total Metals Detectable by ICP | Sample ID, TCLP Metals | Metals with TCLP result above LDR |
|---|---|---|---|---|---|
| Blue over red primer | Basement, N central, NDT tank 1523, W side, 3 locations on tank post and base | 98A1506-001 | Ba, Cr, Pb | X-98A1506-001 | None |
| Tan over red primer | Metal, basement, E central, NDT tank 1535, S side, 3 locations on tank, post, and base | 98A1506-002 | Cr, Pb | X-98A1506-002 | Cr |
| Green over red primer | Metal, basement, S central, NDT tank 1531, W side, 3 locations on tank, post, and base | 98A1506-003 | Pb | X-98A1506-003 | None |
| Grey over red primer | Metal, basement, NW, NDT tank 1524 stanchion, far S post | 98A1506-004 | Cr, Pb | X-98A1506-004 | Cr |
| Yellow over red primer | Metal, W basement stairs, S side at base | 98A1506-005 | Cr, Pb | X-98A1506-005 | Pb |
| Gray | Concrete basement floor | 98A1506-006 | Ba | X-98A1506-006 | None |
| White | Concrete basement wall, W wall, 15' N of SW corner, 4' from floor | 98A1506-007 | None | X-98A1506-007 | None |
| Off-white | Exterior cinder block, S wall, 15' E of SW corner, 4' from ground | 98A1506-008 | None | X-98A1506-008 | None |
| Brown-red | Sheet metal, exterior of Gen 3, S side of 910, 2' W of SE corner, 4' from base | 98A1506-009 | Cr, Pb | ND | ND |
| White, textured | On foam insulation, Tank 215D, W of 910, E side at base | 98A1506-010 | Hg (by cold vapor AA) | X-98A1506-010 | None |
| White, textured | On foam insulation, Tank 215D, W of 910, E side at base | 98A1506-011 (duplicate of 98A1506-010) | None | X-98A1506-011 (duplicate of X-98A1506-010) | None |

As = arsenic, Ba = barium, Cd = cadmium, Cr = chromium, Pb = lead, Hg = mercury, Se = selenium, Ag = silver, other = metals not listed in 40 CFR 261.24, ND = none detected.

#### 4.4.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

#### 4.4.2.5 Asbestos

Asbestos inspection and sampling were performed on Building 910 in a 1997 inspection (RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*) and as part of this RLC. Results are summarized in Table 4-19. The total estimated volume of ACM is approximately 700 linear ft of asbestos-containing TSI.

**Table 4-19 Asbestos Inspection Data from Building 910**

| Description and Location | Asbestos Analysis Result |
|---|---|
| **From 1997 inspection (RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*):** | |
| 700 linear feet of vapor barrier mastic coating on the thermal systems insulation on pipes associated with the steam heating system | Assumed to be asbestos-containing and not sampled; EPA/AHERA hazard assessment category "Thermal systems insulation in good condition," September, 1998 |
| Drywall, tape, and joint compound; from N wall of Room 102, 3 locations | No asbestos |
| Mudded joints, end caps, and tank insulation, 7 locations | No asbestos |
| Floor filler and carpet adhesive under carpeting in Room 102 | No asbestos |
| Tan brushed textured skim, surface of exterior wall cinderblock, 5 locations, including penetration into cinderblock to determine presence of loose filler | No asbestos |
| Rubberized wall / pipe penetration filler | No asbestos |
| Foam tank insulation and textured coating on exterior of Tank 215-D | No asbestos |
| **From RLC inspection:** | |
| Roof material: East end, center | No asbestos |
| Roof material: Center of roof | No asbestos |
| Roof material: West end, center | No asbestos |

## 4.5 904 Pad - Tent 10

### 4.5.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal because survey and sample results do not exceed free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

Radiological survey results on the interior and exterior of the 904 Pad - Tent 10 were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Tent 10 is free-releasable property or sanitary waste.

No radiological samples were required for the 904 Pad - Tent 10.

**Radiological Surveys**

Radiological surveys were performed on the 904 Pad - Tent 10 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 30 surveys on equipment present > 2 meters from the floor; and 4) 30 surveys on exterior walls and top of the tent. Survey results are summarized in Table 4-20.

**Table 4-20 Radiological Survey Results for 904 Pad - Tent 10**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 30 | <20 | 78 | <200 | <200 | <63 | 600 | <300 | 1641 |
| Interior Ceiling & Walls > 2 meter | 11 | <20 | <20 | <200 | <200 | <51 | <51 | <306 | <306 |
| Interior Equipment > 2 meter high | 33 | <20 | <20 | <200 | <200 | <51 | <51 | <306 | <306 |
| Exterior Walls and Roof | 30 | <20 | <20 | <200 | <200 | <43 | 78 | <321 | 486 |

(1) - Both Total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

There are 30 radiological survey points for the interior asphalt floor and tent walls < 2 meters from the floor. The 1 m$^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable beta-gamma contamination. There are 29 points less than the MDC of the instrument for removable alpha contamination. There is one elevated removable alpha survey reading at 78 dpm/100 cm$^2$, which is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 29 points less than the MDC of the instrument for total alpha contamination. There is one elevated total alpha survey reading at 600 dpm/100 cm$^2$, which is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are nine points less than the MDC of the instrument for total beta-gamma contamination. There are 21 elevated total beta- gamma survey points ranging from 360 to 1641 dpm/100 cm$^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The elevated removable and total alpha survey data points (same location) were re-surveyed, and results were below contamination limits and MDC. Therefore, the survey results indicate no radiological contamination.

There are 11 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 33 radiological survey points for the interior equipment > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 30 radiological survey points for the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 24 points less than the MDC of the instrument for total alpha contamination. There are six elevated total alpha survey points ranging from 48 to 78 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 29 points less than the MDC of the instrument for total beta-gamma contamination. There was one elevated total beta-gamma survey point of 486 dpm/100 $cm^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### 4.5.2 Chemical Hazards

The 904 Pad Tent 10 was used as a storage area for pondcrete and saltcrete. It contains a Permacon, which is evaluated separately in Section 4.6.2. Surface smears for beryllium were conducted by the Chronic Beryllium Disease Prevention Program (CBDPP), and no beryllium was found. Historical and process knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor/slab should be considered during in-process characterization. No signs of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete on the pad could be present below the surface (i.e., outside the scope of RLC). Chemical hazards associated with Tent 10 are summarized in Table 4-21.

#### 4.5.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past.

Any LBP debris from Tent 10 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

**Table 4-21 Summary of Pad 904 Tent 10 Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit |
|---|---|---|---|
| Pb/Metals | NA (future sampling suggested; see Section 4.5.2.1) | NA | NA |
| VOC/SVOC | NA (future sampling suggested; see Section 4.5.2.2) | NA | NA |
| Beryllium | Surface smears | Historical | Below |
| PCBs | NA | NA | NA |
| Asbestos | Inspection of pipe insulation and tar | RLC | Below |

NA = no analysis was performed.

#### 4.5.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs/SVOCs were spilled/released in the past.

#### 4.5.2.3 Beryllium

Pondcrete and saltcrete potentially containing beryllium from the RFETS solar ponds were stored in the 904 Pad tents and handled in the Tent 10 Permacon. Surface smear samples were taken from randomly selected interior locations. A total of 45 smears were taken, in addition to samples taken in the Permacon (see below, Section 4.6.2.3). All 45 smears taken in the tent yielded non-detect results (i.e., $\leq 0.1$ µg/100 $cm^2$). The DOE free-release criterion is 0.2 g/100 $cm^2$. Laboratory data from these analyses and a map of sample coordinates are included as Appendix E.3.1.4 and E.3.1.2, respectively.

#### 4.5.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, therefore no sampling and analysis was conducted.

#### 4.5.2.5 Asbestos

Tent 10 was inspected, and a sample of the tar at the base the tent was taken. The tar was determined to be non-ACM. All pipe insulation is fiberglass.

## 4.6 904 Pad - Tent 10 PERMACON

### 4.6.1 Radiological Hazards

Radiological survey results on the interior indicate that a radiological hazard exists. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

There are four survey results on the interior of the 904 Pad - Tent 10 PERMACON that exceed the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There is one elevated removable alpha result and four elevated total alpha results. Also, the PERMACON is radiologically posted as a Contamination Area, and Tent 10 is radiologically posted as a Radioactive Materials Area. Therefore, the 904 Pad - Tent 10 PERMACON and its contents are considered LLW.

No radiological samples were required for the 904 Pad - Tent 10 PERMACON.

**Radiological Surveys**

Radiological surveys were performed on the 904 Pad - Tent 10 PERMACON per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; and 3) 30 surveys on exterior walls and the top of the structure. Survey results are summarized in Table 4-22.

**Table 4-22 Radiological Survey Results for 904 Pad - Tent 10 PERMACON**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor, Walls & Equipment < 2 meter (1) | 40 (2) | <20 | 21 | <200 | <200 | <63 | 342 | <308 | 435 |
| Exterior Walls and Roof | 0 | | | | | | | | |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

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There are 40 combined radiological survey points for the interior floor and walls < 2 meters from the floor and interior ceiling and walls > 2 meters from the floor. The 1 $m^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable beta-gamma contamination. There are 39 points less than the MDC of the instrument for removable alpha contamination. There is one elevated removable alpha survey points at 21 dpm/100 $cm^2$, which is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 34 points less than the MDC of the instrument for total alpha contamination. There are two elevated total alpha survey points at 84 and 72 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are four elevated total alpha survey points at 342, 174, 234 and 186 dpm/100 $cm^2$, which are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 38 points less than the MDC of the instrument for total beta-gamma contamination. There are two elevated total beta-gamma survey points at 414 and 435 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Exterior surveys are not available for the Tent 10 PERMACON. Since the PERMACON structure is located in the Tent 10 structure, the survey results from Tent 10 are used to evaluate the potential radiological contamination on the exterior of the PERMACON.

### 4.6.2 Chemical Hazards

The 904 Pad Tent 10 Permacon was used for pondcrete and saltcrete repack operations, and is posted as a Radioactive Materials Area (RMA). Surface smears for beryllium were collected by the Chronic Beryllium Disease Prevention Program (CBDPP), and beryllium contamination was detected. RFETS has determined through process knowledge that beryllium associated with the Tent 10 Permacon is not the chemical process powder form and therefore does not fit the criteria for a P015 RCRA listed waste. Process and historical knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor/slab should be considered during in-process characterization. No signs of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete on the pad could be present below the surface (i.e., outside the scope of RLC). Chemical hazards associated with the Tent 10 Permacon are summarized in Table 4-23.

**Table 4-23 Summary of Pad 904 Tent 10 Permacon Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | NA (future sampling suggested; see Section 4.6.2.1) | NA | NA |
| VOC/SVOC | NA (future sampling suggested; see Section 4.6.2.2) | NA | NA |
| Beryllium | Surface smears | Historical | ***Above*** |
| PCBs | NA | NA | NA |
| Asbestos | Inspection | RLC | Below |

NA = no analysis was performed.

### 4.6.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past.

Any LBP debris from the Tent 10 Permacon will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

### 4.6.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs/SVOCs were spilled/released in the past.

### 4.6.2.3 Beryllium

Pondcrete and saltcrete potentially containing beryllium from the RFETS solar ponds were stored in the 904 Pad tents and handled in the Tent 10 Permacon. Surface smear samples were taken from randomly selected interior locations of the Permacon. A total of 17 random and two judgment samples were taken within the Permacon. A total of five samples yielded Be levels at or above the DOE free-release criterion of 0.2 $\mu g/100\ cm^2$ (Table 4-24). Laboratory data from these analyses and a map of sample coordinates are included in Appendix E.3.1.4 and E.3.1.2, respectively.

**Table 4-24 Beryllium Surface Smear Results for 904 Pad Tent 10 Permacon**

| Description | Random Sample Coordinate Number | Sample ID | Beryllium (µg/100 cm$^2$) |
|---|---|---|---|
| Cement pump | 1 | 904-05181999-35-001 | 0.1 |
| Floor | 1 | 904-05181999-35-002 | 0.1 |
| Hopper 438-019 | 2 | 904-05181999-35-003 | 0.1 |
| Floor | 2 | 904-05181999-35-004 | **0.4** |
| Cement pump | 3 | 904-05181999-35-005 | 0.1 |
| Floor | 3 | 904-05181999-35-006 | **0.3** |
| Floor | 4 | 904-05181999-35-007 | **0.2** |
| Floor | 5 | 904-05181999-35-008 | 0.1 |
| Floor | 6 | 904-05181999-35-009 | **0.2** |
| Ladder (4th rung from top) | 7 | 904-05181999-35-010 | 0.1 |
| Ladder (bottom rung) | 7 | 904-05181999-35-011 | 0.1 |
| Floor | 7 | 904-05181999-35-012 | 0.1 |
| Floor | 8 | 904-05181999-35-013 | 0.1 |
| Floor | 9 | 904-05181999-35-014 | 0.1 |
| Floor | 10 | 904-05181999-35-015 | **0.2** |
| Floor | 11 | 904-05181999-35-016 | 0.1 |
| Floor | 12 | 904-05181999-35-017 | 0.1 |
| Hood 2 | Judgment | 904-05181999-35-018 | 0.1 |
| Floor (22,3) | Judgment | 904-05181999-35-019 | 0.1 |
| **90% UCL on mean of lognormal distribution** | | | **1.2** |

An evaluation of the number of random beryllium samples acquired for industrial hygiene purposes (17) indicate that an adequate number of samples were acquired for characterization purposes, where only nine are required based on the EPA G-4 model (given a lognormal distribution of Be results; EPA, 1994). Also, based on a 90% upper confidence limit on the mean (of a lognormal distribution) at 1.2 µg/100 $cm^2$, the sampled items clearly exceed the industrial hygiene action level of 0.2 µg/100 $cm^2$, and thus, the Permacon interior and contents are categorized as beryllium contaminated within an RFETS-specific industrial hygiene context. As a result, it may be necessary to label any waste as "Beryllium Waste" or other such appropriate designation if such is required by the waste acceptance criteria of the facility at which it will be disposed.

#### 4.6.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

#### 4.6.2.5 Asbestos

The Tent 10 Permacon was inspected, and no potential ACM was identified.

## 4.7 904 Pad - Tent 11

### 4.7.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal because no survey or sample results exceeded free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

All radiological survey results on the interior and exterior of the 904 Pad - Tent 11 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, Tent 11 is free-releasable property or sanitary waste.

No radiological samples were required for the 904 Pad - Tent 11.

**Radiological Surveys**

Radiological surveys were performed on the 904 Pad - Tent 11 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 30 surveys on

equipment present > 2 meters from the floor; and 4) 30 surveys on exterior walls and the top of the tent. Survey results are summarized in Table 4-25.

**Table 4-25 Radiological Survey Results for 904 Pad - Tent 11**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | | Alpha (dpm/100 cm$^2$) | | Beta (dpm/100 cm$^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 30 | <20 | <20 | <200 | <200 | <34 | 54 | <324 | 1329 |
| Interior Ceiling & Walls > 2 meter | 14 | <20 | <20 | <200 | <200 | <49 | <49 | <318 | 372 |
| Interior Equipment > 2 meter high | 31 | <20 | <20 | <200 | <200 | <49 | <49 | <318 | 462 |
| Exterior Walls and Roof | 30 | <20 | <20 | <200 | <200 | <43 | 90 | <321 | 435 |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

There are 30 radiological survey points for the interior asphalt floor and tent walls < 2 meters from the floor. The 1 m$^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 27 points less than the MDC of the instrument for total alpha contamination. There are three elevated total alpha survey points at 42, 48 and 54 dpm/100 cm$^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 10 points less than the MDC of the instrument for total beta-gamma contamination. There are 20 elevated total beta-gamma survey points ranging from 780 to 1329 dpm/100 cm$^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 14 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total alpha contamination. There are 13 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total beta- gamma survey points at 372 dpm/100 cm$^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 31 radiological survey points for the interior equipment > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and

beta-gamma contamination as well as total alpha contamination. There are 30 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total beta- gamma survey points at 462 dpm/100 $cm^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 30 radiological survey points for the exterior walls and top of the tent. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 15 points less than the MDC of the instrument for total alpha contamination. There are 15 elevated total alpha survey points ranging from 48 to 84 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 29 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total beta-gamma survey point of 435 dpm/100 $cm^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### 4.7.2 Chemical Hazards

The 904 Pad Tent 10 was used as a storage area for pondcrete and saltcrete. It also contains a Permacon, which is evaluated separately in Section 4.3.8. Surface smears for beryllium were conducted by the Chronic Beryllium Disease Prevention Program (CBDPP), and no beryllium was found. Process and historical knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor should be considered during in-process characterization. No sign of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete could be present below the surface (i.e., outside the scope of RLC). Chemical hazards associated with Tent 11 are summarized in Table 4-26.

**Table 4-26 Summary of Pad 904 Tent 11 Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | NA (future sampling suggested; see Section 4.3.7.1) | NA | NA |
| VOC/SVOC | NA (future sampling suggested; see Section 4.3.7.2) | NA | NA |
| Beryllium | Surface smears | Historical | Below |
| PCBs | NA | NA | NA |
| Asbestos | Inspection of pipe insulation and tar | RLC | Below |

NA = no analysis was performed.

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#### 4.7.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past.

Any LBP debris from Tent 11 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

#### 4.7.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs/SVOCs were spilled/released in the past.

#### 4.7.2.3 Beryllium

Pondcrete and saltcrete potentially containing beryllium from the RFETS solar ponds were stored in the 904 Pad tents. Surface smear samples were taken from randomly selected interior locations. A total of 50 smears were taken in Tent 11 and its associated Permacon, and all yielded non-detect results (i.e., $\leq$ 0.1 µg/100 $cm^2$). The DOE free-release criterion is 0.2 µg/100 $cm^2$. Laboratory data from these analyses and a map of sample coordinates are included in Appendix F.3.1.4 and F.3.1.2, respectively.

#### 4.7.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there was no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

#### 4.7.2.5 Asbestos

Tent 11 was inspected, and a sample of tar at the base the tent was taken. The tar was determined to be non-ACM. All pipe insulation is fiberglass.

## 4.8 904 Pad - Tent 11 PERMACON

### 4.8.1 Radiological Hazards

Radiological survey results on the interior indicate that radiological hazards should be minimal because no survey or sample results exceeded free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

All radiological survey results on the interior and exterior of the 904 Pad - Tent 11 PERMACON are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the Tent 11 PERMACON is free-releasable property or sanitary waste.

No radiological samples were required for the 904 Pad - Tent 11 PERMACON.

**Radiological Surveys**

Radiological surveys were performed on the 904 Pad - Tent 11 PERMACON per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 $m^2$ scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; and 3) 30 surveys on exterior walls and the top of the structure. Survey results are summarized in Table 4-27.

**Table 4-27 Radiological Survey Results for 904 Pad - Tent 11 PERMACON**

| | Survey Points | Removable Contamination | | | | Total Contamination | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | | Alpha (dpm/100 $cm^2$) | | Beta (dpm/100 $cm^2$) | |
| | | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum | Minimum | Maximum |
| Interior Floor & Walls < 2 meter (1) | 30 | <20 | <20 | <200 | <200 | <49 | <63 | <300 | 414 |
| Interior Ceiling & Walls > 2 meter | 15 | <20 | <20 | <200 | <200 | <49 | <49 | <318 | <318 |
| Exterior Walls and Roof | 30 | <20 | <20 | <200 | <200 | <49 | 54 | <315 | <315 |

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location with a 10% scan.

There are 30 radiological survey points for the interior floor and walls < 2 meters from the floor. The 1 $m^2$ scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total alpha contamination. There are 27 points less than the MDC of the instrument for total beta-gamma contamination. There are three elevated total beta-gamma survey points ranging from 336 to 414 dpm/100 $cm^2$, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 15 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 30 radiological survey points for the exterior walls and top of the structure. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total beta-gamma contamination. There are 29 points less than the MDC of the instrument for total alpha contamination. There is one elevated total alpha survey points at 54 dpm/100 $cm^2$, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

### 4.8.2 Chemical Hazards

The 904 Pad Tent 11 Permacon was used for pondcrete and saltcrete operations. Surface smears for beryllium were conducted by the Chronic Beryllium Disease Prevention Program (CBDPP), and no beryllium was found. Process and historical knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor/slab should be considered during in-process characterization. No signs of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete on the pad could be present below the surface (i.e., outside the scope of RLC). Chemical hazards associated with the Tent 11 Permacon are summarized in Table 4-28.

#### 4.8.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past.

Any LBP debris from the Tent 11 Permacon will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

**Table 4-28 Summary of Pad 904 Tent 11 Permacon Chemical Hazards**

| Contaminant of Concern | Analysis | Historical or RLC? | Above release limit? |
|---|---|---|---|
| Pb/Metals | NA (future sampling suggested; see Section 4.8.2.1) | NA | NA |
| VOC/SVOC | NA (future sampling suggested; see Section 4.8.2.2) | NA | NA |
| Beryllium | Surface smears | Historical | Below |
| PCBs | NA | NA | NA |
| Asbestos | Inspection | RLC | Below |

NA = no analysis was performed.

#### 4.8.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, and media sampling of the floor/slab was not considered within the scope of RLC for Group A buildings, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs were spilled/released in the past.

#### 4.8.2.3 Beryllium

The Tent 11 Permacon was sampled as part of the analysis of Tent 11 (see Section 4.7.2.3). All smears yielded non-detect results (i.e., $\leq$ 0.1 µg/100 $cm^2$). The DOE free-release criterion is 0.2 µg/100 $cm^2$. Laboratory data from these analyses and a map of sample coordinates are included in Appendix F.3.1.4 and F.3.1.2, respectively.

#### 4.8.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

#### 4.8.2.5 Asbestos

The Tent 11 Permacon was inspected, and no potential ACM was identified.

## 5.0 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES

The disposition of Group A facilities will generate a large quantity of waste. The Site will be able to recycle some waste materials, such as structural metal. Most of the waste will be disposed as sanitary waste. A small amount will have to be disposed off-site as low-level radioactive or chemical (i.e., RCRA - and asbestos containing-) waste. The listing below presents an estimate, by building, of the amount of materials to be disposed. The assumption is that all of these materials will be disposed as sanitary waste. Table 5-1 presents estimates of non-sanitary waste volumes that will be generated by building. Additional radiological characterization will be necessary to finalize low-level waste (LLW) volume estimates. In addition, detailed measurements and calculations will be necessary to determine precise waste volumes.

**BUILDING 551**

DIMENSIONS
122' x 180' x 25' south section
90' x 202' x 25' north section/addition
45' x 65' x 20' east section/addition
MATERIAL QUANTITIES (includes all three sections)
Concrete roof deck – 12,000 cu ft
Concrete columns and beams - 11,000 cu ft
Concrete block - 15,000 cu ft
Exterior wall board - 1,500 cu ft
Corrugated metal - 35,000 sq ft
Translucent panels - 7,000 sq ft
Piping - 12,000 linear feet (ft) (0.5" to 6" diameter)
Structural steel - 16,000 ft
Sheet metal - 12,000 sq ft
Metal racks and shelving - 12,000 sq ft
Angle iron - 1,600 ft
Metal drawers storage - 25' x 4' x 4'
Plywood and other wood debris - 100 sq ft

**BUILDING 662**

DIMENSIONS
40' x 65' x 15' (eave)
MATERIAL QUANTITIES
Sheet metal - 6,000 sq ft
Insulation - 8,500 sq ft
Plywood - 500 sq ft
Dry wall and pre-fab wall material - 4,000 sq ft
Structural steel - 700 ft
Light-weight roof steel - 2,500 ft

**BUILDING 910**

DIMENSIONS
(1st Floor) 47' x 102' x 13'
(2nd Floor) 47' x 102' x 19'

MATERIAL QUANTITIES
Concrete block - 5,000 cu ft
Concrete - 15,000 cu ft
Tanks - 41(15 on lower level, 24 on 1st level, and 2 outside)
Sheet metal - 200 sq ft
Structural steel - 100 ft
Lab slate bench - 30 sq ft
Piping - 3,000 ft
Room 103 - motor control center (MCC), 10' x 2' x 8'
Gas generators - 3 housed inside of metal units, 15'x10'x10'H
Cooling towers (sheet metal) - 3 outside on steel supported platform, 700 sq ft of metal

Note: Some process, product-storage, and waste tanks could be re-used, as well as the gas generators and cooling towers. The building also consists of various instrumentation, pumps, valves, gauges, and other associated process equipment that are probably re-useable.

**709 COOLING TOWER** (CT)

DIMENSIONS
35' x 45' x 35' HIGH
MATERIAL QUANTITIES
Wooden cooling tower - 6,000 sq ft
Corrugated metal - 2,000 sq ft
Piping - 700 ft
Steel ladder & cage bolted to side of cooling tower - 35' high
Concrete - 500 cu ft
Generator - 2,000 lbs.
Generator platform - 12'x 12' checkered plate w/1.5" railing (4 sides)

**TENTS 10 & 11**

DIMENSIONS
#10) 60' x 362' x 21'(high point)
#11) 60' x 334' x 21' (high point)
MATERIAL QUANTITIES
Panels – 2,000 cu ft membrane panels
Aluminum framing - 60,000 lbs
Sheet metal - 4,000 sq ft

**Table 5-1 Non-Sanitary Waste Estimates for Group A Facilities**

| Group A Facilities | Low-Level Waste | RCRA/ Chemical Waste | Mixed Waste | PCB Waste | Asbestos Waste |
|---|---|---|---|---|---|
| B551 | 12,000 cu ft concrete – south side roof<br>15,000 sq ft corrugated metal – north side roof | None | None | None | 24,000 sq ft -- roofing<br>3,925 sq ft -- cementitious wall<br>1,316 linear ft – pipe insulation<br>855 sq ft – floor tile<br>334 elbows & fittings |
| B662 | 2,000 sq ft sheet metal – roof plus slab (ER waste) | None | None | None | None |
| B910 | None | None | None | None | Unknown volume associated with piping -- TBD |
| 709 CT | 55 gal. sediment plus concrete sump (ER waste) | None | None | None | 25 cu ft |
| Tent 10 | None | None | None | None | None |
| Tent 10 Permacon | Unknown volume associated with floor -- TBD | Unknown associated with Be on floor -- TBD | None | None | None |
| Tent 11 | None | None | None | None | None |
| Tents 11 Permacon | None | None | None | None | None |

# 6.0 DATA QUALITY ASSESSMENT

Data used in making management decisions for dispositioning structures, waste, and materials resulting from decommissioning activities must be of adequate quality to ensure 1) adequate safety of associated human health and the environment 2) compliance with waste requirements. Acceptable data quality for input into these decisions is required by applicable K-H corporate policies (e.g., K-H, 1997, §7.1.4 and 7.2.2) and DOE Order 414.1, Quality Assurance, §4.b.(2)(b). Verification and validation of the data ensure that data used in decisions resulting from the decommissioning process are usable and defensible.

This DQA consists of Verification and Validation (V&V) of data and decisions relative to the original DQOs formulated during the planning phase (Integrated Work Control Package (Type-1), Work Control # T0100346, *Site Characterization of Buildings 910, 551, 662, 709, & 904 Pad Tent Structures 7, 8, 9, 10, & 11*) and the quality requirements cited above. The DQA also includes a quantitative assessment of non-radiological data to ensure that enough samples were acquired to substantiate conclusions for decisions specific to each unique combination of building and potential non-radiological hazard. In the case of radiological data, and consistent with the purpose reconnaissance level characterization, data are not used for free-release purposes, but only to indicate waste types and preliminary strategy for pre-demolition surveys.

Table 6-1 summarizes the DQA effort, and includes over 700 individual checks performed on the data. Several qualifications were made to the data as a result of these checks and are summarized as footnotes on the table and throughout this section. All historical data provided in this report, in contrast to the most recent RLC data, are qualified as estimates only, because the same "levels" of quality control practiced for RLC cannot be verified.

## 6.1 Verification/Validation Of Results

Verification of the radiological survey data set(s) corroborates that data produced and used by the project are documented and traceable per quality requirements. Specifically, verification confirmed the following:

- Format and content of the data are clearly presented relative to the project decisions.
- Survey results are properly authenticated, dated, and labeled, which allows clear traceability to survey locations and responsible technical personnel.
- Calibrations and periodic performance checks of all measurement instrumentation produced satisfactory accuracy and precision.
- Count times of surveys produced adequate sensitivity of measurements for comparison with action levels.

## Table 6-1 "Group A" Bldgs -- V&V Checklist

**EVALUATION CRITERIA**

| Table 6-1 "Group A" Bldgs -- V&V Checklist<br>Data Sets | RMRS QAPD sec 6.4 | records authenticated | records peer reviewed | errors/changes initialed/dated | data mgmt: process traceability | data mgmt: adequate archival | Chain-of-Custody | Mgmt review/approval | QA review/approval | Technical review/approval | raw data, original data forms | QA assessments/NCRs/CARs | data reduction/calculations | significant figures | D&D Char Protocol | sample quantities (adequacy of) | analytical methods & MDA/MDC | DQOs accomplished (via decisions) | background rads addressed | data quality indicators (PARCCS) | Precision adequate | Accuracy adequate | Representative (data) | Complete (data sets) | Comparable (data) | Sensitivities adequate | Bias acceptable | QC measurements | method validation | historical data | SOW (subcontracted vendors) | case narrative | EDDs | comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bldg 551 (Warehouse) - rad RLC | | X | X | X | X | X | X | X | X | X | L | | | X | | J | X | | C | X | X | X | X | X | X | F | X | X | X | NA | X | X | | | |
| rad data - historic | | X | X | X | | | | X | X | L | | | | X | | NA | | | | | | | | | | | | | X | | X | | | information onl |
| chemical data - RLC | | H | H | X | | X | X | X | X | X | L | | | X | | X | X | X | NA | X | M | X | X | X | X | X | X | X | | NA | | X | | | Be only |
| chemical data - historic | | | | | | | X | | | | L | | | | | | | | NA | | | | | | | | | | | X | | X | | | Metals, PCBs |
| Bldg 662 (obsolete Butler) - rad RLC | | X | X | X | X | X | NA | X | X | X | L | | | X | | X | X | X | C | X | X | X | X | X | X | X | X | X | X | NA | | NA | | | |
| rad data - historic | | X | X | X | X | X | | X | X | X | | | | X | | | | | | | | | | | | | | | | X | | | | | |
| chemical data - RLC | | H | H | X | | X | X | X | X | X | L | | | X | | X | X | X | NA | X | M | X | X | X | X | X | X | X | X | NA | | X | | | Be only |
| chemical data - historic | | | | | | | | | | | | | | | | | | | NA | | | | | | | | | | | | | | | | none |
| Bldg 709 (Cooling Towers) - rad RLC | | X | N | X | X | X | X | X | X | X | L | | | X | | K | X | | C | X | X | X | X | K | X | X | X | X | X | NA | | X | | | |
| rad data - historic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| chemical data - RLC | | X | X | X | | X | X | X | X | X | L | | | X | | X | X | X | NA | X | M | X | X | X | X | X | X | X | X | NA | | X | | | TCLP metals |
| chemical data - historic | | | | | | | | | | | | | | | | | | | NA | | | | | | | | | | | | | | | | |
| g 910 (Solar Ponds/Water Treatment) - rad RLC | | X | X | X | X | X | X | X | X | X | L | | | X | | J,L | X | | C | X | X | X | X | L | X | X | X | X | X | NA | | X | | | |
| rad data - historic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| chemical data - RLC | | H | H | X | | X | X | X | X | X | L | | | X | | X | X | X | NA | X | M | X | X | X | X | X | X | X | X | NA | X | X | | | Be only |
| chemical data - historic | | | | | | | | | | | L | | | | | | | | NA | | | | | | | | | | | X | | | | | Metals |
| Tent 10 (of RCRA Unit 15B) - rad RLC | | X | X | X | X | X | X | X | X | X | L | | | X | | X | X | X | C | X | X | X | X | X | X | X | X | X | X | NA | | NA | | | |
| rad data - historic | | X | X | X | X | | NA | X | X | X | L | | | | | | | | | | | | | | | | | | | X | | | | | |
| chemical data - RLC | | | | | | | | | | | | | | | | | | | NA | | | | | | | | | | | NA | | | | | none |
| chemical data - historic | | X | | | X | | X | | | | L | | X | | | | | | NA | | | | | | | | | | | X | | | | | Be only |
| Tent 11 (of RCRA Unit 15B) - rad RLC | | X | X | X | X | X | X | X | X | X | L | | | X | | X | X | X | C | X | X | X | X | X | X | X | X | X | X | NA | | NA | | | |
| rad data - historic | | X | X | X | X | | NA | X | X | X | L | | | X | | | | | | | | | | | | | | | | X | | | | | |
| chemical data - RLC | | | | | | | | | | | | | | | | | | | NA | | | | | | | | | | | NA | | | | | none |
| chemical data - historic | | X | | | X | | X | | X | X | L | | | X | | | | | NA | | | | | | | | | | | X | | | | | Be only |

J unable to confirm ~30 scans for items above & below a 2m height.
F typically ≤20dpm/100 cm2 for removable surveys
NA not applicable
C only local area backgrounds were subtracted, not material backgrounds
M all results less than or equal to MDLs
qualifications to Chain-of-Custody records discussed in text

N no authentication or peer review on maps (esp. rad samples)
K unable to confirm ~30 scans for items below a 2m height.
L only 20 of 30 planned survey locations/results
H Be map not authenticated/reviewed; otherwise OK
X requirement satisfied

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Validation consists of a technical review of all data that directly support the dismantling and waste management decisions, so that any limitations of the data relative to project goals are delineated, and the associated data are qualified (caveated) accordingly. Data were validated relative to the DQOs of the project as defined in the DDCP and quality requirements cited earlier in this section.

PARCC parameters address characteristics of the data that must be defined for scientific integrity and defensibility. The following subsections on PARCC parameters -- Precision, Accuracy, Representativeness, Comparability, and Completeness -- will also include discussion on bias and sensitivity.

### 6.1.1 Precision

**Radiological Surveys/Samples**

Precision of the radiological survey instrumentation is satisfactory based on daily source checks within tolerance for each individual instrument used on the project, which includes all measurement types (i.e., scans and static measures for total contamination, swipes for removable). Adequate precision was established through instrument performance within a ±20% range as defined by measurement results compared to a standard source value. Based on standard protocol (*Radiological Safety Practices*), any measurement exceeding the defined tolerance limits required corrective action (repair or replacement) prior to the instrument's use "in the field". Daily source check results are maintained by Radiological Operations in Building 549.

Precision of individual radiochemistry results for the project is indeterminate because no duplicate or replicate samples were acquired. However, precision within individual data sets (by building) is good based on the low variability of all results clustered around the required detection limits (RDLs, i.e., the contractually required minimum detectable concentrations). RDLs are 0.3 pCi/g or pCi/l for $^{239,240}$Pu and $^{241}$Am and 1 pCi/g or pCi/l for the U species. The low variabilities of the radiochemistry data sets, indicative of good precision, are indicated by the ranges listed below:

- Bldg. 551: ~RDL to ~1pCi/g (all actinides of interest -- $^{233,234}$U, $^{235}$U, $^{238}$U, $^{239,240}$Pu, & $^{241}$Am)
- Bldg. 662: ~RDL to ~ 9 pCi/g (U species) and RDL (≤0.3 pCi/g $^{239,240}$Pu & $^{241}$Am)
- Bldg. 910 - ~RDL for all actinides

Laboratory precision is adequate based on acceptable results from duplicate laboratory analyses. One duplicate sample failed for the batch originating from Building 910, but the batch was consequently re-analyzed with satisfactory QC results.

**Hazardous Constituents**

Overall precision of (RCRA-characteristic) metals for the project is adequate based on results of the project's real/duplicate-pair below characteristic action levels for all metals of interest. Relative percent difference values (RPDs) for evaluation of precision are

irrelevant when both sets of real and duplicate values are well below action levels and/or near acceptable method detection limits, as was the case in this data set.

Precision of beryllium results is adequate based on the same rationale given for the RCRA-characteristic metals discussed above.

**Asbestos**

Repeatability is adequate within the data set based on all results less than action levels (≤1% asbestos); field duplicates were not collected.

### 6.1.2 Accuracy (And Bias)

**Radiological Surveys/Samples**

Accuracy of radiological surveys is satisfactory based on RFETS-programmatic annual calibrations that establish instrument efficiencies and sensitivities for all instrumentation used on this project. Daily source checks also provided periodic checks to ensure that all sensors are within accuracy tolerances during daily operations. Calibration and calibration check results are within the RFETS and industry-standard requirement of 20% of the applicable reference standard values.

Accuracy of radiochemistry results is typically within ±1 pCi/g and ±1 pCi/liter for all real samples and all actinides of interest at or near contractually required minimum detectable concentrations (i.e., 0.3 pCi/g or pCi/l for 241Am, 239,240Pu; 1 pCi/g or pCi/l for the U species). Sample-specific accuracies are reported on the laboratory reports as a function of total error, which includes counting error. Accuracy of radiochemistry results was controlled through periodic laboratory calibrations and use of lab control samples. Recoveries of laboratory control samples (LCS) ranged from 92% to 115% of a spike standard at 8 pCi/l, well within the industry standard of ±20% recovery of the reference standard value. Other quality controls, such as sample-specific yield percentages, are maintained in the original laboratory data packages managed by K-H Analytical Services Division in Building 881. Selected QC data, including those resulting from preparation blanks and LCS, are provided herein (Appendices A.2.2.4, C.1.2.4, and D.1.2.4.)

No biases were noted that would cause data to be qualified or rejected. Results from preparation blanks were at or below MDA values in units of dpm; nondetections in blanks indicate that the potential for false positives in the results due to cross-contamination of samples during laboratory processing is extremely unlikely. Finally, neither dilutions nor matrix interferences compromised accuracy of results.

**Hazardous Constituents**

Accuracy for (RCRA-characteristic) metals is adequate based on a variety of laboratory quality controls, including calibrations, serial dilutions (<10% difference in actual and predicted concentrations), lab control samples (%recoveries analyte-specific), and matrix spike %-recoveries within ±25% of the standard value. Blank samples yielded

nondetectable levels and thus potential cross-contamination or false positive results were not an issue. QC sample results are included with the data in Appendix C.2.1.4.

Accuracy of beryllium results is adequate for the project based on satisfactory LCS recoveries (% LCS recoveries) at 96% for the batch. Blank samples yielded nondetectable levels, and thus potential cross-contamination and false positive results are not an issue.

**Asbestos**

Accuracy for asbestos volumetric concentrations is based on the semi-quantitative technique of petrography via polarized light microscopy. Analysts can typically quantify components to within several percent at high concentrations ranging to ~1% at low concentrations (i.e., presence or absence of the mineral of interest). Accuracy for the project is adequate, as the contrast between 0% and 1% is an easy distinction to discern for the decision of "No ACM".

### 6.1.3 Representativeness

Samples and surveys are representative of the materials and locations of interest based on the following criteria:

- Familiarity with facilities -- multiple walk-downs and collaborations by and within the sampling team;
- Use of controlled and (site) approved methods including:
    - Health & Safety Practices (HSP) Procedure 18.10, "Radioactive Material Transfer and Unrestricted Release of Property and Waste," and
    - Radiological Safety Practices (RSP) Procedure 9.01, "Unrestricted Release of Property, Material, Equipment and Waste."
    - RSP 9.03, Unrestricted Release of Bulk or Volume Material," is also applicable
    - K-H Module RC01, Version B.3, *Isotopic Determinations by Alpha Spectroscopy*
    - K-H Module NR01, Version A, *Beryllium Filters* [including SW846 3051/OSHA ID-121 for Whatman filters and NIOSH 7300 for MCE filters)
    - K-H Module SS05 [including SW846 methods 1311 (TCLP), 3005A/6010A/6020B (total metals), and 7470 (Hg)];
- Compliance with the Characterization Package (RMRS, March 1999, *Characterization of Buildings 551, 662, 709, 910, & 904 Pad Tent Structures 7, 8, 9, 10, & 11*, Work Control No. T0100346, Rev. 0) -- reviewed & approved by technical and management consensus prior to implementation; and

- Analysis of samples within EPA recommended holdtimes.

### 6.1.4 Completeness

A comparison between sample and survey planning specifications (IWCP # T0100346, Rev. 0) with the actual numbers and locations where sample and survey data were acquired (§3 and §4) indicates that all planned surveys and samples were acquired with the following exceptions:

- ≤31 items within Bldg 551 at >2m in height -- alpha surveys;
- ≤31 items within Bldg 551 at <2m in height -- alpha surveys;
- ≤30 items within Bldg 709 at <2m in height -- alpha surveys;
- ≤30 items within Bldg 910 at <2m in height -- alpha surveys; and
- ≤30 items within Bldg 910 at <2m in height -- alpha surveys.

The absence of this data does not necessarily affect ultimate project decisions, as the purpose of radiological surveys is only to provide a general indication of radiological contamination throughout the facilities of interest, which may indirectly support free-release data at a later stage in the D&D evolution. The total number of planned surveys was determined by Radiological Engineering professional judgement and consensus approval by Quality Assurance and management organizations. Completed surveys are summarized in Tables 4-1, 4-7, 4-9, 4-14, 4-20, and 4-25.

Quality records for the data presented are complete as evidenced in the Appendices.

### 6.1.5 Comparability

All results presented are comparable with data of like contaminants of concerns for on a site- and DOE-complex wide basis. This comparability is based on the following:

- Use of standardized engineering units in the reporting of measurement results;
- Use of documented and approved procedures (*Radiological Safety Practices*); and
- Thorough documentation of the planning and sampling/analysis processes, and data reduction into formats designed for making decisions based on the project's original DQOs.

### 6.1.6 Sensitivity

Sensitivities for all surveys and chemical analyses are adequate, because all are less than or equal to DQO decision criteria. Adequate sensitivities, in units of dpm/$100^2$ cm, were attained for all radiological surveys based on MDAs at or below the decision limits. For RCRA-characteristic metals and radiochemical results, MDAs were consistently less than RDLs for all actinides of interest. Beryllium sensitivities were ½ the action level of 0.2 μg/$100cm^2$.

## 6.2 Summary

The data presented in this report have been verified and are qualified as valid and complete for comparison with applicable action levels; free-release criteria (action levels) for radiological and beryllium survey results; RCRA characteristic (hazardous) waste thresholds for TCLP metals; and ACM specifications. All data subsets (by location and analytical suite) comply with the Reconnaissance Level DQOs, which support an initial characterization of the Group A facilities.

## 7.0 CLASSIFICATION OF GROUP A FACILIITIES

Based on the analysis of radiological, chemical and physical hazards, the Group A Facilities were classified pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a).

Classification was based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate the presence of some radioactive contamination and asbestos but no other significant chemical or physical hazards exist. Some beryllium contamination was also detected in the Tent 10 Permacon. Classifications by building are presented below.

| FACILTIY | CLASSIFICATION |
|---|---|
| Building 551 | Type 2 |
| Building 662 | Type 2 |
| 709 Cooling Tower | Type 2 |
| Building 910 | Type 1 |
| Tent 10, 904 Pad | Type 2 |
| Tent 11, 904 Pad | Type 1 |

## 8.0 REFERENCES

DOE/RFFO, CDPHE, EPA, 1996. Rocky Flats Cleanup Agreement (RFCA), July 19, 1996.

DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

EPA, 1994. G-4

K-H, 1998a. Decommissioning Program Plan, October 8, 1998.

K-H, 1998b. Facility Disposition Program Manual, MAN-076-FDPM.

K-H, 1999a. Decontamination and Decommissioning Characterization Protocol.

K-H, 1999b. Reconnaissance Level Characterization Plan

MARSSIM – Multi-Agency Radiation Survey and Site Investigation, 12/97 (NUREG-1575, EPA 402-R-97-016).

RFETS, 1999. Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*

RFETS, 1999. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*

# Appendix A

# Bldg. 551

# Appendix A.1

# Bldg. 551 Historical Radiological Data (Radiochemical Samples)

# Appendix A.1.1

# Bldg. 551 Historical Radiological Data (Radiochemical Samples)

# Laboratory Report

85

# Case Narrative for Isotopic Uranium, Plutonium and Americium-241
## Solids

---

## Kaiser-Hill Co., RFETS

98A5236

PAI WO 9808093

1. This report consists of 9 solid samples received by Paragon on 08/13/98. The samples were ground prior to analyses and results are reported on a "dry weight" basis.

2. These samples were prepared according to Paragon Analytics, Inc. procedures PAI SOP728R3, PAI SOP773R3, and PAI SOP780R2.

3. The samples were analyzed sequentially for the presence of isotopic uranium, plutonium and americium-241 according to Paragon Analytics, Inc. procedure PAI SOP714R3. The analyses were completed on 08/27/98.

4. RC01 requires that the peak resolution for the efficiency calibration be less than 40 keV. Kip Harward was informed on 6/30/98 that more than 95% of efficiency calibrations, counted in the same detector configuration (1" sources approximately 5 mm from detector), show resolution of less than 65 keV. Detector resolution, however, meets instrument manufacturer specifications. Since sample data are not compromised, Kip Harward approved of the use of the detectors. Paragon does not use any detectors for RFETS samples where efficiency calibration resolution exceeds that required by RC01 for samples.

5. The monthly calibration package, RC01CAL_PARA_10Aug1998, is included in Section 9.

6. The EDD was produced automatically and was manually reviewed prior to approval.

7. During data acquisition for plutonium analysis, a peak shift occurred for sample 98A5236-009.004 (PAI ID 9808093-09). The sample was recounted and the results of the second analysis are reported.

8. Due to suspected matrix interference during the isotopic uranium analysis, the spectra for samples 98A5236-004.004, -008.004, and -009.004 (PAI Ids 9808093-03, -08, and -09, respectively) were of poor quality. Reserve fractions had been prepared in another batch (ASO1511) using reduced aliquots. The reserve fractions for these samples were submitted for analysis. In order to satisfy duplicate requirements, sample 98A5236-

002.005 (PAI ID 9808093-01) and its duplicate 9808093-01D were submitted as well. The results of the second analysis are reported for samples 98A5236-004.004, -008.004, and -009.004 (PAI Ids 9808093-03, -08, and -09, respectively). The results from both analyses are reported for sample 98A5236-002.005 (PAI ID 9808093-01) and its duplicate 9808093-01D.

9. The isotopic uranium results for sample 98A5236-008.004 (PAI ID 9808093-08; batch AS01511) showed peak resolution in the $^{232}U$ tracer in excess of the maximum 80 keV. The sample was reanalyzed. The reanalysis results are included in this data package.

10. Am-241 activity is reported in the associated method blank (batch AS01509, PAI ID AS01509BLK1) above the minimum detectable concentration value. The measured blank activity is below the requested MDC. Results should be compared to the method blank activity to determine the validity of the measurement.

11. No further anomalous situations were encountered during the preparation and analysis of these samples.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Renee Gallegos — 9-2-98
Renee Gallegos — Date
Radiochemistry Instrument Technician

Wade Cavin — 9/4/98
Radiochemistry Final Data Review — Date

# Appendix A.1.2

## Bldg. 551 Historical Radiological Data (Radiochemical Samples)

## Laboratory Data

# Sample Results Summary

**Client Name:** Kaiser-Hill Co., L.L.C.
**Client Project Name:**
**Client Project Number:** 98A5236

**Laboratory Name:** Paragon Analytics, Inc.
**PAI Work Order:** 9808093


**Reported on:** Wednesday, September 02, 1998 14:03:39

| Lab Sample ID | Client Sample ID | Test | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 9808093-1 | 98A5236-002.005 | ISO Pu | Pu-238 | -0.001 +/- 0.010 | 0.028 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-1 | 98A5236-002.005 | ISO Pu | Pu-239 | 0.014 +/- 0.012 | 0.008 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-2 | 98A5236-003.004 | ISO Pu | Pu-238 | 0.003 +/- 0.011 | 0.009 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-2 | 98A5236-003.004 | ISO Pu | Pu-239 | 0.004 +/- 0.011 | 0.020 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-3 | 98A5236-004.004 | ISO Pu | Pu-238 | -0.001 +/- 0.010 | 0.023 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-3 | 98A5236-004.004 | ISO Pu | Pu-239 | 0.026 +/- 0.017 | 0.009 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-4 | 98A5236-005.004 | ISO Pu | Pu-238 | 0.007 +/- 0.014 | 0.028 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-4 | 98A5236-005.004 | ISO Pu | Pu-239 | 0.039 +/- 0.023 | 0.025 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-5 | 98A5236-006.004 | ISO Pu | Pu-238 | 0.010 +/- 0.012 | 0.019 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-5 | 98A5236-006.004 | ISO Pu | Pu-239 | 0.050 +/- 0.025 | 0.023 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-6 | 98A5236-010.004 | ISO Pu | Pu-238 | 0.008 +/- 0.021 | 0.044 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-6 | 98A5236-010.004 | ISO Pu | Pu-239 | 0.180 +/- 0.050 | 0.026 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-7 | 98A5236-007.004 | ISO Pu | Pu-238 | 0.007 +/- 0.014 | 0.028 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-7 | 98A5236-007.004 | ISO Pu | Pu-239 | 0.009 +/- 0.013 | 0.025 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-8 | 98A5236-008.004 | ISO Pu | Pu-238 | -0.001 +/- 0.011 | 0.030 | pCi/g | Solid | AS01509 | 8/26/98 | U |

**Comments:**

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

**Qualifiers/Flags:**
U - Result is less than the sample specific minimum detectable activity.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y2 - Chemical Yield outside default limits.

# Sample Results Summary

**Client Name:** Kaiser-Hill Co., L.L.C.
**Client Project Name:**
**Client Project Number:** 98A5236

**Laboratory Name:** Paragon Analytics, Inc.
**PAI Work Order:** 9808093


**Reported on:** Wednesday, September 02, 1998 14:03:39

| Lab Sample ID | Client Sample ID | Test | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 9808093-8 | 98A5236-008.004 | ISO Pu | Pu-239 | 0.002 +/- 0.010 | 0.024 | pCi/g | Solid | AS01509 | 8/26/98 | U |
| 9808093-9 | 98A5236-009.004 | ISO Pu | Pu-238 | 0.057 +/- 0.037 | 0.036 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-9 | 98A5236-009.004 | ISO Pu | Pu-239 | 0.008 +/- 0.019 | 0.036 | pCi/g | Solid | AS01509 | 8/25/98 | U |

**Comments:**

000033

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

**Qualifiers/Flags:**
U - Result is less than the sample specific minimum detectable activity.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y2 - Chemical Yield outside default limits.

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ISOS: Paint

# Sample Results Summary

Client Name: Kaiser-Hill Co., L.L.C.
Client Project Name:
Client Project Number: 98A5236

Laboratory Name: Paragon Analytics, Inc.
PAI Work Order: 9808093


Reported on: Wednesday, September 09, 1998 09:27:35

| Lab Sample ID | Client Sample ID | Test | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 9808093-1 | 98A5236-002.005 | ISO Am | Am-241 | 0.053 +/- 0.044 | 0.064 | pCi/g | Solid | AS01509 | 8/27/98 | U |
| 9808093-2 | 98A5236-003.004 | ISO Am | Am-241 | 0.022 +/- 0.034 | 0.062 | pCi/g | Solid | AS01509 | 8/26/98 | U |
| 9808093-3 | 98A5236-004.004 | ISO Am | Am-241 | 0.013 +/- 0.023 | 0.042 | pCi/g | Solid | AS01509 | 8/26/98 | U |
| 9808093-4 | 98A5236-005.004 | ISO Am | Am-241 | 0.027 +/- 0.023 | 0.034 | pCi/g | Solid | AS01509 | 8/27/98 | U |
| 9808093-5 | 98A5236-006.004 | ISO Am | Am-241 | 0.020 +/- 0.025 | 0.042 | pCi/g | Solid | AS01509 | 8/27/98 | U |
| 9808093-6 | 98A5236-010.004 | ISO Am | Am-241 | 0.080 +/- 0.038 | 0.039 | pCi/g | Solid | AS01509 | 8/27/98 | J |
| 9808093-7 | 98A5236-007.004 | ISO Am | Am-241 | 0.011 +/- 0.014 | 0.011 | pCi/g | Solid | AS01509 | 8/27/98 | J |
| 9808093-8 | 98A5236-008.004 | ISO Am | Am-241 | 0.032 +/- 0.026 | 0.036 | pCi/g | Solid | AS01509 | 8/26/98 | U |
| 9808093-9 | 98A5236-009.004 | ISO Am | Am-241 | 0.033 +/- 0.045 | 0.079 | pCi/g | Solid | AS01509 | 8/26/98 | U |

Comments:

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags:
U - Result is less than the sample specific minimum detectable activity.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y2 - Chemical Yield outside default limits.

# Sample Results Summary

Client Name: Kaiser-Hill Co., L.L.C.
Client Project Name:
Client Project Number: 98A5236

Laboratory Name: Paragon Analytics, Inc.
PAI Work Order: 9808093


Reported on: Wednesday, September 02, 1998 15:10:44

| Lab Sample ID | Client Sample ID | Test | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 9808093-1 | 98A5236-002.005 | ISO U | U-234 | 0.292 +/- 0.098 | 0.022 | pCi/g | Solid | AS01511 | 8/26/98 | J |
| 9808093-1 | 98A5236-002.005 | ISO U | U-234 | 0.180 +/- 0.054 | 0.031 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-1 | 98A5236-002.005 | ISO U | U-235 | 0.025 +/- 0.022 | 0.034 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-1 | 98A5236-002.005 | ISO U | U-235 | -0.007 +/- 0.033 | 0.083 | pCi/g | Solid | AS01511 | 8/26/98 | U |
| 9808093-1 | 98A5236-002.005 | ISO U | U-238 | 0.193 +/- 0.054 | 0.010 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-1 | 98A5236-002.005 | ISO U | U-238 | 0.172 +/- 0.076 | 0.057 | pCi/g | Solid | AS01511 | 8/26/98 | J |
| 9808093-2 | 98A5236-003.004 | ISO U | U-234 | 0.410 +/- 0.085 | 0.020 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-2 | 98A5236-003.004 | ISO U | U-235 | 0.067 +/- 0.031 | 0.025 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-2 | 98A5236-003.004 | ISO U | U-238 | 0.447 +/- 0.090 | 0.020 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-3 | 98A5236-004.004 | ISO U | U-234 | 0.220 +/- 0.074 | 0.067 | pCi/g | Solid | AS01511 | 8/26/98 | J |
| 9808093-3 | 98A5236-004.004 | ISO U | U-235 | 0.114 +/- 0.052 | 0.054 | pCi/g | Solid | AS01511 | 8/26/98 | J |
| 9808093-3 | 98A5236-004.004 | ISO U | U-238 | 0.321 +/- 0.083 | 0.034 | pCi/g | Solid | AS01511 | 8/26/98 | J |
| 9808093-4 | 98A5236-005.004 | ISO U | U-234 | 0.069 +/- 0.033 | 0.036 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-4 | 98A5236-005.004 | ISO U | U-235 | 0.020 +/- 0.020 | 0.031 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-4 | 98A5236-005.004 | ISO U | U-238 | 0.047 +/- 0.025 | 0.020 | pCi/g | Solid | AS01509 | 8/25/98 | J |

Comments:

000043

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags:
U - Result is less than the sample specific minimum detectable activity.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y2 - Chemical Yield outside default limits.

# Sample Results Summary

Client Name: Kaiser-Hill Co., L.L.C.
Client Project Name:
Client Project Number: 98A5236

Laboratory Name: Paragon Analytics, Inc.
PAI Work Order: 9808093


Reported on: Wednesday, September 02, 1998 15:10:44

| Lab Sample ID | Client Sample ID | Test | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 9808093-5 | 98A5236-006.004 | ISO U | U-234 | 0.155 +/- 0.054 | 0.037 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-5 | 98A5236-006.004 | ISO U | U-235 | 0.002 +/- 0.020 | 0.048 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-5 | 98A5236-006.004 | ISO U | U-238 | 0.165 +/- 0.055 | 0.033 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-6 | 98A5236-010.004 | ISO U | U-234 | 0.081 +/- 0.038 | 0.041 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-6 | 98A5236-010.004 | ISO U | U-235 | 0.002 +/- 0.014 | 0.035 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-6 | 98A5236-010.004 | ISO U | U-238 | 0.156 +/- 0.050 | 0.032 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-7 | 98A5236-007.004 | ISO U | U-234 | 0.140 +/- 0.045 | 0.034 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-7 | 98A5236-007.004 | ISO U | U-235 | 0.007 +/- 0.017 | 0.036 | pCi/g | Solid | AS01509 | 8/25/98 | U |
| 9808093-7 | 98A5236-007.004 | ISO U | U-238 | 0.141 +/- 0.045 | 0.031 | pCi/g | Solid | AS01509 | 8/25/98 | J |
| 9808093-8 | 98A5236-008.004 | ISO U | U-234 | 0.108 +/- 0.049 | 0.051 | pCi/g | Solid | AS01511 | 8/28/98 | J |
| 9808093-8 | 98A5236-008.004 | ISO U | U-235 | -0.012 +/- 0.036 | 0.077 | pCi/g | Solid | AS01511 | 8/28/98 | U |
| 9808093-8 | 98A5236-008.004 | ISO U | U-238 | 0.129 +/- 0.053 | 0.051 | pCi/g | Solid | AS01511 | 8/28/98 | J |
| 9808093-9 | 98A5236-009.004 | ISO U | U-234 | 0.086 +/- 0.080 | 0.124 | pCi/g | Solid | AS01511 | 8/26/98 | U |
| 9808093-9 | 98A5236-009.004 | ISO U | U-235 | 0.026 +/- 0.056 | 0.106 | pCi/g | Solid | AS01511 | 8/26/98 | U |
| 9808093-9 | 98A5236-009.004 | ISO U | U-238 | 0.043 +/- 0.056 | 0.095 | pCi/g | Solid | AS01511 | 8/26/98 | U |

**Comments:**

Abbreviations:
TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Qualifiers/Flags:
U - Result is less than the sample specific minimum detectable activity.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y2 - Chemical Yield outside default limits.



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# Appendix A.2.1

# Bldg. 551 RLC Radiological Data

# Radiological Surveys

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 46 | Bkg. 41 | Bkg. 0.0 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 9-12-99 | Cal Due 8-12-99 |
| Bkg. 0.0 | Bkg. 9 3 | Bkg. B : 481 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 49 | MDA 314 |

Survey Type: Contamination Survey

Building: 551

Location: warehouse floor

Purpose: CHARACTERIZATION SURVEYS

RWP #: — NA

Date: 04-08-99 Time: 1400

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N A /
Print name Signature Emp. #

PRL # :

Comments All survey spots were taken on the floor Pre-Paint Sample. Plus Direct scan 1m² at all points

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 1. | < 20 | < 200 | < 49 | 1443 |
| 2. | < 20 | < 200 | < 49 | 810 |
| 3. | < 20 | < 200 | < 49 | 672 |
| 4. | < 20 | < 200 | < 49 | 753 |
| 5. | < 20 | < 200 | < 49 | 678 |
| 6. | < 20 | < 200 | < 49 | 774 |
| 7. | < 20 | < 200 | < 49 | 792 |
| 8. | < 20 | < 200 | < 49 | 966 |
| 9. | < 20 | < 200 | < 49 | 660 |
| 10. | < 20 | < 200 | < 49 | 735 |
| 11. | | | | |
| 12. | | | | |
| 13. | | | | |
| 14. | | | | |
| 15. | | | | |
| 16. | | | | |
| 17. | | N | A | |
| 18. | | | | |
| 19. | | | | |
| 20. | | | | |
| 21. | | | | |
| 22. | | | | |

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 23. | | | | |
| 24. | | | | |
| 25. | | | | |
| 26. | | | | |
| 27. | | | | |
| 28. | | | | |
| 29. | | | | |
| 30. | | | | |
| 31. | | | | |
| 32. | | | | |
| 33. | | N | A | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |

Date 4/9/99 RS Supervision: Bauer / [signature] [redacted]
Print Name Signature

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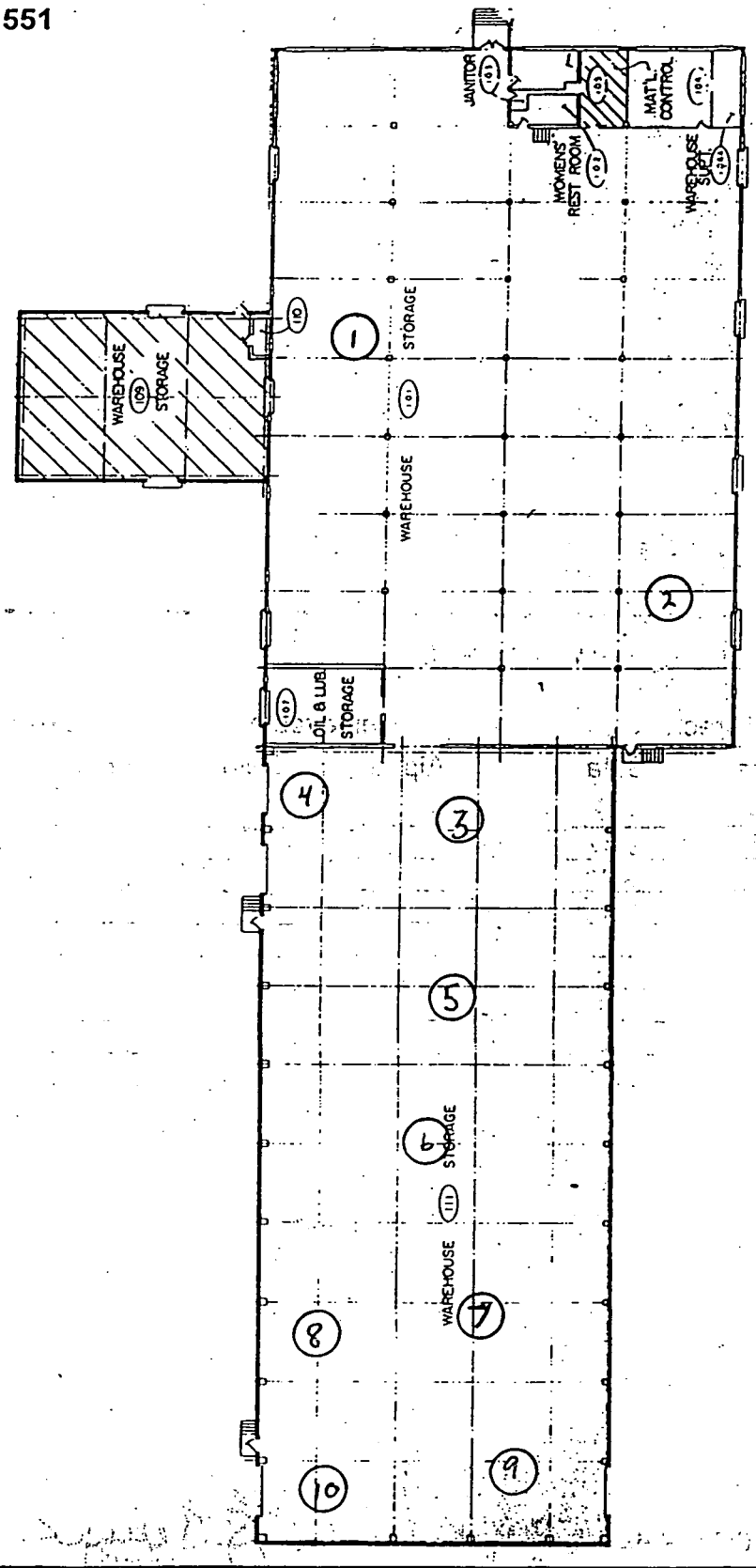
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**




Location:
Floor

#1 10' N of Blue Door
#2 Shelf #3 NW corner
#3 30' N of Door
#4 6' W of door
#5 Center floor
#6 Center floor
#7 old Bolt anchors
#8 inside cage
#9 30' S of wall
#10 15' W of Door

Pre-Job Sample
Before Paint Removal

S

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 46 | Bkg. 41 | Bkg. 0.0 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.0 | Bkg. 9.3 | Bkg. 0.481 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 49 | MDA 314 |

**Survey Type:** Contamination Survey

Building: 551

Location: South Warehouse Floor

Purpose: CHARACTERIZATION SURVEYS

RWP #: - NA -

Date: 04-08-99 Time: 1550

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments All Survey Spots on Floor, Plus Direct Scan 1m² at all points

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 1. | < 20 | < 200 | < 49 | 1443 |
| 2. | < 20 | < 200 | < 49 | 810 |
| 3. | < 20 | < 200 | < 49 | 672 |
| 4. | < 20 | < 200 | < 49 | 753 |
| 5. | < 20 | < 200 | < 49 | 678 |
| 6. | < 20 | < 200 | < 49 | 774 |
| 7. | < 20 | < 200 | < 49 | 797 |
| 8. | < 20 | < 200 | < 49 | 966 |
| 9. | < 20 | < 200 | < 49 | 660 |
| 10. | < 20 | < 200 | < 49 | 735 |
| 11. | < 20 | < 200 | 54 | 774 |
| 12. | < 20 | < 200 | < 49 | 600 |
| 13. | < 20 | < 200 | < 49 | 735 |
| 14. | < 20 | < 200 | < 49 | 597 |
| 15. | < 20 | < 200 | < 49 | 540 |
| 16. | < 20 | < 200 | < 49 | 993 |
| 17. | < 20 | < 200 | < 49 | 867 |
| 18. | < 20 | < 200 | < 49 | 870 |
| [illegible] | < 20 | < 200 | < 49 | 738 |
| [illegible] | < 20 | < 200 | < 49 | 735 |
| 21. | < 20 | < 200 | < 49 | 819 |
| 22. | < 20 | < 200 | < 49 | 624 |
| 23. | < 20 | < 200 | < 49 | 657 |
| 24. | < 20 | < 200 | < 49 | 729 |
| 25. | < 20 | < 200 | < 49 | 681 |
| 26. | < 20 | < 200 | < 49 | 915 |
| 27. | < 20 | < 200 | < 49 | 750 |
| 28. | < 20 | < 200 | < 49 | 765 |
| 29. | < 20 | < 200 | < 49 | 987 |
| 30. | < 20 | < 200 | < 49 | 807 |
| 31. | < 20 | < 200 | < 49 | 849 |
| 32. | < 20 | < 200 | < 49 | 834 |
| 33. | | | | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |

Date 4/9/99 RS Supervision: R Sawyer / R Sawyer [redacted]
Print Name Signature

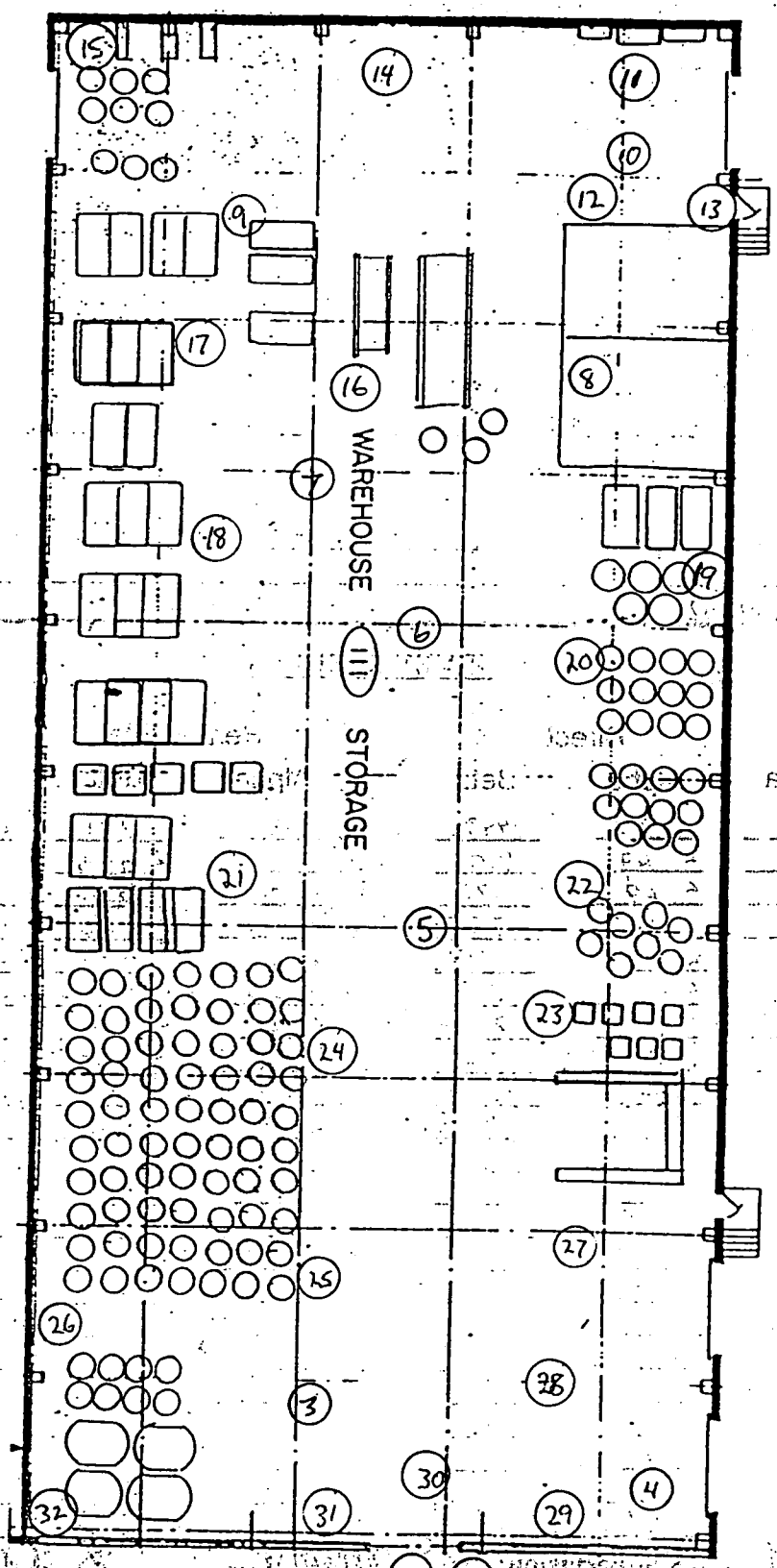
96 97

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**




98

OK

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 40 | Bkg. 37 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.2 | Bkg. 94 | Bkg. B' 513 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 55 | MDA 324 |

**Survey Type:** Contamination Survey

Building: 551

Location: Warehouse floor

Purpose: CHARACTERIZATION SURVEYS

RWP #: – NA –

Date: 04-12-99 Time: 1310

RCT: Rex Snyder / [signature] [redacted]
Print name Signature

RCT: N / A /
Print name Signature Emp. #

**PRL # :**

**Comments** Post Job Survey - After Paint was Removed

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < ~~55~~ RES 7-12-99 < 20 | < 200 | < 55 | 1041 | 23. | | | | |
| 2. | < ~~5~~ RES 7-12-99 < 20 | < 200 | < 55 | 1101 | 24. | | | | |
| 3. | < 20 | < 200 | < 55 | 1050 | 25. | | | | |
| 4. | < 20 | < 200 | < 55 | 540 | 26. | | | | |
| 5. | < 20 | < 200 | < 55 | 726 | 27. | | | | |
| 6. | < 20 | < 200 | < 55 | 885 | 28. | | | | |
| 7. | < 20 | < 200 | < 55 | < 324 | 29. | | | | |
| 8. | < 20 | < 200 | < 55 | 921 | 30. | | | | |
| 9. | < 20 | < 200 | < 55 | < 324 | 31. | | | | |
| 10. | < 20 | < 200 | < 55 | 1674 | 32. | | | | |
| 11. | | | | | 33. | | N | A | |
| 12. | | | | | 34. | | | | |
| 13. | | | | | 35. | | | | |
| 14. | | | | | 36. | | | | |
| 15. | | | | | 37. | | | | |
| 16. | | | | | 38. | | | | |
| 17. | | N | A | | 39. | | | | |
| 18. | | | | | 40. | | | | |
| 19. | | | | | 41. | | | | |
| 20. | | | | | 42. | | | | |
| 21. | | | | | 43. | | | | |
| 22. | | | | | 44. | | | | |

**Date** 4/12/99 **RS Supervision:** Letty N. Cooper / [signature] [redacted]
Print Name Signature

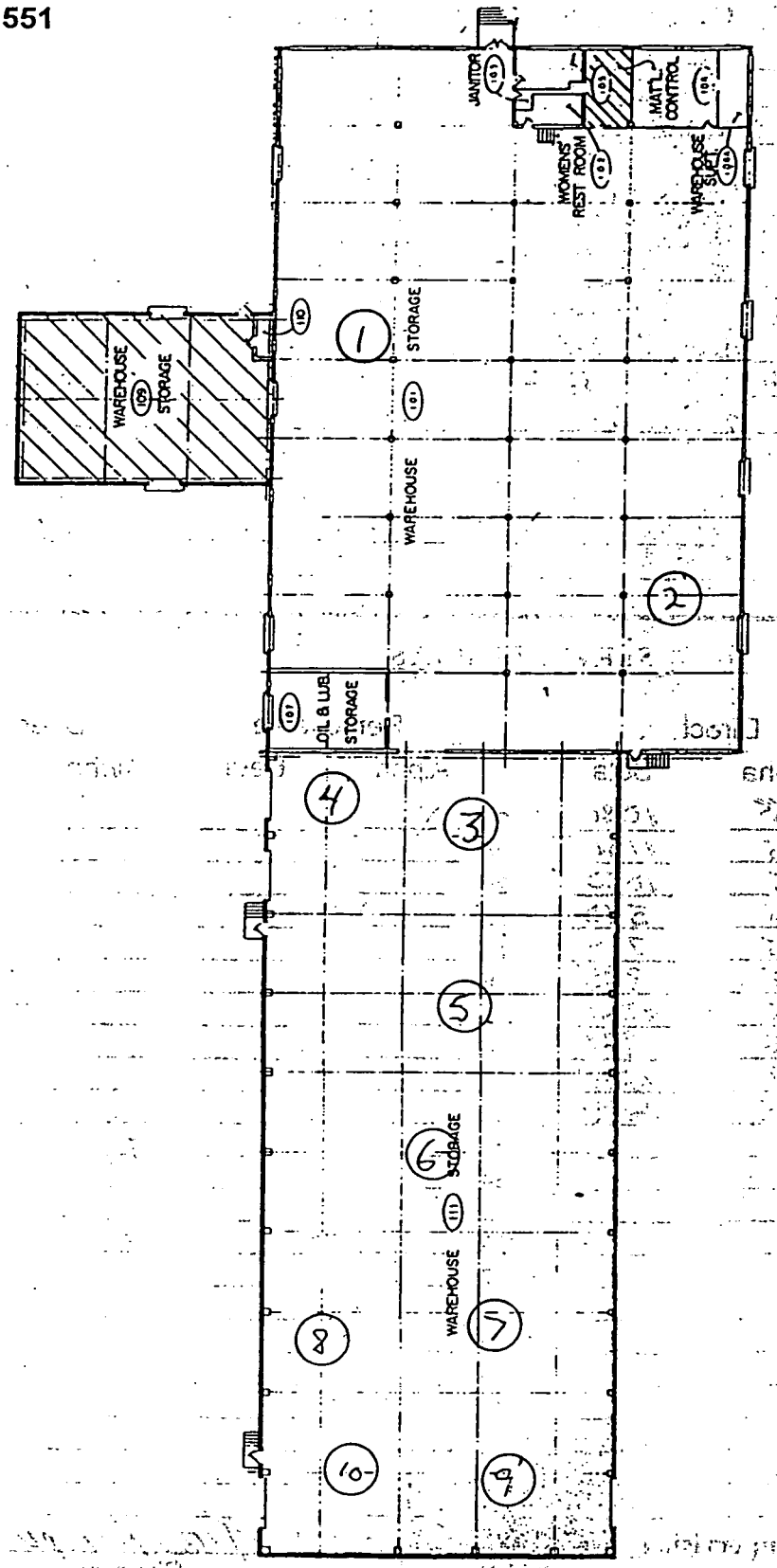
99

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**




Post Paint Sample Survey

100

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
|---|---|---|
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 40 | Bkg. 37 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |

| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
|---|---|---|
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.2 | Bkg. α 4 | Bkg. β 513 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 55 | MDA 324 |

**Survey Type:** Contamination Survey

Building: 551

Location: Ware House

Purpose: Paint Samples

RWP #: — NA —

Date: 04-12-99 Time: 1400

RCT: Rex Snyder / [signature] [redacted]
Print name Signature

RCT: N / A /
Print name Signature Emp. #

COPY

**PRL #:** 99-549-0083

**Comments** Paint Samples from 551 Non RMA area to be shipped off-site
Property Release Eval. #: 990406-00881-001

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 55 | < 324 | 23. | | | | |
| 2. | < 20 | < 200 | < 55 | < 324 | 24. | | | | |
| 3. | < 20 | < 200 | < 55 | < 324 | 25. | | | | |
| 4. | < 20 | < 200 | < 55 | < 324 | 26. | | | | |
| 5. | < 20 | < 200 | < 55 | < 324 | 27. | | | | |
| 6. | < 20 | < 200 | < 55 | < 324 | 28. | | | | |
| 7. | < 20 | < 200 | < 55 | < 324 | 29. | | | | |
| 8. | < 20 | < 200 | < 55 | < 324 | 30. | | | | |
| 9. | < 20 | < 200 | < 55 | < 324 | 31. | | | | |
| 10. | < 20 | < 200 | < 55 | < 324 | 32. | | | | |
| 11. | < 20 | < 200 | < 55 | < 324 | 33. | | | | |
| 12. | < 20 | < 200 | < 55 | < 324 | 34. | | | | |
| 13. | < 20 | < 200 | < 55 | < 324 | 35. | | | | |
| 14. | < 20 | < 200 | < 55 | < 324 | 36. | | | | |
| 15. | < 20 | < 200 | < 55 | < 324 | 37. | | | | |
| 16. | < 20 | < 200 | < 55 | < 324 | 38. | | | | |
| 17. | < 20 | < 200 | < 55 | < 324 | 39. | | | | |
| 18. | < 20 | < 200 | < 55 | < 324 | 40. | | | | |
| 19. | < 20 | < 200 | < 55 | < 324 | 41. | | | | |
| 20. | < 20 | < 200 | < 55 | < 324 | 42. | | | | |
| 21. | < 20 | < 200 | < 55 | < 324 | 43. | | | | |
| 22. | < 20 | < 200 | < 55 | < 324 | 44. | | | | |

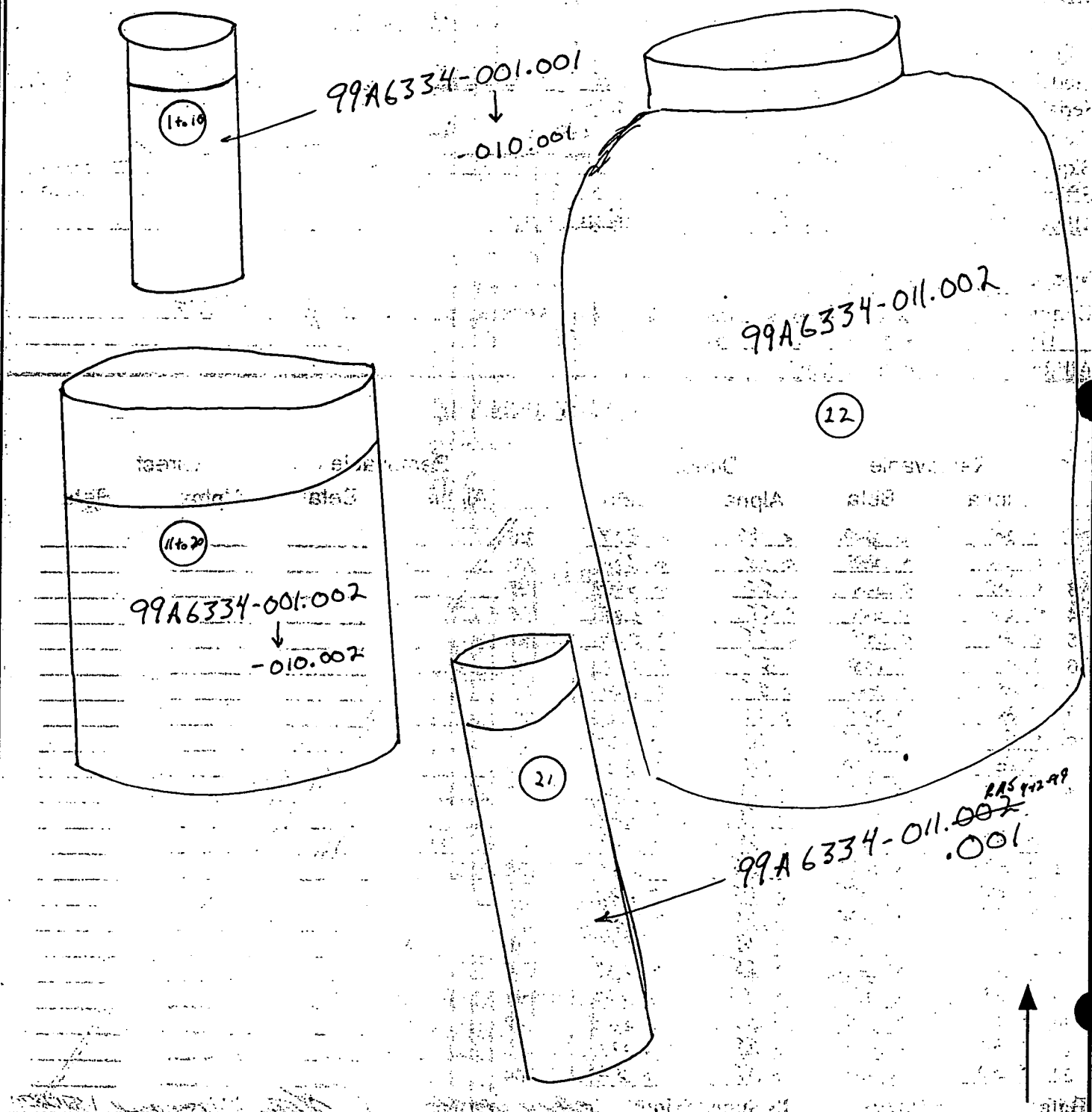
**Date** 4/12/99 **RS Supervision:** Lethyn Cooper / [signature] [redacted]
Print Name Signature

98
101

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SIT

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points




102

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
|---|---|---|
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 40 | Bkg. 37 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |

| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
|---|---|---|
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.2 | Bkg. α 4 | Bkg. β: 513 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 55 | MDA 324 |

**Survey Type:** Contamination Survey
Building: 551
Location: Warehouse
Purpose: CHARACTERIZATION SURVEYS
RWP #: -N-
Date: 04-12-99 Time: 1500
RCT: Rex Snyder / [signature] [redacted]
Print name Signature
RCT: N / A /
Print name Signature Emp. #

PRL # :
Comments: Survey on Floor + Walls 2' 2 meters Front ½ of warehouse 551
Plus Direct Scan 1m² at all points
All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 1. | < 20 | < 200 | < 55 | 666 |
| 2. | < 20 | < 200 | < 55 | 996 |
| 3. | < 20 | < 200 | 90 | 759 |
| 4. | < 20 | < 200 | 78 | 801 |
| 5. | < 20 | < 200 | < 55 | 591 |
| 6. | < 20 | < 200 | < 55 | 1152 |
| 7. | < 20 | < 200 | < 55 | 828 |
| 8. | < 20 | < 200 | < 55 | 936 |
| 9. | < 20 | < 200 | < 55 | < 324 |
| 10. | < 20 | < 200 | < 55 | 900 |
| 11. | < 20 | < 200 | < 55 | 876 |
| 12. | < 20 | < 200 | < 55 | 828 |
| 13. | < 20 | < 200 | < 55 | 654 |
| 14. | < 20 | < 200 | < 55 | 735 |
| 15. | < 20 | < 200 | < 55 | 789 |
| 16. | < 20 | < 200 | < 55 | 780 |
| 17. | < 20 | < 200 | < 55 | 756 |
| 18. | < 20 | < 200 | < 55 | 789 |
| 19. | < 20 | < 200 | 60 | 1122 |
| 20. | < 20 | < 200 | < 55 | 768 |
| 21. | < 20 | < 200 | < 55 | 705 |
| 22. | < 20 | < 200 | < 55 | 1083 |
| 23. | < 20 | < 200 | < 55 | 435 |
| 24. | < 20 | < 200 | < 55 | 849 |
| 25. | < 20 | < 200 | < 55 | 723 |
| 26. | < 20 | < 200 | < 55 | 945 |
| 27. | < 20 | < 200 | < 55 | 693 |
| 28. | < 20 | < 200 | < 55 | 480 |
| 29. | < 20 | < 200 | < 55 | 996 |
| 30. | < 20 | < 200 | < 55 | 1089 |
| 31. | < 20 | < 200 | < 55 | 993 |
| 32. | < 20 | < 200 | < 55 | 1224 |
| 33. | | | | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |

N A

Date 4/12/99 RS Supervision: Letty N. Cooper / [signature] [redacted]
Print Name Signature Emp. #

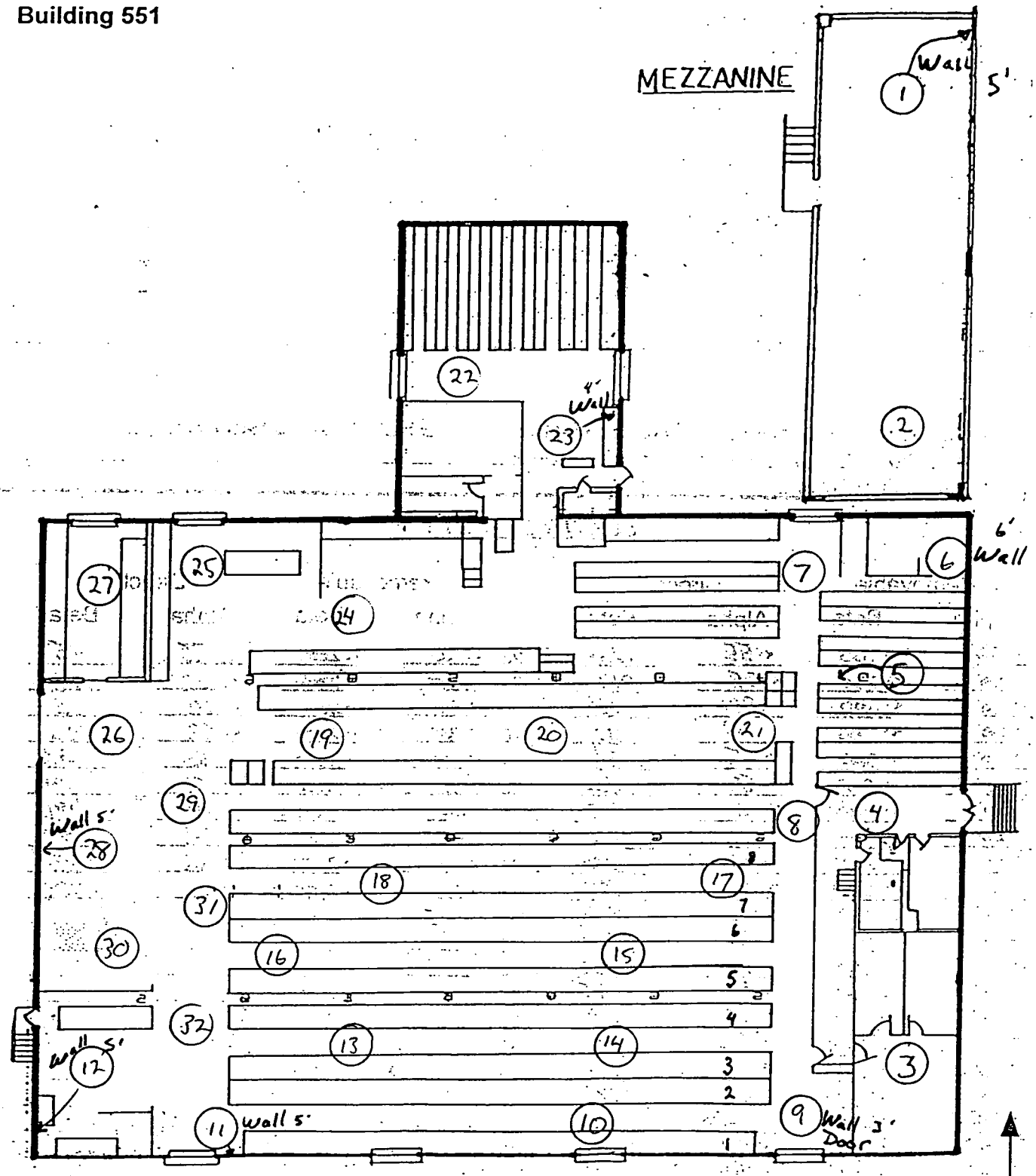
103

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**



# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
|---|---|---|
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 42 | Bkg. 37 | Bkg. 0.0 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |

| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
|---|---|---|
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.2 | Bkg. 9 5 | Bkg. 3 478 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 60 | MDA 313 |

**Survey Type:** Contamination Survey

Building: 551

Location: Warehouse

Purpose: CHARACTERIZATION SURVEYS

RWP #: - NA -

Date: 04-13-99 Time: 1500

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments Survey points for < 2 meter building systems PLUS Direct Scan 1m² at all points < 2 meter

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 1. | < 20 | < 200 | < 60 | 459 |
| 2. | < 20 | < 200 | < 60 | < 313 |
| 3. | < 20 | < 200 | < 60 | < 313 |
| 4. | < 20 | < 200 | < 60 | 504 |
| 5. | < 20 | < 200 | < 60 | < 313 |
| 6. | < 20 | < 200 | < 60 | 507 |
| 7. | < 20 | < 200 | < 60 | 990 |
| 8. | < 20 | < 200 | < 60 | 372 |
| 9. | < 20 | < 200 | < 60 | < 313 |
| 10. | < 20 | < 200 | < 60 | 624 |
| 11. | < 20 | < 200 | < 60 | 1038 |
| 12. | < 20 | < 200 | < 60 | < 313 |
| 13. | < 20 | < 200 | < 60 | 690 |
| 14. | < 20 | < 200 | < 60 | 423 |
| 15. | < 20 | < 200 | < 60 | < 313 |
| 16. | | | | |
| 17. | | | | |
| 18. | | | | |
| 19. | | | | |
| 20. | | | | |
| 21. | | | | |
| 22. | | | | |

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 23. | | | | |
| 24. | | | | |
| 25. | | | | |
| 26. | | | | |
| 27. | | | | |
| 28. | | | | |
| 29. | | | | |
| 30. | | | | |
| 31. | | | | |
| 32. | | | | |
| 33. | | | | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |

N A

Date 4/13/99 RS Supervision: Letty N. Cooper / [signature] [redacted]
Print Name Signature

105

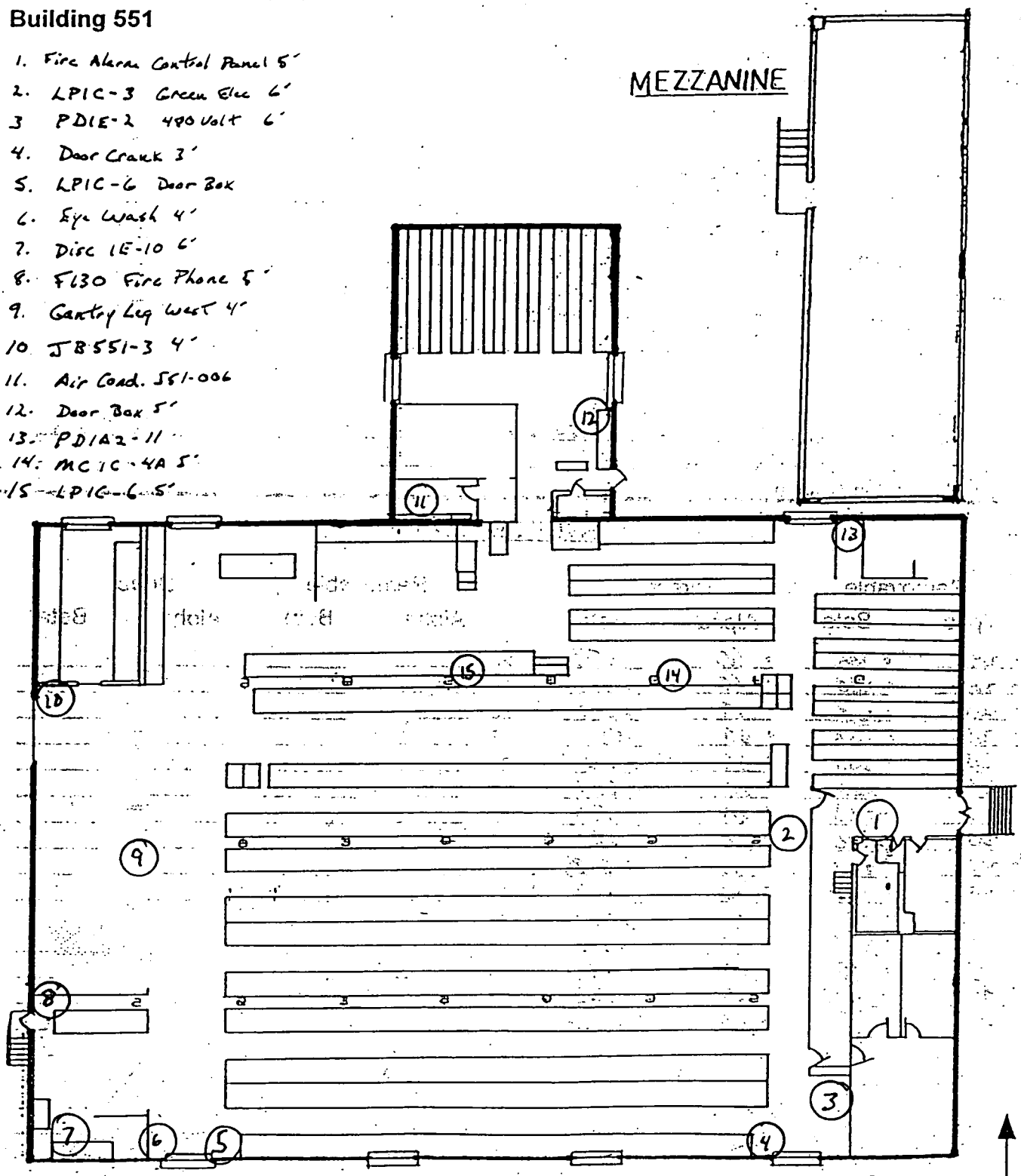
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SIT

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**

1. Fire Alarm Control Panel 5'
2. LPIC-3 Green Elec 6'
3. PDIE-2 480 Volt 6'
4. Door Crank 3'
5. LPIC-6 Door Box
6. Eye Wash 4'
7. Disc IE-10 6'
8. F630 Fire Phone 5'
9. Gantry Leg West 4'
10. JB551-3 4'
11. Air Cond. 551-006
12. Door Box 5'
13. PDIA2-11
14. MCIC-4A 5'
15. LPIC-6 5'



# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 42 | Bkg. 37 | Bkg. 0.0 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.2 | Bkg. 9 5 | Bkg. 8 478 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.6% |
| MDA <20 | MDA 60 | MDA 313 |

**Survey Type:** Contamination Survey

Building: 551

Location: Ware House

Purpose: CHARACTERIZATION SURVEYS

RWP #: -NA-

Date: 04-13-99 Time: 1545

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: / /
Print name Signature Emp. #

PRL # :

Comments Remaining Floor + < 2 meter wall survey points + < 2 meter Building Systems Plus Direct scan at all < 2 meter points at 1 m²

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 60 | 1074 | 23. | < 20 | < 200 | < 60 | < 313 |
| 2. | < 20 | < 200 | < 60 | 741 | 24. | < 20 | < 200 | < 60 | < 313 |
| 3. | < 20 | < 200 | < 60 | 696 | 25. | < 20 | < 200 | < 60 | < 313 |
| 4. | < 20 | < 200 | < 60 | 789 | 26. | < 20 | < 200 | < 60 | < 313 |
| 5. | < 20 | < 200 | < 60 | 666 | 27. | < 20 | < 200 | < 60 | < 313 |
| 6. | < 20 | < 200 | < 60 | 624 | 28. | < 20 | < 200 | < 60 | < 313 |
| 7. | < 20 | < 200 | < 60 | 732 | 29. | < 20 | < 200 | < 60 | < 313 |
| 8. | < 20 | < 200 | < 60 | 783 | 30. | < 20 | < 200 | < 60 | < 313 |
| 9. | < 20 | < 200 | < 60 | 657 | 31. | < 20 | < 200 | < 60 | < 313 |
| 10. | < 20 | < 200 | < 60 | 696 | 32. | < 20 | < 200 | < 60 | < 313 |
| 11. | < 20 | < 200 | < 60 | 678 | 33. | < 20 | < 200 | < 60 | < 313 |
| 12. | < 20 | < 200 | < 60 | 849 | 34. | < 20 | < 200 | < 60 | < 313 |
| 13. | < 20 | < 200 | < 60 | 801 | 35. | < 20 | < 200 | < 60 | < 313 |
| 14. | < 20 | < 200 | < 60 | < 313 | 36. | < 20 | < 200 | < 60 | < 313 |
| 15. | < 20 | < 200 | < 60 | < 313 | 37. | < 20 | < 200 | < 60 | < 313 |
| 16. | < 20 | < 200 | < 60 | < 313 | 38. | < 20 | < 200 | < 60 | < 313 |
| 17. | < 20 | < 200 | < 60 | < 313 | 39. | < 20 | < 200 | < 60 | < 313 |
| 18. | < 20 | < 200 | < 60 | < 313 | 40. | < 20 | < 200 | < 60 | < 313 |
| [illegible] | < 20 | < 200 | < 60 | < 313 | 41. | | | | |
| [illegible] | < 20 | < 200 | < 60 | < 313 | 42. | | | | |
| 21. | < 20 | < 200 | < 60 | < 313 | 43. | | | | |
| 22. | < 20 | < 200 | < 60 | 531 | 44. | | | | |

Date 4/13/99 RS Supervision: Cathy N. Cooper / [signature] [redacted]
Print Name Signature

107

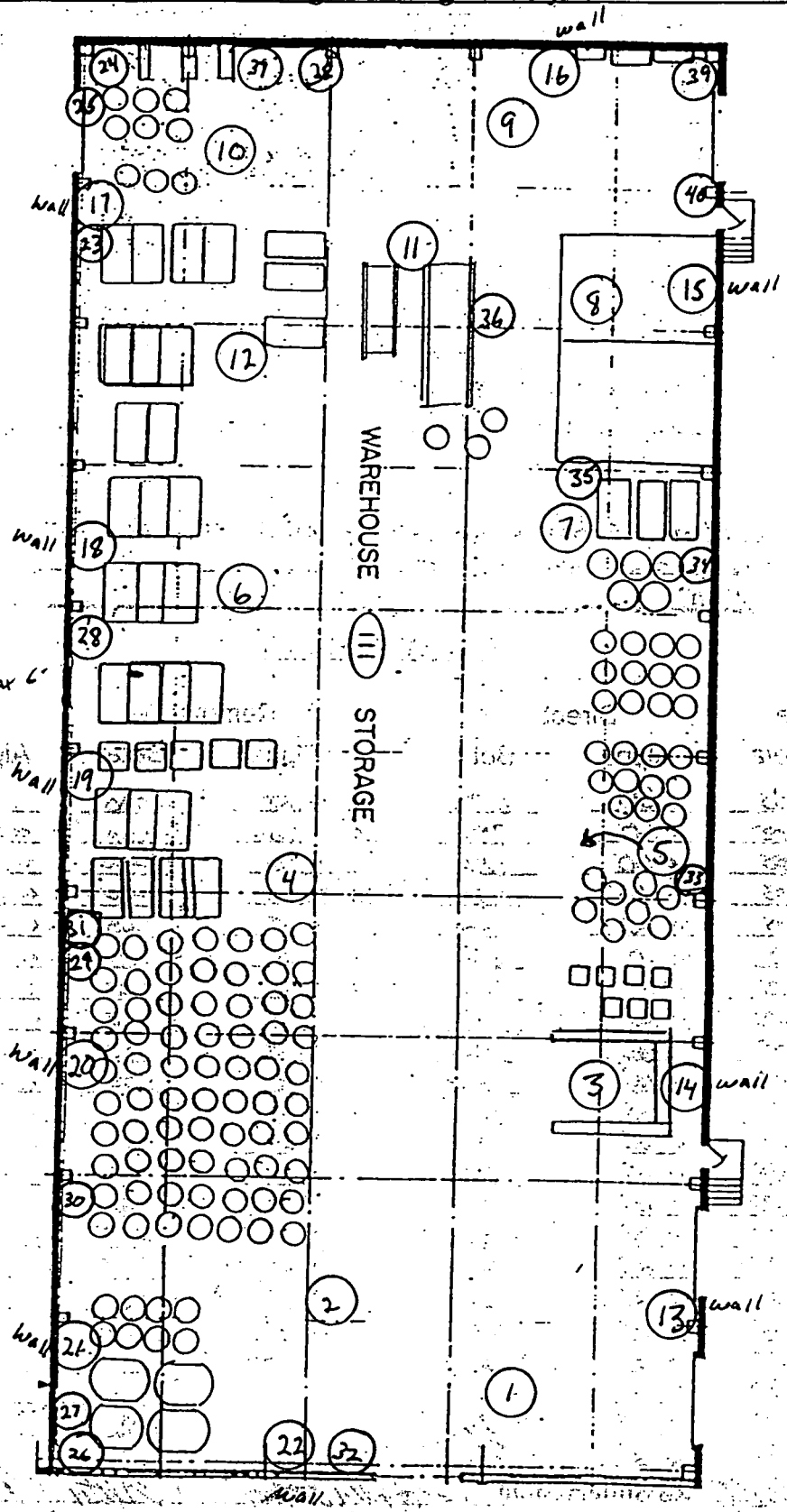
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**

23 Fire line Valve 5'
24 SB551-1 Box 4'
25. 480V Box 6'
26 Condensate Steam 5'
27. DI-C10 4'
28 Beam 6'
29. Conduit/Box 5'
30. Wood/Phone Line
31 Fire System Value
32 Fire Value
33 PDIAI-11/1 6'
34. TI-AI-17 3'
35 Cage wall 4'
36. Mockup Glove Box 6'
37. Shelf 5'
38 Shelf 5'
39 Fire System B/3
40. Door Box




108

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | | |
|---|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE | Survey Type: Contamination Survey |
| Model BC-4 | Model BC-4 | Model SAC-4 | Building: 551 |
| Serial # 838 | Serial # 874 | Serial # 959 | Location: Warehouse |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 | Purpose: CHARACTERIZATION SURVEYS |
| Bkg. 44 | Bkg. 41 | Bkg. 0.1 | |
| Efficiency 25% | Efficiency 25% | Efficiency 33% | RWP #: - NA - |
| MDA <200 | MDA <200 | MDA <20 | |
| | | | Date: 04-19-99 Time: 1400 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH | |
| Model SAC-4 | Model ELECTRA | Model ELECTRA | RCT: Rex Snyder / [redacted] |
| Serial # 1188 | Serial # 2343 | Serial # 2343 | Print name / Signature |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 | |
| Bkg. 0.0 | Bkg. α 2 | Bkg. β: 473 | RCT: N / A / |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% | Print name / Signature / Emp. # |
| MDA <20 | MDA 43 | MDA 311 | |

PRL # :

Comments Exterior Survey Points Walls + Roof

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable | | Direct | | | Removable | | Direct | |
|---|---|---|---|---|---|---|---|---|---|
| | Alpha | Beta | Alpha | Beta | | Alpha | Beta | Alpha | Beta |
| 1. | < 20 | < 200 | < 43 | 825 | 23. | < 20 | < 200 | < 43 | < 311 |
| 2. | < 20 | < 200 | < 43 | 618 | 24. | < 20 | < 200 | 156 | < 311 |
| 3. | < 20 | < 200 | < 43 | 480 | 25. | < 20 | < 200 | 66 | 540 |
| 4. | < 20 | < 200 | < 43 | 690 | 26. | < 20 | < 200 | 228 | < 311 |
| 5. | < 20 | < 200 | < 43 | 600 | 27. | < 20 | < 200 | 102 | 930 |
| 6. | < 20 | < 200 | < 43 | < 311 | 28. | < 20 | < 200 | < 43 | 876 |
| 7. | < 20 | < 200 | < 43 | < 311 | 29. | < 20 | < 200 | 60 | 654 |
| 8. | < 20 | < 200 | < 43 | < 311 | 30. | < 20 | < 200 | < 43 | 1071 |
| 9. | < 20 | < 200 | < 43 | < 311 | 31. | | | | |
| 10. | < 20 | < 200 | < 43 | 606 | 32. | | | | |
| 11. | < 20 | < 200 | < 43 | < 311 | 33. | | | | |
| 12. | < 20 | < 200 | < 43 | < 311 | 34. | | | | |
| 13. | < 20 | < 200 | < 43 | 951 | 35. | | | | |
| 14. | < 20 | < 200 | < 43 | 912 | 36. | | | | |
| 15. | < 20 | < 200 | < 43 | 735 | 37. | | N | A | |
| 16. | < 20 | < 200 | < 43 | < 311 | 38. | | | | |
| 17. | < 20 | < 200 | < 43 | 876 | 39. | | | | |
| 18. | < 20 | < 200 | < 43 | 708 | 40. | | | | |
| [illegible] | < 20 | < 200 | < 43 | 624 | 41. | | | | |
| [illegible] | < 20 | < 200 | < 43 | 453 | 42. | | | | |
| 21. | < 20 | < 200 | < 43 | 531 | 43. | | | | |
| 22. | < 20 | < 200 | < 43 | 681 | 44. | | | | |

Date 4/19/99 RS Supervision: L N Cooper / [redacted]

Print Name / Signature

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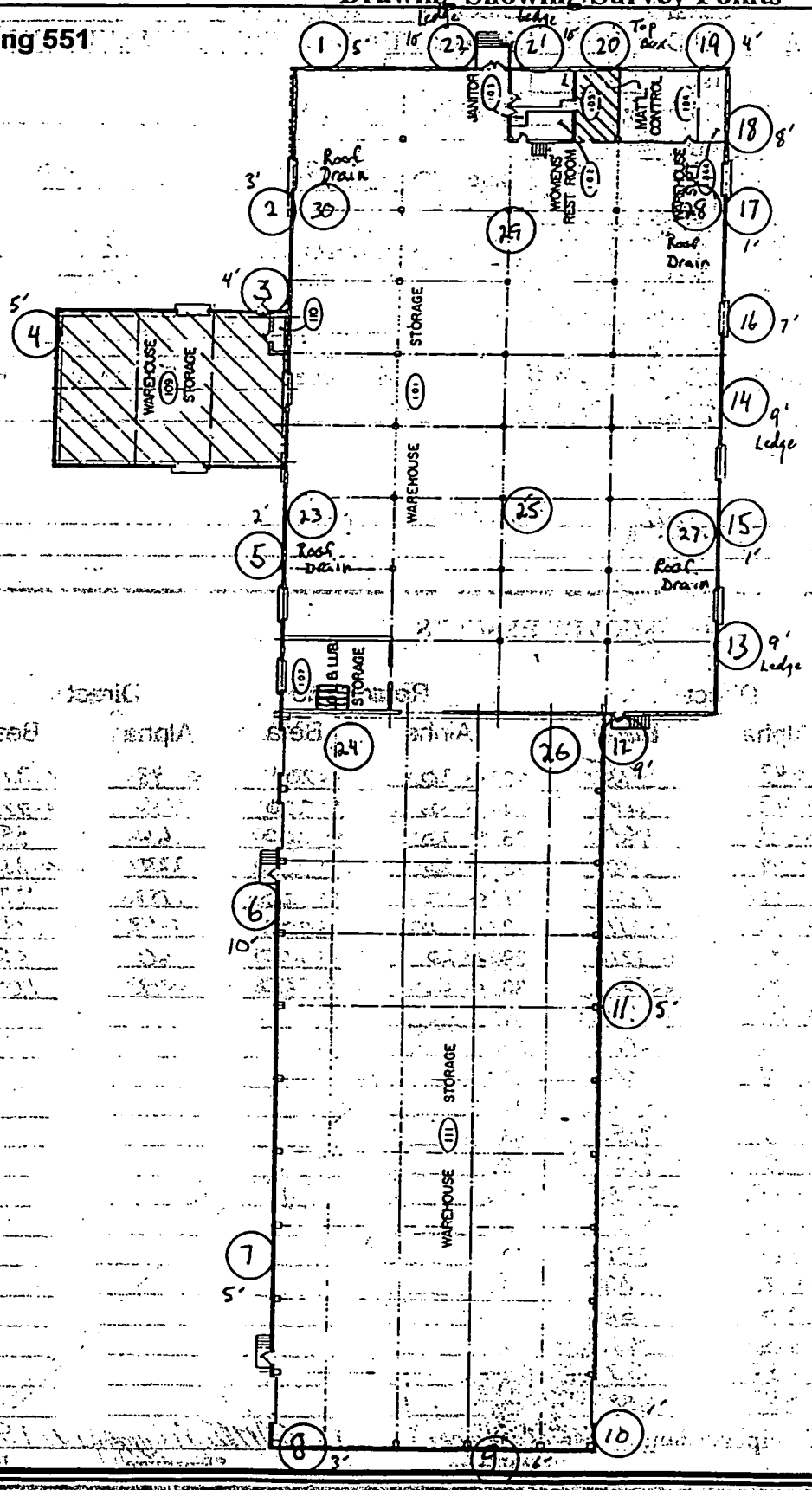
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SIT

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

Building 551



# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

COPY

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 40 | Bkg. 41 | Bkg. 00 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2356 | Serial # 2356 |
| Cal Due 6/16/99 | Cal Due 8-18-99 | Cal Due 8-18-99 |
| Bkg. 0.2 | Bkg. 9 ~~22~~ 4 | Bkg. 8 499 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 31.3% |
| MDA <20 | MDA 55 | MDA 313 |

Survey Type: Contamination Survey

Building: 551

Location: Warehouse

Purpose: CHARACTERIZATION SURVEYS

RWP #: -NA-

Date: 04-20-99 Time: 1500

RCT: Rex Snyder / [signature] [redacted]
Print name Signature

RCT: N / A /
Print name Signature Emp. #

PRL #:

Comments: Building Systems > 2 meter. (Front Half of warehouse only)

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 1. | < 20 | < 200 | < 55 | < 313 |
| 2. | < 20 | < 200 | < 55 | < 313 |
| 3. | < 20 | < 200 | < 55 | 1053 |
| 4. | < 20 | < 200 | < 55 | < 313 |
| 5. | < 20 | < 200 | < 55 | < 313 |
| 6. | < 20 | < 200 | < 55 | < 313 |
| 7. | < 20 | < 200 | < 55 | 459 |
| 8. | < 20 | < 200 | < 55 | 606 |
| 9. | < 20 | < 200 | < 55 | < 313 |
| 10. | < 20 | < 200 | < 55 | < 313 |
| 11. | < 20 | < 200 | < 55 | < 313 |
| 12. | < 20 | < 200 | < 55 | < 313 |
| 13. | < 20 | < 200 | < 55 | < 313 |
| 14. | < 20 | < 200 | < 55 | < 313 |
| 15. | < 20 | < 200 | < 55 | < 313 |
| 16. | < 20 | < 200 | < 55 | 423 |
| 17. | < 20 | < 200 | < 55 | < 313 |
| 18. | < 20 | < 200 | < 55 | < 313 |
| 19. | < 20 | < 200 | < 55 | < 313 |
| 20. | | | | |
| 21. | | | | |
| 22. | | | | |
| 23. | | | | |
| 24. | | | | |
| 25. | | | | |
| 26. | | | | |
| 27. | | | | |
| 28. | | | | |
| 29. | | | | |
| 30. | | | | |
| 31. | | | | |
| 32. | | | | |
| 33. | | | | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |

N A

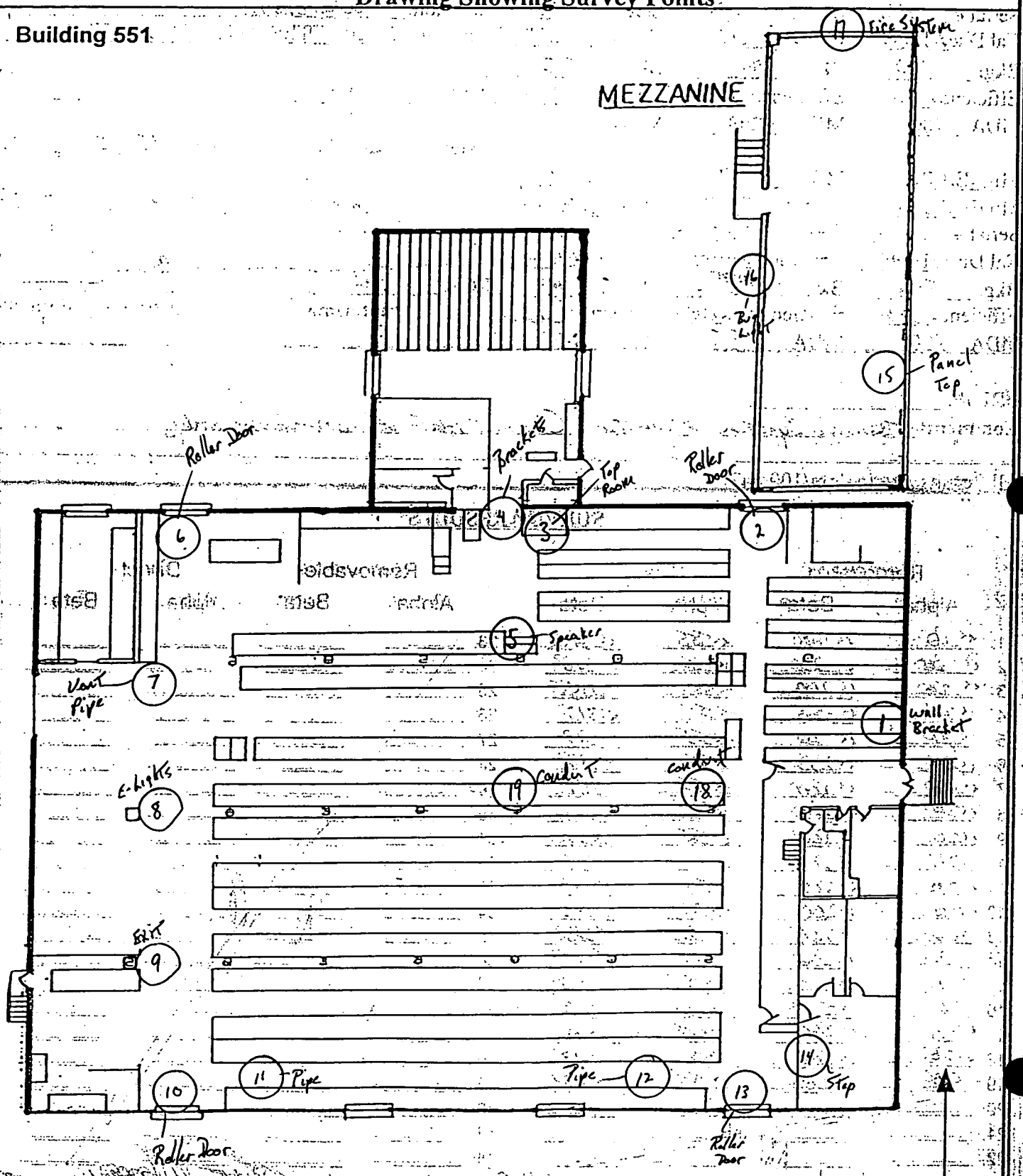
Date 4/21/99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name Signature

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## RADIOLOGICAL SAFETY

### Drawing Showing Survey Points

Building 551



# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | | |
|---|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE | Survey Type: Contamination Survey |
| Model BC-4 | Model BC-4 | Model SAC-4 | Building: 551 |
| Serial # 838 | Serial # 874 | Serial # 959 | Location: Warehouse |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 | Purpose: CHARACTERIZATION SURVEYS |
| Bkg. 39 | Bkg. 38 | Bkg. 0.2 | |
| Efficiency 25% | Efficiency 25% | Efficiency 33% | RWP #: – NA |
| MDA <200 | MDA <200 | MDA <20 | |
| | | | Date: 04-27-99 Time: 1800 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH | |
| Model SAC-4 | Model ELECTRA | Model ELECTRA | RCT: Rex Snyder / [redacted] |
| Serial # 1188 | Serial # 1682 | Serial # 1682 | Print name / Signature |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 | |
| Bkg. 0.2 | Bkg. 3 | Bkg. 496 | RCT: N / A / |
| Efficiency 33% | Efficiency 22.3% | Efficiency 31.1% | Print name / Signature / Emp. # |
| MDA <20 | MDA 49 | MDA 318 | |

PRL # :

Comments Asbestos Sampling Pre + Post Survey Results + Sample Survey

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 49 | 831 | 23. | | | | |
| 2. | < 20 | < 200 | < 49 | < 318 | 24. | | | | |
| 3. | < 20 | < 200 | < 49 | < 318 | 25. | | | | |
| 4. | < 20 | < 200 | < 49 | 807 | 26. | | | | |
| 5. | < 20 | < 200 | < 49 | < 318 | 27. | | | | |
| 6. | < 20 | < 200 | < 49 | < 318 | 28. | | | | |
| 7. | < 20 | < 200 | < 49 | < 318 | 29. | | | | |
| 8. | < 20 | < 200 | < 49 | 642 | 30. | | | | |
| 9. | < 20 | < 200 | < 49 | < 318 | 31. | | | | |
| 10. | < 20 | < 200 | < 49 | 570 | 32. | | | | |
| 11. | < 20 | < 200 | < 49 | 342 | 33. | | | | |
| 12. | < 20 | < 200 | < 49 | < 318 | 34. | | | | |
| 13. | < 20 | < 200 | < 49 | < 318 | 35. | | | | |
| 14. | < 20 | < 200 | < 49 | < 318 | 36. | | | | |
| 15. | < 20 | < 200 | < 49 | < 318 | 37. | | | | |
| 16. | < 20 | < 200 | < 49 | < 318 | 38. | | | | |
| 17. | < 20 | < 200 | < 49 | < 318 | 39. | | | | |
| 18. | < 20 | < 200 | < 49 | < 318 | 40. | | | | |
| 19. | < 20 | < 200 | < 49 | < 318 | 41. | | | | |
| [illegible] | < 20 | < 200 | < 49 | < 318 | 42. | | | | |
| 21. | < 20 | < 200 | < 49 | < 318 | 43. | | | | |
| 22. | N | | A | | 44. | | | | |

Date 4/28/99 RS Supervision: LN Cooper / [redacted]
Print Name Signature Emp. #

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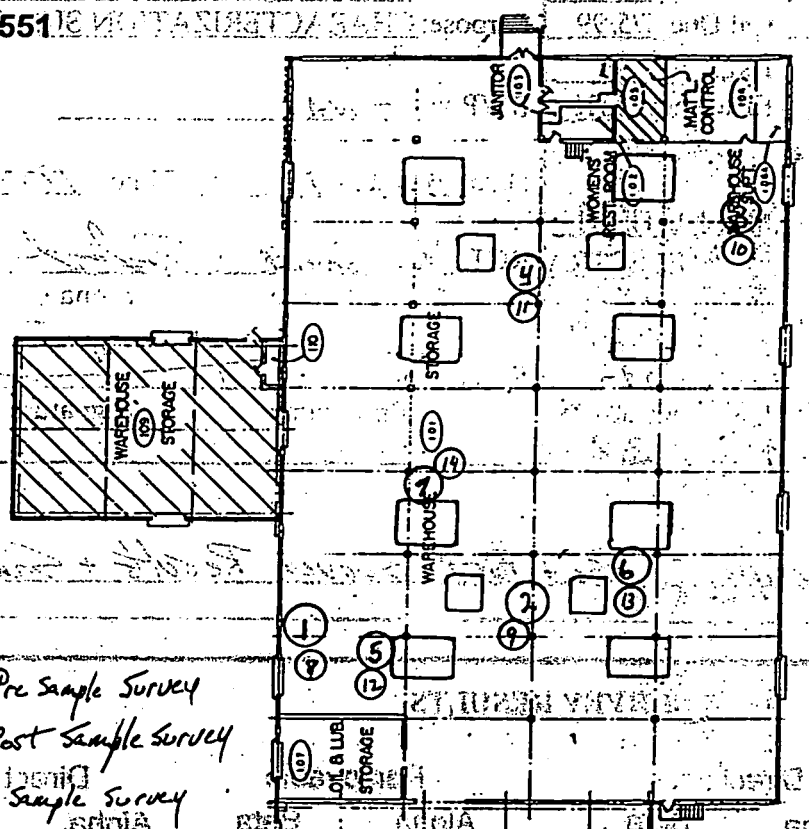
Page ____ of ____

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

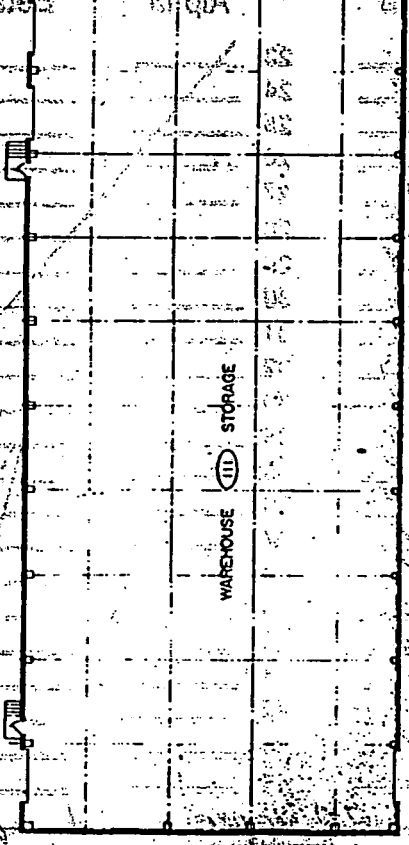
## RADIOLOGICAL SAFETY
### Drawing Showing Survey Points

**Building 551**




#1 to 7 = Pre Sample Survey
# 8 to 14 = Post Sample Survey
# 15 to 21 = Sample Survey

Sample

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copy

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. | Bkg. | Bkg. |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 1255 | Serial # 1255 |
| Cal Due 6/16/99 | Cal Due 9-16-99 | Cal Due 9-16-99 |
| Bkg. | Bkg. / | Bkg. 477 |
| Efficiency 33% | Efficiency 21.8% | Efficiency 31.8% |
| MDA <20 | MDA 35 | MDA 312 |

**Survey Type:** Contamination Survey

Building: 551

Location: Warehouse

Purpose: CHARACTERIZATION SURVEYS

RWP #: — NA —

Date: 04-28-99 Time: 1500

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments Survey Points Ceiling + Walls + Building Systems > 2 meter

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 35 | < 312 | 23. | < 20 | < 200 | < 35 | < 312 |
| 2. | < 20 | < 200 | < 35 | < 312 | 24. | < 20 | < 200 | < 35 | < 312 |
| 3. | < 20 | < 200 | < 35 | < 312 | 25. | < 20 | < 200 | < 35 | < 312 |
| 4. | < 20 | < 200 | < 35 | < 312 | 26. | < 20 | < 200 | < 35 | < 312 |
| 5. | < 20 | < 200 | < 35 | < 312 | 27. | < 20 | < 200 | < 35 | 837 |
| 6. | < 20 | < 200 | < 35 | < 312 | 28. | < 20 | < 200 | < 35 | 927 |
| 7. | < 20 | < 200 | < 35 | < 312 | 29. | < 20 | < 200 | < 35 | 579 |
| 8. | < 20 | < 200 | < 35 | < 312 | 30. | < 20 | < 200 | < 35 | 381 |
| 9. | < 20 | < 200 | < 35 | < 312 | 31. | < 20 | < 200 | < 35 | 894 |
| 10. | < 20 | < 200 | < 35 | < 312 | 32. | < 20 | < 200 | < 35 | < 312 |
| 11. | < 20 | < 200 | < 35 | < 312 | 33. | < 20 | < 200 | < 35 | 423 |
| 12. | < 20 | < 200 | < 35 | < 312 | 34. | < 20 | < 200 | < 35 | < 312 |
| 13. | < 20 | < 200 | < 35 | < 312 | 35. | < 20 | < 200 | < 35 | 855 |
| 14. | < 20 | < 200 | < 35 | < 312 | 36. | < 20 | < 200 | < 35 | 822 |
| 15. | < 20 | < 200 | < 35 | < 312 | 37. | | | | |
| 16. | < 20 | < 200 | < 35 | < 312 | 38. | | | | |
| 17. | < 20 | < 200 | < 35 | < 312 | 39. | | | | |
| 18. | < 20 | < 200 | < 35 | < 312 | 40. | | | | |
| [illegible] | < 20 | < 200 | < 35 | < 312 | 41. | | | | |
| 20. | < 20 | < 200 | < 35 | < 312 | 42. | | | | |
| 21. | < 20 | < 200 | < 35 | < 312 | 43. | | | | |
| 22. | < 20 | < 200 | < 35 | < 312 | 44. | | | | |

NA

Date 4/28/99 RS Supervision: L.N. Cooper / [signature] [redacted]
Print Name Signature

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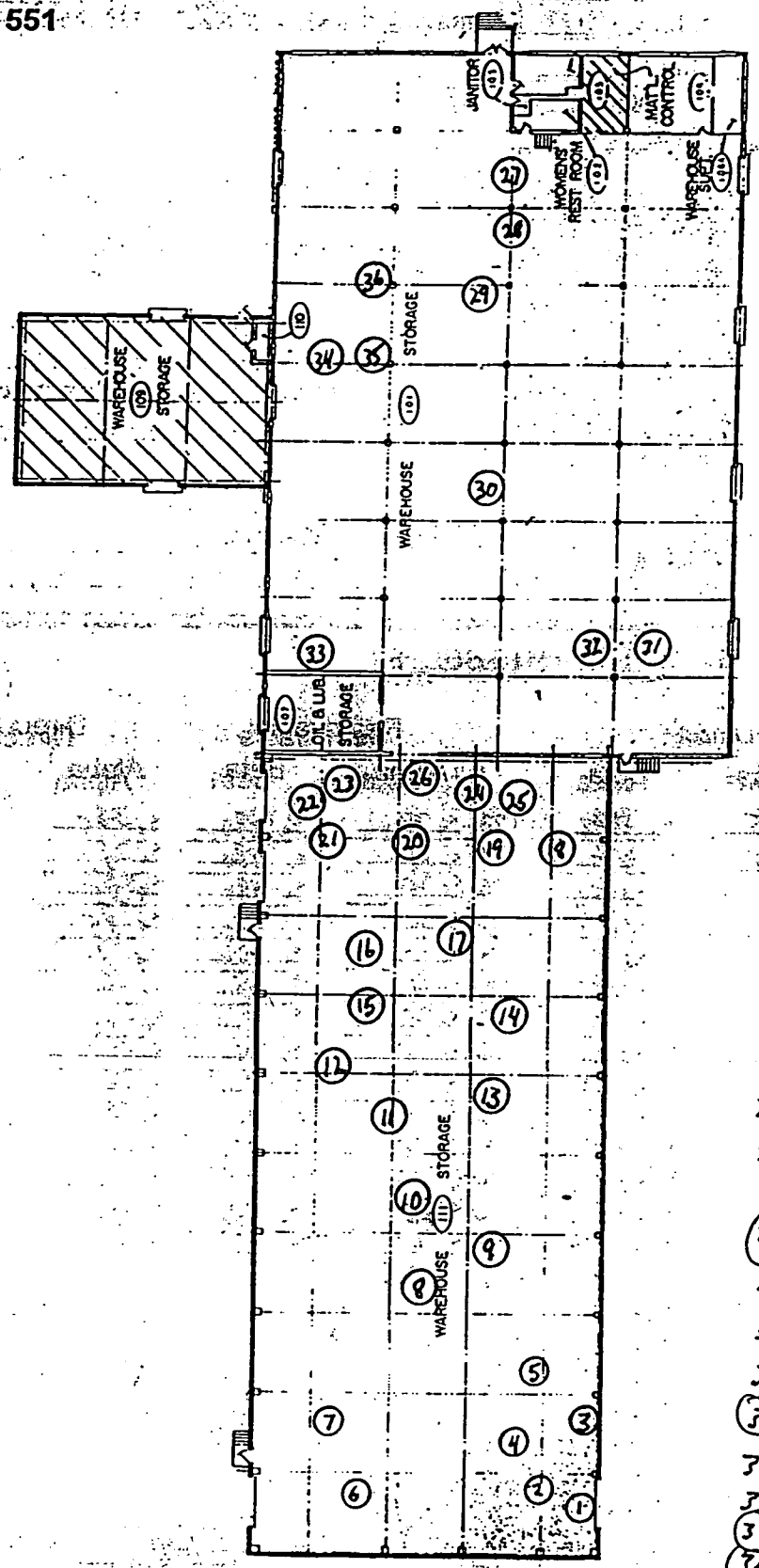
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 551**




1. Door Spring
2. Light
3. Ledge 20'
4. Fan
5. Beam 20'
6. Light
7. Beam 20'
8. Speakers
9. Light
10. Steamline 22'
11. Beam
12. Fire System 22'
13. Steam line 24'
14. 8" I Beam 20'
15. Cable Tray 18'
16. Fire System 22'
17. 6" Beam 20'
18. Steamline 18'
19. Light
20. Light
21. Light
22. Vent
23. Light
24. Light
25. Steam line
26. Beam
27. Light
28. Ceiling
29. Vent
30. Heater
31. Heater
32. Ceiling
33. Vent Pipe
34. Fire System
35. Ceiling
36. Ceiling

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# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSRUMENT DATA

| | | |
|---|---|---|
| Mfg. Eberline | Mfg. Eberline | Mfg. NE Electra |
| Model SAC-4 | Model SAC-4 | Model DP6 |
| Serial# 835 | Serial# 824 | Serial# 1682 |
| Cal Due 10-26-99 | Cal Due 10-13-99 | Cal Due 8-12-99 |
| Bkg. 0.4 | Bkg. 0.3 | Bkg. 2/454 |
| Efficienc 0.33 | Efficienc 0.33 | Efficienc 22.2%/3068 |
| MDA <20 | MDA <20 | MDA 42/333 |
| Mfg. Ebeline | Mfg. Ebeline | Mfg. |
| Model BC-4 | Model BC-4 | Model |
| Serial# 905 | Serial# 702 | Serial# |
| Cal Due 9-30-99 | Cal Due 11-20-99 | Cal Due |
| Bkg. 38 | Bkg. 40 | Bkg. |
| Efficienc 0.25 | Efficienc 0.25 | Efficienc |
| MDA <200 | MDA <200 | MDA |

Survey Type: Contamination

Building: 551

Location: Roof of Warehouse

Purpose: RE-Characterization Survey

RWP #: N/A

Date: 7-27-99 Time: 1400

RCT: P. Vestal / [signature] [redacted]
Print name Signature

RCT: / /
Print name Signature Emp. #

PRL #:

Comments: This was a resurvey of original locations #27, #26 & #24 as shown on map on back. Each location was surveyed twice.

## SURVEY RESULTS

| Swipe # | Location/Description Results in DPM/100sq/cm | Removable Alpha | Removable Beta | Total Removable+Fixed Alpha | Total Removable+Fixed Beta |
|---|---|---|---|---|---|
| 1 | 1st Reading | <20 | <200 | 96 | <333 |
| 2 | 2nd Reading | <20 | <200 | 108 | <333 |
| 3 | 1st Reading | <20 | <200 | 192 | <333 |
| 4 | 2nd Reading | <20 | <200 | 234 | <333 |
| 5 | 1st Reading | <20 | <200 | 258 | <333 |
| 6 | 2nd Reading | <20 | <200 | 270 | <333 |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |

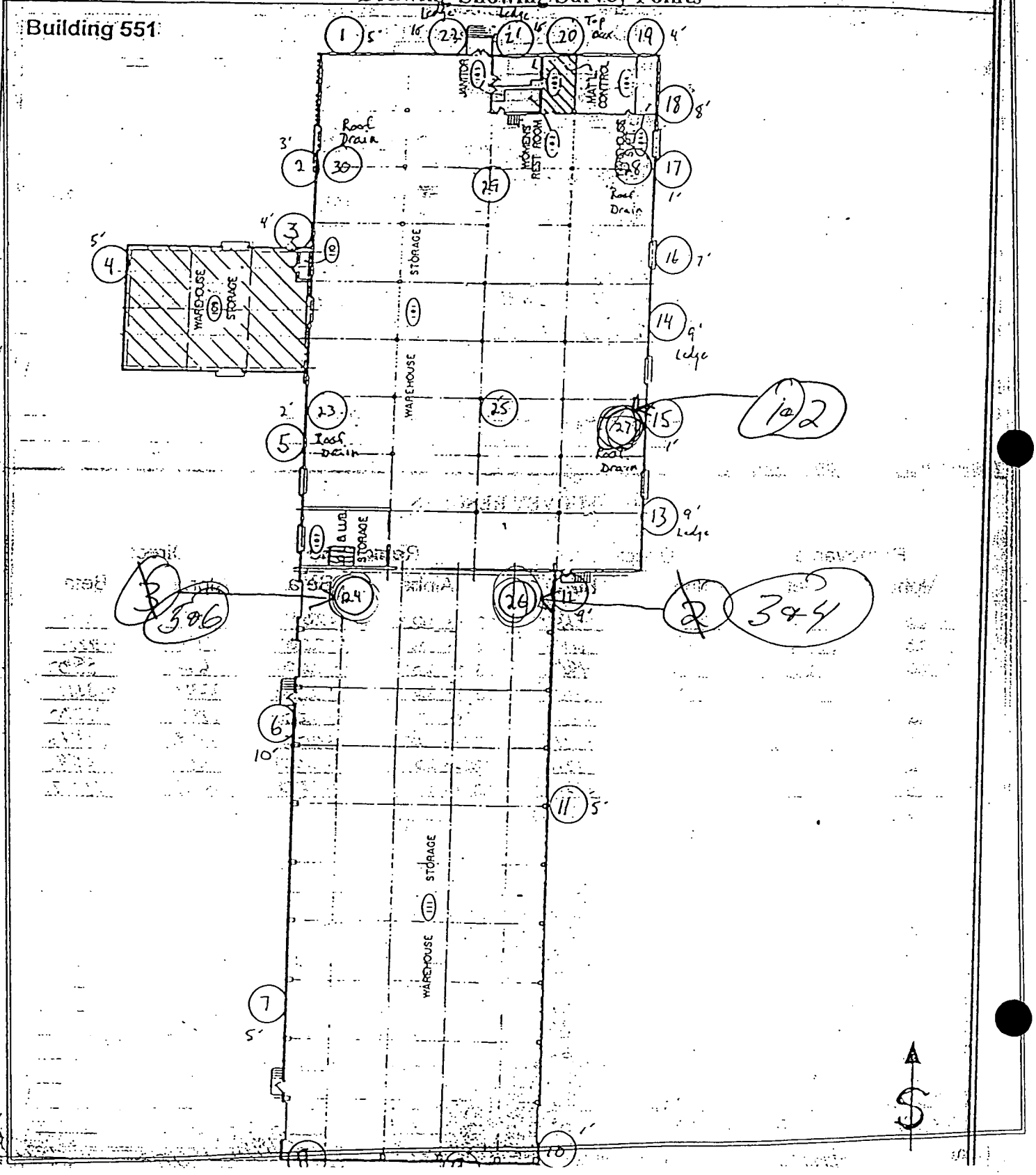
| Swipe # | Location/Description Results in DPM/100sq/cm | Removable Alpha | Removable Beta | Total Removable+Fixed Alpha | Total Removable+Fixed Beta |
|---|---|---|---|---|---|
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |

Date Reviewed: 7-27-99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name Signature

# ROCKWELL MS ENVIRONMENTAL TECHNOLOGY SITE
## RADIOLOGICAL SAFETY
### Drawing Showing Survey Points

RADIOLOGICAL SAFETY
Drawing Showing Survey Points

Building 551

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## SECTION 5

### *SDG NARRATIVE:* INORGANIC METAL FRACTION

| | |
|---|---|
| **RIN #:** | 98A5236-B |
| **SWLO BATCH ID:** | 980827TI1, 980902HG1 |
| **ANALYTE:** | Metals |
| **Samples:** | 35234.02,4,6,7,9,11,13,15,17,19,21,23,25,&27 |
| **SAMPLE MATRIX:** | TCLP extracts |

**METHOD REFERENCE NUMBERS AND REVISIONS:**
The samples were analyzed according to the following SWLO procedures and in accordance to specifications in SS08:

| SWLO SOP | Method of Reference |
|---|---|
| SWL-IN-700 rev. 4.0 | SW846 1311 |
| SWL-IN-205 rev. 5.0 | SW846 3010A / 3050B / 6010B |
| SWL-IN-207 rev. 2.1 | SW846 7470A / 7471A |

**DESCRIPTION OF MATRIX INTERFERENCES:**
Matrix interference was not observed in samples.

**DESCRIPTION OF REQUIRED DILUTIONS:**
Dilutions were required for Ca, Zn, and Na. Sodium dilutions were mainly required because it is a reagent in the TCLP extraction process as the TCLP extraction blank verifies is in high concentration in the samples.

**EXPLANATION OF QC DEFICIENCIES:**
All QC samples were within the specified control limits for this data group. RDL was met for all parameters. There was no hold time violations. Prep QC consisted of a PBS, LCS, LDS, matrix spike and duplicate for each digestion batch and was within specified control limits. A replicate analysis was performed on a frequency of 1 in 20 samples per digestion batch.

**REASONS FOR REANALYSIS:**
Reanalysis of samples was required due to the fact that Lithium is added to the samples to enhance the recovery for potassium and sodium so therefore lithium had to be analyzed on a separate run. Also there was run QC failure for Se & Mn in the analysis for the other elements.

**EXPLANATIONS OF ANY DEVIATIONS FROM ROUTINE PROTOCOLS:**
No deviations were made.

**EXPLANATIONS FOR "N", "*", AND "E" MARKED ON "DATA REVIEW CHECKLIST"**
A " N" flag was required for Potassium.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

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## SECTION 5

### *SDG NARRATIVE:* INORGANIC METAL FRACTION

| | |
|---|---|
| **RIN #:** | 98A5236-B |
| **SWLO BATCH ID:** | 980827TI1, 980902HG1 |
| **ANALYTE:** | Metals |
| **Samples:** | 35234.01,3,5,8,10,12,14,16,18,20,22,24,26 |
| **SAMPLE MATRIX:** | Soils |

**METHOD REFERENCE NUMBERS AND REVISIONS:**
The samples were analyzed according to the following SWLO procedures and in accordance to specifications in SS05:

| SWLO SOP | Method of Reference |
|---|---|
| SWL-IN-205 rev. 5.0 | SW846 3010A / 3050B / 6010B |
| SWL-IN-207 rev. 2.1 | SW846 7470A / 7471A |

**DESCRIPTION OF MATRIX INTERFERENCES:**
Matrix interference was not observed in samples.

**DESCRIPTION OF REQUIRED DILUTIONS:**
Dilutions were required for Ca, Mn, Zn, and Fe.

**EXPLANATION OF QC DEFICIENCIES:**
All QC samples were within the specified control limits for this data group. RDL was met for all parameters. There was no hold time violations. Prep QC consisted of a PBS, LCS, LDS, matrix spike and duplicate for each digestion batch and was within specified control limits. A replicate analysis was performed on a frequency of 1 in 20 samples per digestion batch.

**REASONS FOR REANALYSIS:**
Reanalysis of samples was required due to the fact that Lithium is added to the samples to enhance the recovery for potassium and sodium so therefore lithium had to be analyzed on a separate run. Also there was run QC failure for Al, Pb, and Zn in the analysis for the other elements.

**EXPLANATIONS OF ANY DEVIATIONS FROM ROUTINE PROTOCOLS:**
No deviations were made.

**EXPLANATIONS FOR "N", "*", AND "E" MARKED ON "DATA REVIEW CHECKLIST"**
A " N" flag was required for Sb, As, Cd, Co, Mn, Mo, Ni, Se, and Ag. An "E" flag was required for Al, Cr, Co, Fe, Pd, Mg, Mn, Mo, Ni, and Zn. An "*" flag was required for Cr, Fe, and Ni.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

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## SECTION 5

## *SDG NARRATIVE:* INORGANIC METAL FRACTION

| | |
|---|---|
| **RIN #:** | 98A5236-B |
| **SWLO BATCH ID:** | 980827TI1, 980902HG1 |
| **ANALYTE:** | Metals |
| **Samples:** | 35234.02,4,6,7,9,11,13,15,17,19,21,23,25,&27 |
| **SAMPLE MATRIX:** | Water |

**METHOD REFERENCE NUMBERS AND REVISIONS:**
The samples were analyzed according to the following SWLO procedures and in accordance to specifications in SS05:

| SWLO SOP | Method of Reference |
|---|---|
| SWL-IN-700 rev. 4.0 | SW846 1311 |
| SWL-IN-205 rev. 5.0 | SW846 3010A / 3050B / 6010B |
| SWL-IN-207 rev. 2.1 | SW846 7470A / 7471A |

**DESCRIPTION OF MATRIX INTERFERENCES:**
Matrix interference was not observed in samples.

**DESCRIPTION OF REQUIRED DILUTIONS:**
Dilutions were required for Ca, Zn, and Na. Sodium dilutions were mainly required because it is a reagent in the TCLP extraction process as the TCLP extraction blank verifies is in high concentration in the samples/

**EXPLANATION OF QC DEFICIENCIES:**
All QC samples were within the specified control limits for this data group. RDL was met for all parameters. There was no hold time violations. Prep QC consisted of a PBS, LCS, LDS, matrix spike and duplicate for each digestion batch and was within specified control limits. A replicate analysis was performed on a frequency of 1 in 20 samples per digestion batch.

**REASONS FOR REANALYSIS:**
Reanalysis of samples was required due to the fact that Lithium is added to the samples to enhance the recovery for potassium and sodium so therefore lithium had to be analyzed on a separate run. Also there was run QC failure for Se & Mn in the analysis for the other elements.

**EXPLANATIONS OF ANY DEVIATIONS FROM ROUTINE PROTOCOLS:**
No deviations were made.

**EXPLANATIONS FOR "N", "*", AND "E" MARKED ON "DATA REVIEW CHECKLIST"**
A " N" flag was required for Potassium.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

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# Appendix A.2.2

# Bldg. 551 RLC Radiological Data

# Radiochemical Samples

# Appendix A.2.2.1

# Bldg. 551 RLC Radiological Data

# Radiochemical Samples

# Chain of Custody

Commode[redacted]vanced Sciences, Inc.

# CHAIN OF CUSTODY/S[redacted]PLE ANALYSIS REQUEST

C.O.C. # 9[redacted]34#002

Page 1 of 2

| | | |
|---|---|---|
| Collector jWingard / D Zimmerman 513228 | Contact/Requester WOJTASZEK, PAUL | Telephone No. 3125 MSIN FAX |
| RIN 99A6334 | Sampling Origin Bldg 551 | Purchase Order/Charge Code NG220000 |
| Project Title NA | Logbook No. 92 VAN | Ice Chest No. NA Temp. |
| To (Lab) S. Cohen & Associates | Method of Shipment FED X | Bill of Lading/Air Bill No. 4533 2124 4657 |
| Protocol NA | | Offsite Property No. |

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

KH199-1523-

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative ; Packing |
|---|---|---|---|---|---|---|---|---|
| 99A6334-001.002 | NA | SOLID | 4/12/99 | 0817 | Bldg 551 S. End | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 01 | None None |
| 99A6334-002.002 | | SOLID | | 0836 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 02 | None None |
| 99A6334-003.002 | | SOLID | | 0850 | Bldg 551 N. End | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 03 | None None |
| 99A6334-004.002 | | SOLID | | 0907 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 04 | None None |
| 99A6334-005.002 | | SOLID | | 0918 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 05 | None None |
| 99A6334-006.002 | | SOLID | | 0930 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 06 | None None |
| 99A6334-007.002 | | SOLID | | 1019 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 07 | None None |

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| D Zimmerman [redacted] | 1115 | Locked Rm Bldg 551, Rm 105 | 4/12/99 1115 | Bldg 551 Rm 105 | 4/12/99 1500 | jWingard CAS | 4/12/99 1500 |
| jWingard CAS [redacted] | 1317 | T891R Fridge #2 CAS | 4/12/99 1317 | T891R Fridge #2 CAS | 4-15-99 1400 | S. Miller CAS | 4-15-99 1400 |
| S. Miller | 4-15-99 1500 | Fed Ex | | | | S. Fisher S C&A | 4-16-99 0900 |
| | | | | | | | |

| FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

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Commod[illegible]vanced Sciences, Inc.

# CHAIN OF CUSTODY/S[illegible]PLE ANALYSIS REQUEST

C.O.C. # 9[illegible]34#002



RIN 99A6334 | Contact/Requestor WOJTASZEK, PAUL | Telephone No. 3125 | MSIN | FAX

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative ; Packing |
|---|---|---|---|---|---|---|---|---|
| 99A6334-008.002 | NA | SOLID | 4/12/99 | 1025 | Bldg 551 N. End | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 08 | None None |
| 99A6334-009.002 | | SOLID | | 1037 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 09 | None None |
| 99A6334-010.002 | | SOLID | | 1054 | Bldg 551 | 5-G P/G | RC01B004 (Isotopic Waste) [Rush] 10 | None None |
| 99A6334-011.002 | | LIQUID | | 1011 | Bldg 551 Rinsate | 4-L P | RC01B001 (Isotopic Water) [Rush] 1524 - 01 | HN03 4 degrees C |

DC 4/12/99

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| D. Z[illegible] | 4/12/99 1115 | Locked Room Bldg. 551, Rm 105 | 4/12/99 1115 | Bldg 551 Rm 105 | 4/12/99 1500 | J. Wingard CAS | 4/12/99 1500 |
| J. Wingard CAS | 4/12/99 1317 | Fridge #2 T891R CAS | 4/12/99 1317 | Fridge #2 T891R CAS | 4-15-99 1400 | S. Miller CAS | 4-15-99 1400 |
| S. Miller | 4-15-99 1500 | Fed Ex | | | | S. Fisher USEA | 4-16-99 0900 |
| | | | | | | | |

FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

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| | |
|---|---|
| 03/31/99 continued | 99A6300, Bldg 707, Module D, Jeff Widney. Sample paint on Panduit and conduit (beige colored paint) mh, dof |
| 4/9/99 12PM | 99D6626; IW 99029 TO 881 TO SAMPLE WATER IN ELEVATOR SHAFT FOR CHUCK ALBIN & KEN FRY. gross α/β to TNU. JW, DL |
| 4/12/99 0730 | 99A6334; TO 551 FOR PRE-EN & PAINT SCRAPING JOB FOR PAUL WOJTASZEK. RCT: REX. SAMPLED ALL 10 EVENTS w/ 1 RENDATE. RADSCREENS TO TNU & ISOTOPICS TO R TRAILER AFTER SURVEY RESULTS & TRANSPORT TAG SIGNED (1500). JW/DL |
| 4/14/99 | 99A6329, Bldg 884, Fred White. Sampled waste |

7/15/99 Paul & Jim-

here is a copy of the logbook entry from the 4/12/99 Bldg 551 paint scraping job. The COC signed off to the shipping trailer should read "1517". (COC # 99A6334 #002)

J. Wingard
CAS 7/15/99

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# Appendix A.2.2.2

# Bldg. 551 RLC Radiological Data

# Radiochemical Samples

# Sample Locations

551

A 222

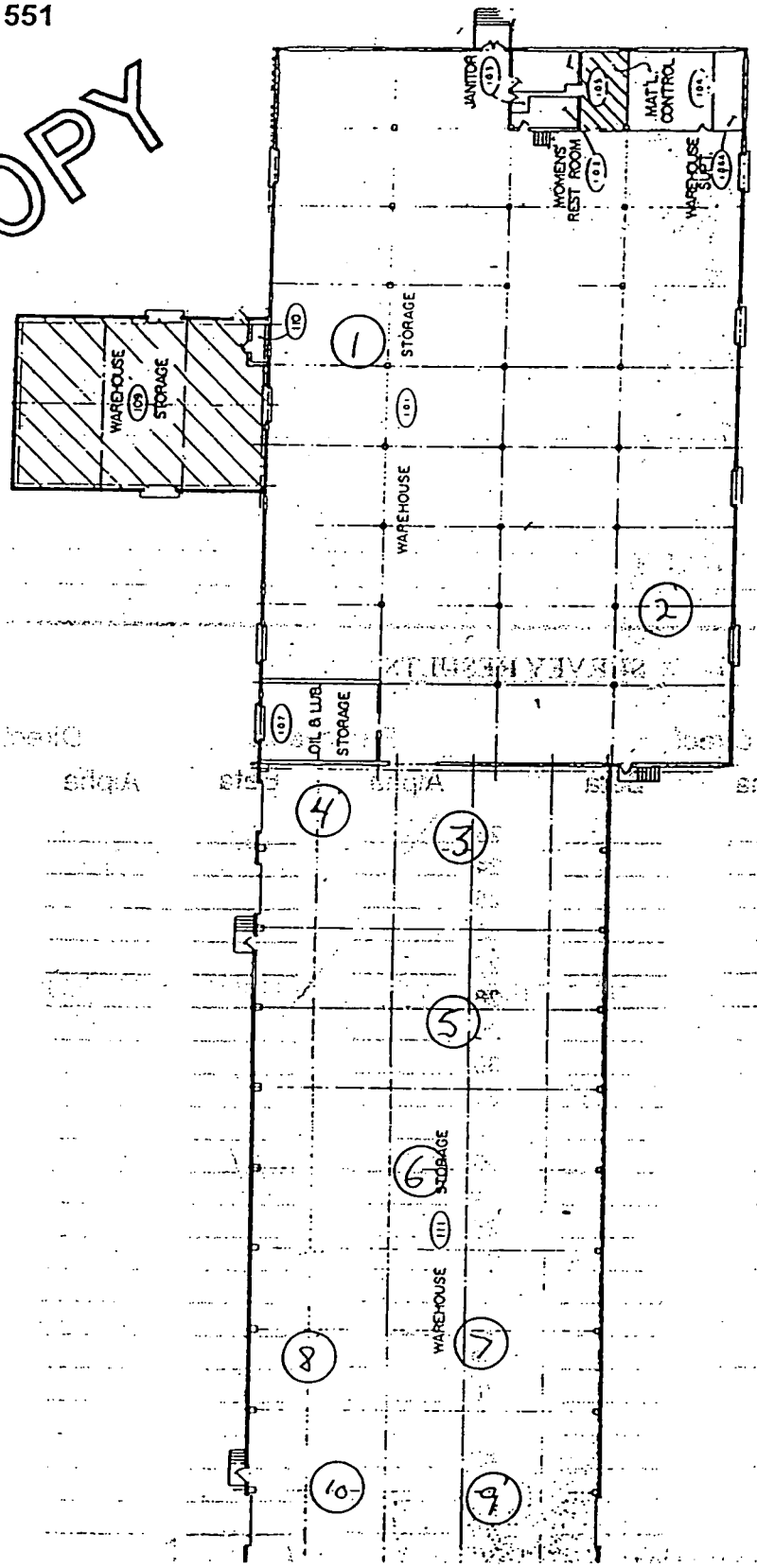
ROCKY FLATS ENVIRONMENTAL TECH

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

Building 551

COPY




Samples
99A6334
Events
co-incide w/
survey pts.
Event 11 rinsate
took place
between events
6 & 7. JSW
4/12/99

Post-Paint
Sample
Survey

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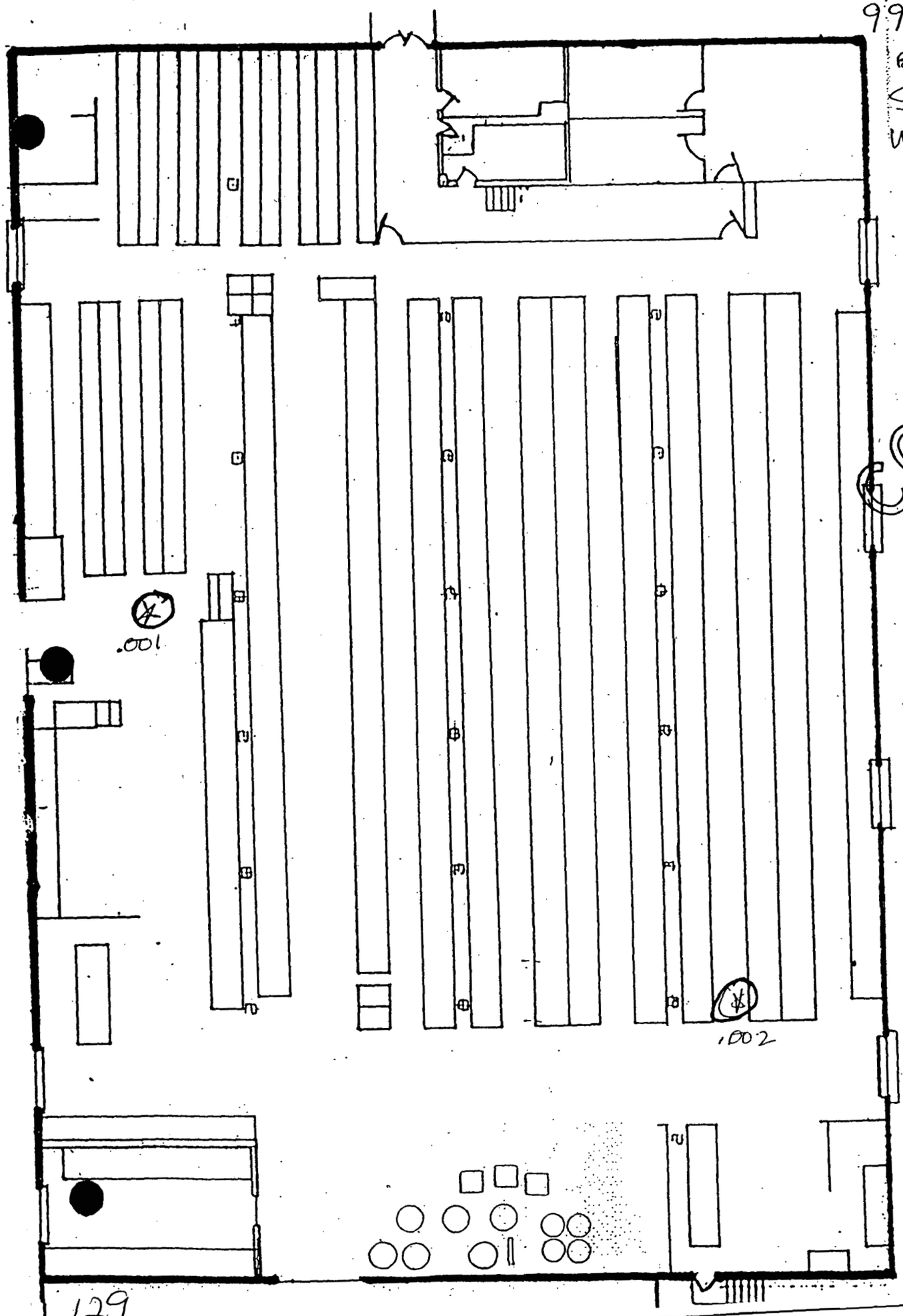
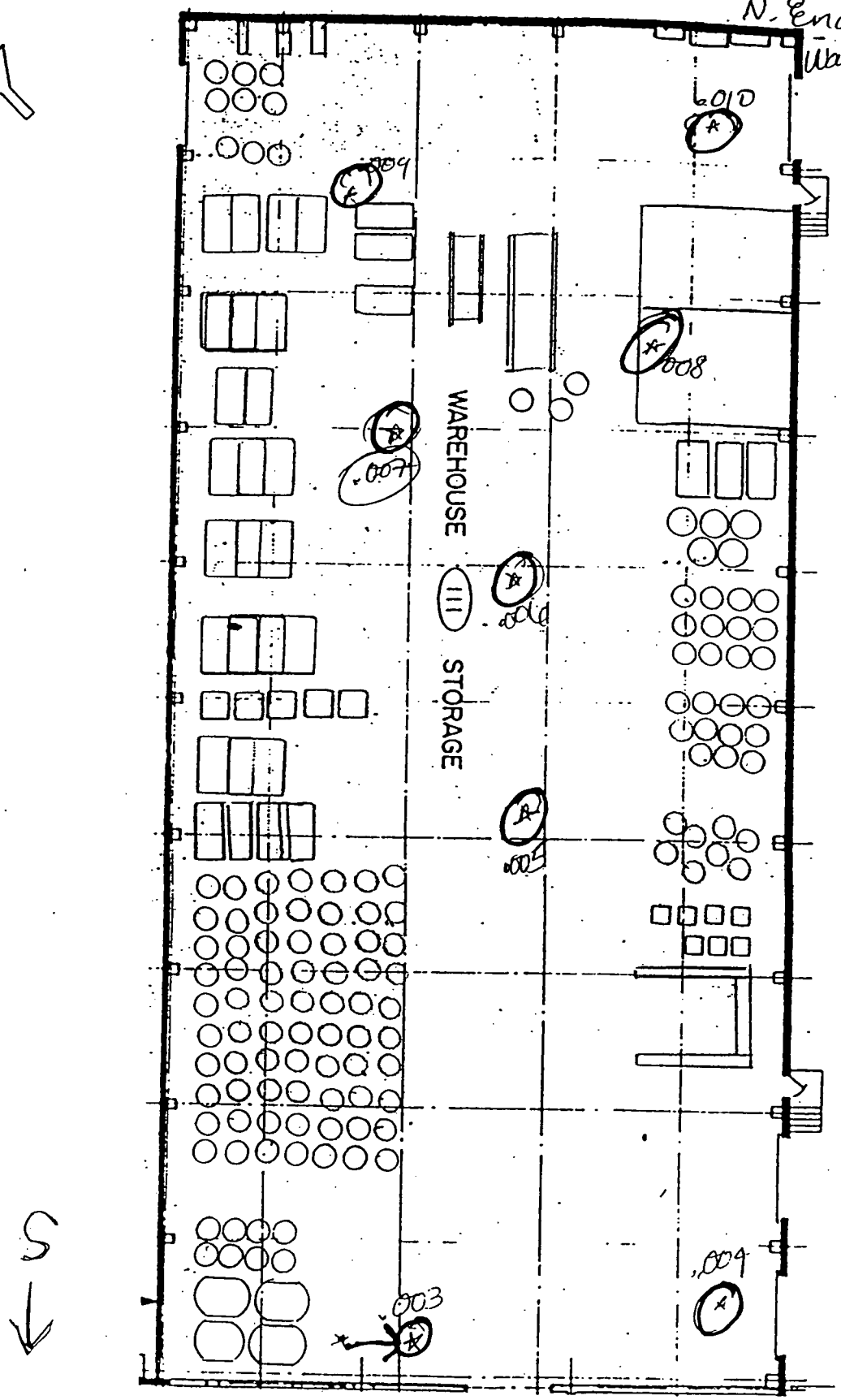
99A6334
Bldg 551
S. End
Warehouse




COPY

99A 6334
Bldg 551
N. End
Warehouse

COPY

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# Appendix A.2.2.3

# Bldg. 551 RLC Radiological Data

# Radiochemical Samples

# Laboratory Report

**CASE NARRATIVE**
**RIN 99A6334**
**Laboratory Report Identification Number: 1523, 1524**
**PSA Module RC01B.3**

COPY

April 27, 1999

## I. Introduction

On April 16, 1999, ten waste samples and one water sample, (RIN 99A6334), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The chain-of-custody accompanying the samples requested they be analyzed on a "rush" basis. The samples were analyzed in accordance with Kaiser-Hill specifications stated in the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RCO1-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

## II. Analytical Methodology

The radioanalytical results reported for each sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. All samples were analyzed by an Eichrom Industries, Inc. extraction chromatography method (ACW03) for isotopic uranium, plutonium, and americium.

## III. Analytical Results

Deficiencies

None

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Matrix Interferences

There were no indications of matrix interference.

Dilutions

No dilutions were required.

Detection Limits

The required detection limits (RDL) were met for all sample analyses.

Reanalysis

There were no reanalysis.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CTR

There were no contacts with the contract technical representative (CTR) regarding these samples.

## IV. Quality Control

Site Samples Used for Quality Control Samples:

| Site Sample Number | Laboratory Sample Number | Type of Quality Control Analysis Sample |
|---|---|---|
| Laboratory Type II Water | SCAQC-1523-LC1 | Laboratory Control Sample |
| 99A6334-001.002 Bldg 551 S. END | SCAQC-1523-LD1 | Laboratory Duplicate Sample |
| Laboratory Type II Water | SCAQC-1523-PB | Preparation Blank |

Site Samples Used for Quality Control Samples:

| Site Sample Number | Laboratory Sample Number | Type of Quality Control Analysis Sample |
|---|---|---|
| Laboratory Type II Water | SCAQC-1509-LC1 | Laboratory Control Sample |
| 99A4849-006.002 BH94298 | SCAQC-1509-LD1 | Laboratory Duplicate Sample |
| Laboratory Type II Water | SCAQC-1509-PB | Preparation Blank |

The water sample received on 4/16/99, RIN 99A6334 (Batch No. 1524), was analyzed concurrently with one water sample received on 4/14/99, RIN 99A4849, (Batch No. 1509). Therefore, the Laboratory Control Sample (SCAQC-1509-LC1), the Laboratory Duplicate Sample (SCAQC-1509-LD1), and the Preparation Blank (SCAQC-1509-PB) were used as quality control samples for both sample batches.

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,

Joe Stinson

Joe Stinson
Laboratory Manager

4/29/99
Date

011



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# RC01

## *DATA QUALITY ASSESSMENT REPORT*

## *Rocky Flats Environmental Technology Site*

| RIN Number | Analytical Method/PSA Line Number | Review Level |
|---|---|---|
| 99A6334<br>(Lab ID# KH199-1523, 1524) | Uranium, Plutonium, Americium by Alpha Spectrometry in waste and water/ RC01-B004 and RC01-B001 | Validation |

| Analytical Laboratory | Assessment Performed By | Number of Samples/ Matrix |
|---|---|---|
| Sanford Cohen & Associates (SC&A) | TechLaw, Inc. | 10/ Waste/ RC01-B004<br>1/Aqueous/RC01-B002 |

Sample Numbers: 99A6334-001.002, 99A6334-002.002, 99A6334-003.002, 99A6334-004.002, 99A6334-005.002, 99A6334-006.002, 99A6334-007.002, 99A6334-008.002, 99A6334-009.002, 99A6334-010.002, 99A6334-011.002

| Quality Control Item | Reviewed (Y or N) | Non-Compliance Identified |
|---|---|---|
| General: (Cover Page, Table of Contents, Data Review Checklist (DRC), General SDP Requirements, Narrative) | Y | N |
| Chain of Custody, Preservation, Holding Times | Y | N |
| Sample Results | Y | Comment 1 |
| QC Sample Results | Y | Comment 2 |
| Duplicate Sample Results | Y | N |
| Laboratory Control Sample Results | Y | N |
| Preparation Blank Results | Y | N |
| Standards Summary | Y | N |
| Instrument Calibration Summary | Y | N |
| Counting Raw Data Summary | Y | N |
| Electronic Data Deliverable (EDD) | Y | N |
| INSTRUMENT CALIBRATION PACKAGE | Y | N |
| Structural Requirements | Y | N |
| General Requirements | Y | N |
| Energy Calibration | Y | N |
| Backgrounds | Y | N |
| Efficiency Calibration | Y | N |
| Other: | N/A | N/A |

Y Item was reviewed or non-compliance was identified
N Item was not reviewed or non-compliance was not identified
N/A Item is not applicable to the line item

ENTERED

RECEIVED
JUN 14 1999

**Action Items:** None.

**Comments:**

1. Sample Results: The laboratory is reporting an uncertainty of +/- 0.000 for several analytes. After communicating with the laboratory it reports that this is due to software limitations and is working to correct the problem. No action was taken. **[153]**

2. QC Sample Results: The laboratory's Quality Control Sample Evaluation sheet incorrectly lists the units for the laboratory replicate results for sample 99A6334-001.002 as DPMs. The results are listed in pCi/G. No action was taken.

Verification/ Validation Signature: Richard Thurman Date: 6/10/99

Reviewer Signature: _____ Date: 6/11/99
(*Validation Only*)

# Appendix A.2.2.4

# Bldg. 551 RLC Radiological Data

## Radiochemical Samples

## Laboratory Data

# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 001.002 | | | | |
| Other Sample ID: | BLDG 551 S. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-01 | 0.282 | 0.134 | 0.146 | 0.040 |
| ACW03 | U-235 | KH199-1523-01 | 0.037 | 0.052 | 0.053 | 0.050 |
| ACW03 | U-238 | KH199-1523-01 | 0.504 | 0.187 | 0.212 | 0.084 |
| ACW03 | PU-239/240 | KH199-1523-01 | 0.231 | 0.140 | 0.147 | 0.100 |
| ACW03 | AM-241 | KH199-1523-01 | 0.086 | 0.108 | 0.109 | 0.149 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 002.002 | | | | |
| Other Sample ID: | BLDG 551 S. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-02 | 0.149 | 0.091 | 0.096 | 0.037 |
| ACW03 | U-235 | KH199-1523-02 | 0.000 | 0.000 | 0.000 | 0.045 |
| ACW03 | U-238 | KH199-1523-02 | 0.350 | 0.144 | 0.160 | 0.036 |
| ACW03 | PU-239/240 | KH199-1523-02 | 0.024 | 0.034 | 0.034 | 0.032 |
| ACW03 | AM-241 | KH199-1523-02 | 0.048 | 0.087 | 0.088 | 0.135 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 003.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-03 | 0.138 | 0.092 | 0.096 | 0.085 |
| ACW03 | U-235 | KH199-1523-03 | -0.006 | 0.013 | 0.013 | 0.073 |
| ACW03 | U-238 | KH199-1523-03 | 0.267 | 0.118 | 0.130 | 0.033 |
| ACW03 | PU-239/240 | KH199-1523-03 | 0.129 | 0.084 | 0.088 | 0.035 |
| ACW03 | AM-241 | KH199-1523-03 | 0.065 | 0.086 | 0.087 | 0.122 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 004.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-04 | 1.27 | 0.279 | 0.377 | 0.054 |
| ACW03 | U-235 | KH199-1523-04 | 0.030 | 0.051 | 0.052 | 0.079 |
| ACW03 | U-238 | KH199-1523-04 | 2.01 | 0.377 | 0.552 | 0.064 |
| ACW03 | PU-239/240 | KH199-1523-04 | 0.103 | 0.079 | 0.081 | 0.072 |
| ACW03 | AM-241 | KH199-1523-04 | 0.076 | 0.084 | 0.085 | 0.111 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 005.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-05 | 0.286 | 0.132 | 0.144 | 0.077 |
| ACW03 | U-235 | KH199-1523-05 | 0.019 | 0.051 | 0.052 | 0.095 |
| ACW03 | U-238 | KH199-1523-05 | 0.312 | 0.138 | 0.152 | 0.077 |
| ACW03 | PU-239/240 | KH199-1523-05 | 0.010 | 0.037 | 0.037 | 0.082 |
| ACW03 | AM-241 | KH199-1523-05 | -0.005 | 0.068 | 0.068 | 0.142 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 006.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-06 | 0.313 | 0.132 | 0.146 | 0.083 |
| ACW03 | U-235 | KH199-1523-06 | -0.006 | 0.012 | 0.012 | 0.071 |
| ACW03 | U-238 | KH199-1523-06 | 0.374 | 0.141 | 0.160 | 0.057 |
| ACW03 | PU-239/240 | KH199-1523-06 | 0.033 | 0.047 | 0.047 | 0.044 |
| ACW03 | AM-241 | KH199-1523-06 | 0.060 | 0.096 | 0.097 | 0.143 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 007.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-07 | 0.936 | 0.250 | 0.312 | 0.036 |
| ACW03 | U-235 | KH199-1523-07 | 0.049 | 0.057 | 0.059 | 0.044 |
| ACW03 | U-238 | KH199-1523-07 | 0.856 | 0.238 | 0.293 | 0.075 |
| ACW03 | PU-239/240 | KH199-1523-07 | 0.038 | 0.044 | 0.045 | 0.034 |
| ACW03 | AM-241 | KH199-1523-07 | -0.004 | 0.035 | 0.035 | 0.092 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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020

# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 008.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-08 | 0.261 | 0.124 | 0.135 | 0.037 |
| ACW03 | U-235 | KH199-1523-08 | 0.000 | 0.000 | 0.000 | 0.046 |
| ACW03 | U-238 | KH199-1523-08 | 0.397 | 0.155 | 0.174 | 0.037 |
| ACW03 | PU-239/240 | KH199-1523-08 | 0.053 | 0.060 | 0.061 | 0.073 |
| ACW03 | AM-241 | KH199-1523-08 | 0.063 | 0.064 | 0.065 | 0.043 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 009.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-09 | 0.459 | 0.150 | 0.176 | 0.052 |
| ACW03 | U-235 | KH199-1523-09 | 0.042 | 0.056 | 0.057 | 0.076 |
| ACW03 | U-238 | KH199-1523-09 | 0.602 | 0.174 | 0.211 | 0.029 |
| ACW03 | PU-239/240 | KH199-1523-09 | 0.014 | 0.038 | 0.038 | 0.071 |
| ACW03 | AM-241 | KH199-1523-09 | 0.111 | 0.093 | 0.095 | 0.103 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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022

# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Waste |
| Site Sample ID: | 010.002 | | | | |
| Other Sample ID: | BLDG 551 N. END | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1523 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1523-10 | 0.212 | 0.103 | 0.111 | 0.055 |
| ACW03 | U-235 | KH199-1523-10 | 0.000 | 0.000 | 0.000 | 0.038 |
| ACW03 | U-238 | KH199-1523-10 | 0.170 | 0.090 | 0.096 | 0.031 |
| ACW03 | PU-239/240 | KH199-1523-10 | 0.022 | 0.032 | 0.032 | 0.030 |
| ACW03 | AM-241 | KH199-1523-10 | -0.006 | 0.013 | 0.013 | 0.073 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6334#002 | Matrix: | Water |
| Site Sample ID: | 011.002 | | | | |
| Other Sample ID: | BLDG 551 RINSATE | Collection Date: | 4/12/99 | Date Received: | 4/16/99 |
| | | Batch Number: | 1524 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/L) | 2 σ Counting Error (pCi/L) | Total Error (pCi/L) | MDA (pCi/L) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1524-01 | 0.013 | 0.015 | 0.015 | 0.018 |
| ACW03 | U-235 | KH199-1524-01 | -0.004 | 0.005 | 0.005 | 0.026 |
| ACW03 | U-238 | KH199-1524-01 | 0.015 | 0.015 | 0.015 | 0.010 |
| ACW03 | PU-239/240 | KH199-1524-01 | 0.009 | 0.009 | 0.010 | 0.010 |
| ACW03 | AM-241 | KH199-1524-01 | 0.011 | 0.010 | 0.010 | 0.011 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1509-LC1 | SCAQC-1509-LD1 | SCAQC-1509-PB |
| Pu | SCAQC-1509-LC1 | SCAQC-1509-LD1 | SCAQC-1509-PB |
| Am | SCAQC-1509-LC1 | SCAQC-1509-LD1 | SCAQC-1509-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

### Quality Control Sample
### Preparation Blank (PB)

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | None | Matrix: | Water |
| Site Sample ID: | N/A | | | | |
| Other Sample ID: | PB | Collection Date: | 4/14/99 | Date Received: | 4/16/99 |
| | | | | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/L) | 2 σ Counting Error (pCi/L) | Total Error (pCi/L) | MDA (pCi/L) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | SCAQC-1509-PB | 0.006 | 0.011 | 0.011 | 0.018 |
| ACW03 | U-235 | SCAQC-1509-PB | 0.001 | 0.011 | 0.011 | 0.026 |
| ACW03 | U-238 | SCAQC-1509-PB | 0.008 | 0.014 | 0.014 | 0.021 |
| ACW03 | PU-239/240 | SCAQC-1509-PB | 0.016 | 0.009 | 0.010 | 0.004 |
| ACW03 | AM-241 | SCAQC-1509-PB | 0.024 | 0.026 | 0.027 | 0.030 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1509-LC1 | SCAQC-1509-LD1 | SCAQC-1509-PB |
| Pu | SCAQC-1509-LC1 | SCAQC-1509-LD1 | SCAQC-1509-PB |
| Am | SCAQC-1509-LC1 | SCAQC-1509-LD1 | SCAQC-1509-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

### Quality Control Sample
### Preparation Blank (PB)

Report Identification Number: 99A6334

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | None | Matrix: | Water |
| Site Sample ID: | Blank 1 | | | | |
| Other Sample ID: | PB | Collection Date: | 4/16/99 | Date Received: | 4/16/99 |
| | | | | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (dpm) | 2 σ Counting Error (dpm) | Total Error (dpm) | MDA (dpm) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | SCAQC-1523-PB | 0.008 | 0.029 | 0.029 | 0.064 |
| ACW03 | U-235 | SCAQC-1523-PB | -0.014 | 0.019 | 0.020 | 0.093 |
| ACW03 | U-238 | SCAQC-1523-PB | 0.002 | 0.031 | 0.031 | 0.075 |
| ACW03 | PU-239/240 | SCAQC-1523-PB | 0.042 | 0.049 | 0.049 | 0.038 |
| ACW03 | AM-241 | SCAQC-1523-PB | 0.015 | 0.030 | 0.030 | 0.040 |

| Quality Control Samples | | | |
|---|---|---|---|
| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
| U | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Pu | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |
| Am | SCAQC-1523-LC1 | SCAQC-1523-LD1 | SCAQC-1523-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

## Quality Control Sample Evaluation

Report Identification Number: 99A6334

Project Name: Kaiser-Hill | Laboratory Code: SCA

### Laboratory Contol Sample (LC1) Evaluation

| Method Number | Radionuclide | Laboratory Sample ID | (CV) Decay Corrected Activity of Spike Added (pCi/L) | (OV) Laboratory Control Sample Activity (pCi/L) | Laboratory Control Sample % Recovery (Accuracy) | Number of σ Between CV and OV |
|---|---|---|---|---|---|---|
| ACW03 | AM-241 | SCAQC-1509-LC1 | 1.91 ∓ 0.053 | 2.18 ∓ 0.494 | 114 | 0.819 |
| ACW03 | PU-239/240 | SCAQC-1509-LC1 | 2.05 ∓ 0.045 | 2.23 ∓ 0.494 | 109 | 0.541 |
| ACW03 | U-233/234 | SCAQC-1509-LC1 | 3.61 ∓ 0.145 | 3.48 ∓ 0.818 | 96.4 | 0.233 |
| ACW03 | U-238 | SCAQC-1509-LC1 | 3.61 ∓ 0.145 | 3.46 ∓ 0.813 | 95.8 | 0.273 |
| ACW03 | AM-241 | SCAQC-1523-LC1 | * 4.24 ∓ 0.117 | * 4.27 ∓ 1.13 | 101 | 0.041 |
| ACW03 | PU-239/240 | SCAQC-1523-LC1 | * 4.55 ∓ 0.100 | * 4.33 ∓ 1.36 | 95.1 | 0.275 |
| ACW03 | U-233/234 | SCAQC-1523-LC1 | * 8.02 ∓ 0.321 | * 8.00 ∓ 1.87 | 99.6 | 0.023 |
| ACW03 | U-238 | SCAQC-1523-LC1 | * 8.02 ∓ 0.321 | * 8.06 ∓ 1.89 | 100 | 0.030 |

### Laboratory Duplicate Sample (LD1) Evaluation

| Method Number | Radionuclide | Laboratory Sample ID | Original Sample Activity (pCi/L) | Duplicate Sample Activity (pCi/L) | Difference Between Original Activity and Duplicate Sample Activity (F) | Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | SCAQC-1509-LD1 | 0.012 ∓ 0.014 | 0.005 ∓ 0.014 | 0.007 | 0.373 |
| ACW03 | U-235 | SCAQC-1509-LD1 | 0.005 ∓ 0.010 | -0.002 ∓ 0.004 | 0.007 | 0.634 |
| ACW03 | U-238 | SCAQC-1509-LD1 | 0.009 ∓ 0.015 | 0.009 ∓ 0.013 | 0.000 | 0.022 |
| ACW03 | PU-239/240 | SCAQC-1509-LD1 | 0.009 ∓ 0.007 | 0.016 ∓ 0.011 | 0.008 | 0.569 |
| ACW03 | AM-241 | SCAQC-1509-LD1 | 0.005 ∓ 0.006 | 0.002 ∓ 0.006 | 0.002 | 0.293 |
| ACW03 | U-233/234 | SCAQC-1523-LD1 | * 0.282 ∓ 0.146 | * 0.160 ∓ 0.102 | 0.121 | 0.682 |
| ACW03 | U-235 | SCAQC-1523-LD1 | * 0.037 ∓ 0.053 | * 0.053 ∓ 0.063 | 0.017 | 0.201 |
| ACW03 | U-238 | SCAQC-1523-LD1 | * 0.504 ∓ 0.212 | * 0.342 ∓ 0.152 | 0.162 | 0.620 |
| ACW03 | PU-239/240 | SCAQC-1523-LD1 | * 0.231 ∓ 0.147 | * 0.055 ∓ 0.062 | 0.176 | 1.10 |
| ACW03 | AM-241 | SCAQC-1523-LD1 | * 0.086 ∓ 0.109 | * 0.021 ∓ 0.039 | 0.065 | 0.565 |

* - Activity Specified in dpm

↳ * No, activity is in pCi/G

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# Appendix A.3

# Bldg. 551 Historical Chemical Data

# Appendix A.3.1

# Bldg. 551 Historical Chemical Data

# Metals

# Appendix A.3.1.1

# Bldg. 551 Historical Chemical Data

# Metals

# Chain of Custody

# ROCKY FLATS
# ENVIRONMENTAL TECHNOLOGY SITE
# CHAIN OF CUSTODY NUMBER: 98A5236#002

SAMPLERS (Signature): 524293273 J. Swearingen / M. Bershey [redacted]

REPORT IDENTIFICATION NUMBER (RIN): 98A5236

LABORATORY: SouthWest Lab of Oklahoma

AGGREGATE AREA: NA

RFETS CONTRACTOR: COMMODORE ADVANCED SCIENCES, INC.

| Bottle Num. | User Samp. Num. | Date | Time | Location | Container | Matrix | Preservation | SS08B006 (TCLP Metals) | SS05B047 (Mlls w/Hg SW846) | SS03B006 (PCB 8080-Soil) |
|---|---|---|---|---|---|---|---|---|---|---|
| 98A5236-002.002 | NA | 7/31/98 | 14:10 | 551 Rm 106 N | 125G G | SOLID | 4 degrees C | P | | |
| 98A5236-002.003 | | | | | 125G G | | 4 degrees C | | P | |
| 98A5236-003.002 | | | 13:50 | 551 Rm 106 W | 125G G | | 4 degrees C | P | | |
| 98A5236-003.003 | | | | | 125G G | | 4 degrees C | | P | |
| 98A5236-004.002 | | | 14:30 | 551 main floor | 125G G | | 4 degrees C | P | | |
| 98A5236-004.003 | | | | | 125G G | | 4 degrees C | | P | |
| ~~98A5236-005.002~~ | | | | | ~~125G G~~ | | ~~4 degrees C~~ | | | |
| 98A5236-005.003 | | | | | 125G G | | 4 degrees C | | | |
| ~~98A5236-001.007~~ | | | | | 125G O | | ~~NA282G3~~ | | | |

JSS 7/31/98

JSS 7/31/98

## CHAIN OF POSSESSION

Sign/Print Names

| | | | |
|---|---|---|---|
| Relinquished By: J. Swearingen CAS | Date/Time: 7/31/98 15:15 | Received By: Fridge #2 T891R CAS | Date/Time: 7/31/98 15:15 |
| Relinquished By: [illegible] | Date/Time: 8/12/98 1435 | Received By: [illegible] | Date/Time: 8/12/98 1435 |
| Relinquished By: [illegible] | Date/Time: 8/12/98 1435 | Received By: Fed Ex | Date/Time: 8/12/98 |
| Relinquished By: | Date/Time: | Received By: [illegible] SWLO | Date/Time: 8/13/98 1000 |

REMARKS:

Charge #:

Project: WASTE PROJECTS

Shipping Requirements:

Air Bill No.: 4336 4301 2050



08/11/98 10:00 FAX 970 561 0202

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# Appendix A.3.1.2

# Bldg. 551 Historical Chemical Data

# Metals

# Laboratory Report

# Appendix A.3.1.3

# Bldg. 551 Historical Chemical Data

# Metals

# Laboratory Data

TCLP - Paints

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-002.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.02
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 68.0 | B | | P |
| 7440-36-0 | Antimony | 32.2 | B | E | P |
| 7440-38-2 | Arsenic | 3.0 | B | N | P |
| 7440-39-3 | Barium | 103 | | | P |
| 7440-41-7 | Beryllium | 0.96 | | | P |
| 7440-43-9 | Cadmium | 0.75 | B | | P |
| 7440-70-2 | Calcium | 1290000 | | | P |
| 7440-47-3 | Chromium | 25.0 | | | P |
| 7440-48-4 | Cobalt | 1100 | | | P |
| 7440-50-8 | Copper | 20.8 | B | | P |
| 7439-89-6 | Iron | 109 | | | P |
| 7439-92-1 | Lead | 582 | | N | P |
| 7439-93-2 | Lithium | 87.7 | B | N | P |
| 7439-95-4 | Magnesium | 7030 | | | P |
| 7439-96-5 | Manganese | 862 | | | P |
| 7439-97-6 | Mercury | 55.7 | | | AV |
| 7439-98-7 | Molybdnum | 20.8 | B | | P |
| 7440-02-0 | Nickel | 35.4 | B | | P |
| 7440-09-7 | Potassium | 48900 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1580000 | | | P |
| 7440-24-6 | Strontium | 3250 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 10.7 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 42.7 | | | P |
| 7440-66-6 | Zinc | 9300 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-002.003

FORM I - IN

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-003.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.04
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 3920 | | | P |
| 7440-36-0 | Antimony | 11.2 | B | E | P |
| 7440-38-2 | Arsenic | 13.6 | B | N | P |
| 7440-39-3 | Barium | 2510 | | | P |
| 7440-41-7 | Beryllium | 3.0 | | | P |
| 7440-43-9 | Cadmium | 1.5 | B | | P |
| 7440-70-2 | Calcium | 987000 | | | P |
| 7440-47-3 | Chromium | 118 | | | P |
| 7440-48-4 | Cobalt | 144 | | | P |
| 7440-50-8 | Copper | 36.4 | | | P |
| 7439-89-6 | Iron | 2250 | | | P |
| 7439-92-1 | Lead | 462 | | N | P |
| 7439-93-2 | Lithium | 84.4 | B | N | P |
| 7439-95-4 | Magnesium | 7170 | | | P |
| 7439-96-5 | Manganese | 103 | | | P |
| 7439-97-6 | Mercury | 92.7 | | | AV |
| 7439-98-7 | Molybdnum | 41.2 | B | | P |
| 7440-02-0 | Nickel | 27.3 | B | | P |
| 7440-09-7 | Potassium | 43300 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1430000 | | | P |
| 7440-24-6 | Strontium | 3070 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 14.7 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 567 | | | P |
| 7440-66-6 | Zinc | 1580 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-003.003

FORM I - IN

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-004.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.06
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 2260 | | | P |
| 7440-36-0 | Antimony | 8.5 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 1730 | | | P |
| 7440-41-7 | Beryllium | 0.98 | | | P |
| 7440-43-9 | Cadmium | 7.6 | | | P |
| 7440-70-2 | Calcium | 298000 | | | P |
| 7440-47-3 | Chromium | 318 | | | P |
| 7440-48-4 | Cobalt | 17.2 | B | | P |
| 7440-50-8 | Copper | 44.4 | | | P |
| 7439-89-6 | Iron | 8360 | | | P |
| 7439-92-1 | Lead | 1280 | | N | P |
| 7439-93-2 | Lithium | 59.7 | B | N | P |
| 7439-95-4 | Magnesium | 4460 | B | | P |
| 7439-96-5 | Manganese | 462 | | | P |
| 7439-97-6 | Mercury | 3.0 | | | AV |
| 7439-98-7 | Molybdnum | 2.9 | B | | P |
| 7440-02-0 | Nickel | 43.4 | | | P |
| 7440-09-7 | Potassium | 22200 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1370000 | | | P |
| 7440-24-6 | Strontium | 775 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 7.3 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 8.0 | B | | P |
| 7440-66-6 | Zinc | 2610 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-004.003

FORM I - IN

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-001.007

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.07
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1480 | | | P |
| 7440-36-0 | Antimony | 6.2 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 551 | | | P |
| 7440-41-7 | Beryllium | 0.91 | | | P |
| 7440-43-9 | Cadmium | 0.30 | U | | P |
| 7440-70-2 | Calcium | 1410000 | | | P |
| 7440-47-3 | Chromium | 91.5 | | | P |
| 7440-48-4 | Cobalt | 42.4 | B | | P |
| 7440-50-8 | Copper | 41.7 | | | P |
| 7439-89-6 | Iron | 489 | | | P |
| 7439-92-1 | Lead | 13.2 | B | N | P |
| 7439-93-2 | Lithium | 111 | | N | P |
| 7439-95-4 | Magnesium | 153 | B | | P |
| 7439-96-5 | Manganese | 9.6 | B | | P |
| 7439-97-6 | Mercury | 4.5 | | | AV |
| 7439-98-7 | Molybdnum | 108 | B | | P |
| 7440-02-0 | Nickel | 16.1 | B | | P |
| 7440-09-7 | Potassium | 52000 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1510000 | | | P |
| 7440-24-6 | Strontium | 5430 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 8.6 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 25.6 | B | | P |
| 7440-66-6 | Zinc | 99.1 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-001.007

FORM I - IN

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-005.003

Lab Name: SOUTHWEST_LABS_OF_OK_____ Contract:KASIHILL__
Lab Code: SWOK__ Case No.: 35234 SAS No.: _____ SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.09
Level (low/med): LOW__ Date Received: 08/13/98
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | 6900 | | | P |
| 7440-36-0 | Antimony_ | 113 | | E | P |
| 7440-38-2 | Arsenic__ | 4.4 | B | N | P |
| 7440-39-3 | Barium___ | 886 | | | P |
| 7440-41-7 | Beryllium | 0.31 | B | | P |
| 7440-43-9 | Cadmium__ | 7.7 | | | P |
| 7440-70-2 | Calcium__ | 59000 | | | P |
| 7440-47-3 | Chromium_ | 22.3 | | | P |
| 7440-48-4 | Cobalt___ | 61.7 | B | | P |
| 7440-50-8 | Copper___ | 137 | | | P |
| 7439-89-6 | Iron____ | 660 | | | P |
| 7439-92-1 | Lead____ | 28.1 | B | N | P |
| 7439-93-2 | Lithium__ | 45.1 | B | N | P |
| 7439-95-4 | Magnesium | 2530 | B | | P |
| 7439-96-5 | Manganese | 209 | | | P |
| 7439-97-6 | Mercury__ | 415 | | | AV |
| 7439-98-7 | Molybdnum | 3.0 | B | | P |
| 7440-02-0 | Nickel___ | 26.4 | B | | P |
| 7440-09-7 | Potassium | 40000 | | | P |
| 7782-49-2 | Selenium_ | 4.0 | U | N | P |
| 7440-22-4 | Silver___ | 1.2 | U | | P |
| 7440-23-5 | Sodium___ | 1550000 | | | P |
| 7440-24-6 | Strontium | 178 | B | | P |
| 7440-28-0 | Thallium_ | 3.9 | U | N | P |
| 7440-31-5_ | Tin_____ | 12.1 | B | | P |
| 11-09-6___ | Uranium__ | 6.2 | U | N | P |
| 7440-62-2_ | Vanadium_ | 18.1 | B | | P |
| 7440-66-6_ | Zinc_____ | 3110 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
CLIENT_ID_=_98A5236-005.003

FORM I - IN

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-006.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.11
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1690 | | | P |
| 7440-36-0 | Antimony | 18.2 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 1640 | | | P |
| 7440-41-7 | Beryllium | 0.45 | B | | P |
| 7440-43-9 | Cadmium | 61.6 | | | P |
| 7440-70-2 | Calcium | 218000 | | | P |
| 7440-47-3 | Chromium | 16.1 | | | P |
| 7440-48-4 | Cobalt | 189 | | | P |
| 7440-50-8 | Copper | 364 | | | P |
| 7439-89-6 | Iron | 5700 | | | P |
| 7439-92-1 | Lead | 1500 | | N | P |
| 7439-93-2 | Lithium | 34.8 | B | N | P |
| 7439-95-4 | Magnesium | 2300 | B | | P |
| 7439-96-5 | Manganese | 542 | | | P |
| 7439-97-6 | Mercury | 3.2 | | | AV |
| 7439-98-7 | Molybdnum | 9.2 | B | | P |
| 7440-02-0 | Nickel | 39.0 | B | | P |
| 7440-09-7 | Potassium | 9680 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1410000 | | | P |
| 7440-24-6 | Strontium | 381 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 12.1 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 2.5 | B | | P |
| 7440-66-6 | Zinc | 7770 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-006.003

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-007.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.15
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 93.7 | B | | P |
| 7440-36-0 | Antimony | 4.3 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 146 | | | P |
| 7440-41-7 | Beryllium | 0.92 | | | P |
| 7440-43-9 | Cadmium | 28.2 | | | P |
| 7440-70-2 | Calcium | 1450000 | | | P |
| 7440-47-3 | Chromium | 4.9 | B | | P |
| 7440-48-4 | Cobalt | 1.1 | U | | P |
| 7440-50-8 | Copper | 855 | | | P |
| 7439-89-6 | Iron | 242 | | | P |
| 7439-92-1 | Lead | 154 | | N | P |
| 7439-93-2 | Lithium | 42.8 | B | N | P |
| 7439-95-4 | Magnesium | 6580 | | | P |
| 7439-96-5 | Manganese | 318 | | | P |
| 7439-97-6 | Mercury | 171 | | | AV |
| 7439-98-7 | Molybdnum | 3.9 | B | | P |
| 7440-02-0 | Nickel | 12.7 | B | | P |
| 7440-09-7 | Potassium | 15400 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1470000 | | | P |
| 7440-24-6 | Strontium | 5770 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 9.4 | B | | P |
| 11-09-6 | Uranium | 694 | | N | P |
| 7440-62-2 | Vanadium | 2.8 | B | | P |
| 7440-66-6 | Zinc | 3610 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-007.003

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-008.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.17
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 447 | | | P |
| 7440-36-0 | Antimony | 1130 | | E | P |
| 7440-38-2 | Arsenic | 268 | | N | P |
| 7440-39-3 | Barium | 652 | | | P |
| 7440-41-7 | Beryllium | 0.59 | B | | P |
| 7440-43-9 | Cadmium | 55.8 | | | P |
| 7440-70-2 | Calcium | 486000 | | | P |
| 7440-47-3 | Chromium | 57.6 | | | P |
| 7440-48-4 | Cobalt | 168 | | | P |
| 7440-50-8 | Copper | 234 | | | P |
| 7439-89-6 | Iron | 2380 | | | P |
| 7439-92-1 | Lead | 88.1 | | N | P |
| 7439-93-2 | Lithium | 68.7 | B | N | P |
| 7439-95-4 | Magnesium | 13800 | | | P |
| 7439-96-5 | Manganese | 771 | | | P |
| 7439-97-6 | Mercury | 2.0 | U | | AV |
| 7439-98-7 | Molybdnum | 53.6 | B | | P |
| 7440-02-0 | Nickel | 133 | | | P |
| 7440-09-7 | Potassium | 31200 | | | P |
| 7782-49-2 | Selenium | 6.2 | B | N | P |
| 7440-22-4 | Silver | 3.1 | B | | P |
| 7440-23-5 | Sodium | 1440000 | | | P |
| 7440-24-6 | Strontium | 225 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 17.4 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 5.3 | B | | P |
| 7440-66-6 | Zinc | 50400 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-008.003

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-009.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.21
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 157 | B | | P |
| 7440-36-0 | Antimony | 4.1 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 2240 | | | P |
| 7440-41-7 | Beryllium | 0.18 | B | | P |
| 7440-43-9 | Cadmium | 2.2 | B | | P |
| 7440-70-2 | Calcium | 42200 | | | P |
| 7440-47-3 | Chromium | 14.1 | | | P |
| 7440-48-4 | Cobalt | 2.4 | B | | P |
| 7440-50-8 | Copper | 31.8 | | | P |
| 7439-89-6 | Iron | 443 | | | P |
| 7439-92-1 | Lead | 27.4 | B | N | P |
| 7439-93-2 | Lithium | 34.0 | U | N | P |
| 7439-95-4 | Magnesium | 10400 | | | P |
| 7439-96-5 | Manganese | 65.6 | | | P |
| 7439-97-6 | Mercury | 2.0 | U | | AV |
| 7439-98-7 | Molybdnum | 1.5 | B | | P |
| 7440-02-0 | Nickel | 15.4 | B | | P |
| 7440-09-7 | Potassium | 4170 | B | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1280000 | | | P |
| 7440-24-6 | Strontium | 82.4 | B | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 13.3 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 0.80 | U | | P |
| 7440-66-6 | Zinc | 3810 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-009.003

FORM I - IN

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-010.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.13
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 3130 | | | P |
| 7440-36-0 | Antimony | 15.6 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 1150 | | | P |
| 7440-41-7 | Beryllium | 0.50 | B | | P |
| 7440-43-9 | Cadmium | 57.6 | | | P |
| 7440-70-2 | Calcium | 278000 | | | P |
| 7440-47-3 | Chromium | 31.7 | | | P |
| 7440-48-4 | Cobalt | 186 | | | P |
| 7440-50-8 | Copper | 324 | | | P |
| 7439-89-6 | Iron | 22700 | | | P |
| 7439-92-1 | Lead | 435 | | N | P |
| 7439-93-2 | Lithium | 37.2 | B | N | P |
| 7439-95-4 | Magnesium | 3250 | B | | P |
| 7439-96-5 | Manganese | 890 | | | P |
| 7439-97-6 | Mercury | 3.8 | | | AV |
| 7439-98-7 | Molybdnum | 11.6 | B | | P |
| 7440-02-0 | Nickel | 60.7 | | | P |
| 7440-09-7 | Potassium | 14800 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1410000 | | | P |
| 7440-24-6 | Strontium | 575 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 11.1 | B | | P |
| 11-09-6 | Uranium | 8.5 | B | N | P |
| 7440-62-2 | Vanadium | 3.5 | B | | P |
| 7440-66-6 | Zinc | 7790 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-010.003

FORM I - IN

Ue6

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-011.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.23
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1100 | | | P |
| 7440-36-0 | Antimony | 290 | | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 1370 | | | P |
| 7440-41-7 | Beryllium | 0.40 | B | | P |
| 7440-43-9 | Cadmium | 28.5 | | | P |
| 7440-70-2 | Calcium | 107000 | | | P |
| 7440-47-3 | Chromium | 318 | | | P |
| 7440-48-4 | Cobalt | 156 | | | P |
| 7440-50-8 | Copper | 70.5 | | | P |
| 7439-89-6 | Iron | 591 | | | P |
| 7439-92-1 | Lead | 4400 | | N | P |
| 7439-93-2 | Lithium | 34.0 | U | N | P |
| 7439-95-4 | Magnesium | 20200 | | | P |
| 7439-96-5 | Manganese | 997 | | | P |
| 7439-97-6 | Mercury | 83.3 | | | AV |
| 7439-98-7 | Molybdnum | 8.7 | B | | P |
| 7440-02-0 | Nickel | 75.2 | | | P |
| 7440-09-7 | Potassium | 4730 | B | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1370000 | | | P |
| 7440-24-6 | Strontium | 176 | B | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 11.8 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 1.2 | B | | P |
| 7440-66-6 | Zinc | 47200 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-011.003

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-012.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.25
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 697 | | | P |
| 7440-36-0 | Antimony | 5.4 | B | E | P |
| 7440-38-2 | Arsenic | 1.8 | U | N | P |
| 7440-39-3 | Barium | 1420 | | | P |
| 7440-41-7 | Beryllium | 0.82 | | | P |
| 7440-43-9 | Cadmium | 10.8 | | | P |
| 7440-70-2 | Calcium | 849000 | | | P |
| 7440-47-3 | Chromium | 28.8 | | | P |
| 7440-48-4 | Cobalt | 9.7 | B | | P |
| 7440-50-8 | Copper | 65.7 | | | P |
| 7439-89-6 | Iron | 566 | | | P |
| 7439-92-1 | Lead | 123 | | N | P |
| 7439-93-2 | Lithium | 34.0 | U | N | P |
| 7439-95-4 | Magnesium | 38000 | | | P |
| 7439-96-5 | Manganese | 506 | | | P |
| 7439-97-6 | Mercury | 2.0 | U | | AV |
| 7439-98-7 | Molybdnum | 7.5 | B | | P |
| 7440-02-0 | Nickel | 3.4 | B | | P |
| 7440-09-7 | Potassium | 21000 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1380000 | | | P |
| 7440-24-6 | Strontium | 634 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 9.0 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 52.2 | | | P |
| 7440-66-6 | Zinc | 1690 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-012.003

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-013.003

Lab Name: SOUTHWEST_LABS_OF_OK_____ Contract: KASIHILL__
Lab Code: SWOK__ Case No.: 35234 SAS No.: _____ SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.27
Level (low/med): LOW__ Date Received: 08/13/98
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | 259 | | | P |
| 7440-36-0 | Antimony_ | 874 | | E | P |
| 7440-38-2 | Arsenic__ | 1.8 | U | N | P |
| 7440-39-3 | Barium___ | 1390 | | | P |
| 7440-41-7 | Beryllium | 0.15 | B | | P |
| 7440-43-9 | Cadmium__ | 13.5 | | | P |
| 7440-70-2 | Calcium__ | 9570 | | | P |
| 7440-47-3 | Chromium_ | 7.8 | B | | P |
| 7440-48-4 | Cobalt___ | 3.0 | B | | P |
| 7440-50-8 | Copper___ | 8.6 | B | | P |
| 7439-89-6 | Iron____ | 1540 | | | P |
| 7439-92-1 | Lead____ | 123 | | N | P |
| 7439-93-2 | Lithium__ | 34.0 | U | N | P |
| 7439-95-4 | Magnesium | 413 | B | | P |
| 7439-96-5 | Manganese | 184 | | | P |
| 7439-97-6 | Mercury__ | 2.0 | U | | AV |
| 7439-98-7 | Molybdnum | 11.0 | B | | P |
| 7440-02-0 | Nickel___ | 11.8 | B | | P |
| 7440-09-7 | Potassium | 1840 | B | | P |
| 7782-49-2 | Selenium_ | 4.0 | U | N | P |
| 7440-22-4 | Silver___ | 7.8 | | | P |
| 7440-23-5 | Sodium___ | 1160000 | | | P |
| 7440-24-6 | Strontium | 33.0 | B | | P |
| 7440-28-0 | Thallium_ | 3.9 | U | N | P |
| 7440-31-5_ | Tin_____ | 6.2 | B | | P |
| 11-09-6___ | Uranium_ | 6.2 | U | N | P |
| 7440-62-2_ | Vanadium_ | 0.80 | U | | P |
| 7440-66-6_ | Zinc_____ | 61200 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
CLIENT_ID_=_98A5236-013.003

FORM I - IN

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INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-015.003

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KASIHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234B
Matrix (soil/water): WATER Lab Sample ID: 35234.19
Level (low/med): LOW Date Received: 08/13/98
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 61.9 | B | | P |
| 7440-36-0 | Antimony | 17.9 | B | E | P |
| 7440-38-2 | Arsenic | 19.1 | B | N | P |
| 7440-39-3 | Barium | 700 | | | P |
| 7440-41-7 | Beryllium | 2.7 | | | P |
| 7440-43-9 | Cadmium | 1.5 | B | | P |
| 7440-70-2 | Calcium | 970000 | | | P |
| 7440-47-3 | Chromium | 334 | | | P |
| 7440-48-4 | Cobalt | 793 | | | P |
| 7440-50-8 | Copper | 28.7 | | | P |
| 7439-89-6 | Iron | 69.2 | B | | P |
| 7439-92-1 | Lead | 7.1 | B | N | P |
| 7439-93-2 | Lithium | 100 | | N | P |
| 7439-95-4 | Magnesium | 7830 | | | P |
| 7439-96-5 | Manganese | 607 | | | P |
| 7439-97-6 | Mercury | 4.9 | | | AV |
| 7439-98-7 | Molybdnum | 47.5 | B | | P |
| 7440-02-0 | Nickel | 70.8 | | | P |
| 7440-09-7 | Potassium | 32200 | | | P |
| 7782-49-2 | Selenium | 4.0 | U | N | P |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1380000 | | | P |
| 7440-24-6 | Strontium | 2620 | | | P |
| 7440-28-0 | Thallium | 3.9 | U | N | P |
| 7440-31-5 | Tin | 10.8 | B | | P |
| 11-09-6 | Uranium | 6.2 | U | N | P |
| 7440-62-2 | Vanadium | 484 | | | P |
| 7440-66-6 | Zinc | 1160 | | E | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-015.003

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ICP - Paints

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-002.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.01
Level (low/med): LOW Date Received: 08/13/98
% Solids: 98.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 3390 | | E | P |
| 7440-36-0 | Antimony | 32.6 | | N | P |
| 7440-38-2 | Arsenic | 1.0 | B | N | P |
| 7440-39-3 | Barium | 1550 | | | P |
| 7440-41-7 | Beryllium | 0.10 | B | | P |
| 7440-43-9 | Cadmium | 0.82 | B | N | P |
| 7440-70-2 | Calcium | 128000 | | | P |
| 7440-47-3 | Chromium | 220 | | E* | P |
| 7440-48-4 | Cobalt | 139 | | EN | P |
| 7440-50-8 | Copper | 11.7 | | | P |
| 7439-89-6 | Iron | 2670 | | E* | P |
| 7439-92-1 | Lead | 2800 | | E | P |
| 7439-93-2 | Lithium | 8.4 | B | | P |
| 7439-95-4 | Magnesium | 1440 | | E | P |
| 7439-96-5 | Manganese | 65.9 | | EN | P |
| 7439-97-6 | Mercury | 0.45 | | | AV |
| 7439-98-7 | Molybdnum | 1.3 | B | EN | P |
| 7440-02-0 | Nickel | 4.3 | B | EN* | P |
| 7440-09-7 | Potassium | 901 | B | | P |
| 7782-49-2 | Selenium | 0.49 | B | N | P |
| 7440-22-4 | Silver | 0.26 | B | N | P |
| 7440-23-5 | Sodium | 1210 | | | P |
| 7440-24-6 | Strontium | 391 | | | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-31-5 | Tin | 5.8 | B | | P |
| 11-09-6 | Uranium | 0.63 | U | | P |
| 7440-62-2 | Vanadium | 12.5 | | | P |
| 7440-66-6 | Zinc | 4230 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-002.002

FORM I - IN

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-003.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.03
Level (low/med): LOW Date Received: 08/13/98
% Solids: 98.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 6860 | | E | P |
| 7440-36-0 | Antimony | 15.9 | | N | P |
| 7440-38-2 | Arsenic | 0.98 | B | N | P |
| 7440-39-3 | Barium | 4060 | | | P |
| 7440-41-7 | Beryllium | 0.43 | | | P |
| 7440-43-9 | Cadmium | 1.1 | | N | P |
| 7440-70-2 | Calcium | 114000 | | | P |
| 7440-47-3 | Chromium | 290 | | E* | P |
| 7440-48-4 | Cobalt | 111 | | EN | P |
| 7440-50-8 | Copper | 30.7 | | | P |
| 7439-89-6 | Iron | 3800 | | E* | P |
| 7439-92-1 | Lead | 2540 | | E | P |
| 7439-93-2 | Lithium | 9.7 | B | | P |
| 7439-95-4 | Magnesium | 1140 | | E | P |
| 7439-96-5 | Manganese | 103 | | EN | P |
| 7439-97-6 | Mercury | 1.1 | | | AV |
| 7439-98-7 | Molybdnum | 2.6 | B | EN | P |
| 7440-02-0 | Nickel | 11.3 | | EN* | P |
| 7440-09-7 | Potassium | 1220 | | | P |
| 7782-49-2 | Selenium | 0.41 | U | N | P |
| 7440-22-4 | Silver | 0.12 | U | N | P |
| 7440-23-5 | Sodium | 1160 | | | P |
| 7440-24-6 | Strontium | 458 | | | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-31-5 | Tin | 6.0 | B | | P |
| 11-09-6 | Uranium | 0.63 | U | | P |
| 7440-62-2 | Vanadium | 63.3 | | | P |
| 7440-66-6 | Zinc | 3830 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-003.002

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-004.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.05
Level (low/med): LOW Date Received: 08/13/98
% Solids: 96.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 892 | | E | P |
| 7440-36-0 | Antimony | 0.84 | B | N | P |
| 7440-38-2 | Arsenic | 0.58 | B | N | P |
| 7440-39-3 | Barium | 354 | | | P |
| 7440-41-7 | Beryllium | 0.14 | B | | P |
| 7440-43-9 | Cadmium | 0.70 | B | N | P |
| 7440-70-2 | Calcium | 86200 | | | P |
| 7440-47-3 | Chromium | 17.3 | | E* | P |
| 7440-48-4 | Cobalt | 9.9 | B | EN | P |
| 7440-50-8 | Copper | 30.5 | | | P |
| 7439-89-6 | Iron | 30100 | | E* | P |
| 7439-92-1 | Lead | 48.8 | | E | P |
| 7439-93-2 | Lithium | 5.6 | B | | P |
| 7439-95-4 | Magnesium | 1490 | | E | P |
| 7439-96-5 | Manganese | 50.0 | | EN | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7439-98-7 | Molybdnum | 2.4 | B | EN | P |
| 7440-02-0 | Nickel | 4.6 | B | EN* | P |
| 7440-09-7 | Potassium | 323 | B | | P |
| 7782-49-2 | Selenium | 0.51 | B | N | P |
| 7440-22-4 | Silver | 0.12 | U | N | P |
| 7440-23-5 | Sodium | 641 | B | | P |
| 7440-24-6 | Strontium | 51.9 | | | P |
| 7440-28-0 | Thallium | 0.41 | B | | P |
| 7440-31-5 | Tin | 13.1 | B | | P |
| 11-09-6 | Uranium | 1.9 | B | | P |
| 7440-62-2 | Vanadium | 6.2 | B | | P |
| 7440-66-6 | Zinc | 106 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-004.002

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-005.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.08
Level (low/med): LOW Date Received: 08/13/98
% Solids: 96.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 45900 | | E | P |
| 7440-36-0 | Antimony | 2.1 | B | N | P |
| 7440-38-2 | Arsenic | 0.92 | B | N | P |
| 7440-39-3 | Barium | 44.1 | | | P |
| 7440-41-7 | Beryllium | 0.01 | U | | P |
| 7440-43-9 | Cadmium | 0.12 | B | N | P |
| 7440-70-2 | Calcium | 1340 | | | P |
| 7440-47-3 | Chromium | 3.9 | | E* | P |
| 7440-48-4 | Cobalt | 0.91 | B | EN | P |
| 7440-50-8 | Copper | 22.5 | | | P |
| 7439-89-6 | Iron | 531 | | E* | P |
| 7439-92-1 | Lead | 46.0 | | E | P |
| 7439-93-2 | Lithium | 3.5 | U | | P |
| 7439-95-4 | Magnesium | 119 | B | E | P |
| 7439-96-5 | Manganese | 17.3 | | EN | P |
| 7439-97-6 | Mercury | 4.2 | | | AV |
| 7439-98-7 | Molybdnum | 0.47 | B | EN | P |
| 7440-02-0 | Nickel | 9.7 | | EN* | P |
| 7440-09-7 | Potassium | 695 | B | | P |
| 7782-49-2 | Selenium | 0.41 | U | N | P |
| 7440-22-4 | Silver | 0.12 | U | N | P |
| 7440-23-5 | Sodium | 1050 | | | P |
| 7440-24-6 | Strontium | 5.1 | B | | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-31-5 | Tin | 2.9 | B | | P |
| 11-09-6 | Uranium | 0.64 | U | | P |
| 7440-62-2 | Vanadium | 7.6 | B | | P |
| 7440-66-6 | Zinc | 60.0 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-005.002

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-006.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.10
Level (low/med): LOW Date Received: 08/13/98
% Solids: 98.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1420 | | E | P |
| 7440-36-0 | Antimony | 5.2 | B | N | P |
| 7440-38-2 | Arsenic | 2.0 | B | N | P |
| 7440-39-3 | Barium | 428 | | | P |
| 7440-41-7 | Beryllium | 0.12 | B | | P |
| 7440-43-9 | Cadmium | 3.4 | | N | P |
| 7440-70-2 | Calcium | 74500 | | | P |
| 7440-47-3 | Chromium | 312 | | E* | P |
| 7440-48-4 | Cobalt | 115 | | EN | P |
| 7440-50-8 | Copper | 111 | | | P |
| 7439-89-6 | Iron | 34000 | | E* | P |
| 7439-92-1 | Lead | 69.2 | | E | P |
| 7439-93-2 | Lithium | 4.0 | B | | P |
| 7439-95-4 | Magnesium | 1200 | | E | P |
| 7439-96-5 | Manganese | 150 | | EN | P |
| 7439-97-6 | Mercury | 0.03 | U | | AV |
| 7439-98-7 | Molybdnum | 9.9 | B | EN | P |
| 7440-02-0 | Nickel | 172 | | EN* | P |
| 7440-09-7 | Potassium | 278 | B | | P |
| 7782-49-2 | Selenium | 0.53 | B | N | P |
| 7440-22-4 | Silver | 0.90 | B | N | P |
| 7440-23-5 | Sodium | 435 | B | | P |
| 7440-24-6 | Strontium | 49.9 | | | P |
| 7440-28-0 | Thallium | 0.58 | B | | P |
| 7440-31-5 | Tin | 7.3 | B | | P |
| 11-09-6 | Uranium | 2.9 | B | | P |
| 7440-62-2 | Vanadium | 6.5 | B | | P |
| 7440-66-6 | Zinc | 1140 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-006.002

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-007.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.14
Level (low/med): LOW Date Received: 08/13/98
% Solids: 94.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4770 | | E | P |
| 7440-36-0 | Antimony | 0.19 | U | N | P |
| 7440-38-2 | Arsenic | 0.42 | B | N | P |
| 7440-39-3 | Barium | 16.0 | B | | P |
| 7440-41-7 | Beryllium | 0.11 | B | | P |
| 7440-43-9 | Cadmium | 0.08 | B | N | P |
| 7440-70-2 | Calcium | 101000 | | | P |
| 7440-47-3 | Chromium | 3.0 | | E* | P |
| 7440-48-4 | Cobalt | 0.19 | B | EN | P |
| 7440-50-8 | Copper | 10.7 | | | P |
| 7439-89-6 | Iron | 2160 | | E* | P |
| 7439-92-1 | Lead | 2.3 | B | E | P |
| 7439-93-2 | Lithium | 5.4 | B | | P |
| 7439-95-4 | Magnesium | 1550 | | E | P |
| 7439-96-5 | Manganese | 45.5 | | EN | P |
| 7439-97-6 | Mercury | 2.0 | | | AV |
| 7439-98-7 | Molybdnum | 0.41 | B | EN | P |
| 7440-02-0 | Nickel | 1.6 | B | EN* | P |
| 7440-09-7 | Potassium | 156 | B | | P |
| 7782-49-2 | Selenium | 0.43 | U | N | P |
| 7440-22-4 | Silver | 0.13 | U | N | P |
| 7440-23-5 | Sodium | 825 | B | | P |
| 7440-24-6 | Strontium | 395 | | | P |
| 7440-28-0 | Thallium | 0.41 | U | | P |
| 7440-31-5 | Tin | 5.8 | B | | P |
| 11-09-6 | Uranium | 0.66 | U | | P |
| 7440-62-2 | Vanadium | 3.9 | B | | P |
| 7440-66-6 | Zinc | 176 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-007.002

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-008.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.16
Level (low/med): LOW Date Received: 08/13/98
% Solids: 97.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1320 | | E | P |
| 7440-36-0 | Antimony | 80.8 | | N | P |
| 7440-38-2 | Arsenic | 25.8 | | N | P |
| 7440-39-3 | Barium | 24.8 | | | P |
| 7440-41-7 | Beryllium | 0.08 | B | | P |
| 7440-43-9 | Cadmium | 3.7 | | N | P |
| 7440-70-2 | Calcium | 44200 | | | P |
| 7440-47-3 | Chromium | 332 | | E* | P |
| 7440-48-4 | Cobalt | 33.6 | | EN | P |
| 7440-50-8 | Copper | 115 | | | P |
| 7439-89-6 | Iron | 5020 | | E* | P |
| 7439-92-1 | Lead | 45.9 | | E | P |
| 7439-93-2 | Lithium | 4.3 | B | | P |
| 7439-95-4 | Magnesium | 16700 | | E | P |
| 7439-96-5 | Manganese | 436 | | EN | P |
| 7439-97-6 | Mercury | 0.06 | B | | AV |
| 7439-98-7 | Molybdnum | 22.0 | B | EN | P |
| 7440-02-0 | Nickel | 427 | | EN* | P |
| 7440-09-7 | Potassium | 399 | B | | P |
| 7782-49-2 | Selenium | 1.1 | B | N | P |
| 7440-22-4 | Silver | 0.28 | B | N | P |
| 7440-23-5 | Sodium | 566 | B | | P |
| 7440-24-6 | Strontium | 16.7 | B | | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-31-5 | Tin | 26.2 | B | | P |
| 11-09-6 | Uranium | 0.63 | U | | P |
| 7440-62-2 | Vanadium | 7.6 | B | | P |
| 7440-66-6 | Zinc | 4830 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-008.002

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-009.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.20
Level (low/med): LOW Date Received: 08/13/98
% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 105 | | E | P |
| 7440-36-0 | Antimony | 48.5 | | N | P |
| 7440-38-2 | Arsenic | 15.6 | | N | P |
| 7440-39-3 | Barium | 7.1 | B | | P |
| 7440-41-7 | Beryllium | 0.01 | U | | P |
| 7440-43-9 | Cadmium | 7.2 | | N | P |
| 7440-70-2 | Calcium | 781 | | | P |
| 7440-47-3 | Chromium | 54.0 | | E* | P |
| 7440-48-4 | Cobalt | 15.0 | | EN | P |
| 7440-50-8 | Copper | 1220 | | | P |
| 7439-89-6 | Iron | 568000 | | E* | P |
| 7439-92-1 | Lead | 94.0 | | E | P |
| 7439-93-2 | Lithium | 3.3 | B | | P |
| 7439-95-4 | Magnesium | 124 | B | E | P |
| 7439-96-5 | Manganese | 2140 | | EN | P |
| 7439-97-6 | Mercury | 0.03 | U | | AV |
| 7439-98-7 | Molybdnum | 10.9 | B | EN | P |
| 7440-02-0 | Nickel | 34.5 | | EN* | P |
| 7440-09-7 | Potassium | 31.7 | B | | P |
| 7782-49-2 | Selenium | 18.7 | | N | P |
| 7440-22-4 | Silver | 0.68 | B | N | P |
| 7440-23-5 | Sodium | 151 | B | | P |
| 7440-24-6 | Strontium | 1.5 | B | | P |
| 7440-28-0 | Thallium | 17.7 | | | P |
| 7440-31-5 | Tin | 15.3 | B | | P |
| 11-09-6 | Uranium | 13.4 | B | | P |
| 7440-62-2 | Vanadium | 19.6 | | | P |
| 7440-66-6 | Zinc | 4180 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-009.002

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# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-010.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.12
Level (low/med): LOW Date Received: 08/13/98
% Solids: 98.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1010 | | E | P |
| 7440-36-0 | Antimony | 1.6 | B | N | P |
| 7440-38-2 | Arsenic | 1.8 | B | N | P |
| 7440-39-3 | Barium | 487 | | | P |
| 7440-41-7 | Beryllium | 0.11 | B | | P |
| 7440-43-9 | Cadmium | 2.4 | | N | P |
| 7440-70-2 | Calcium | 83900 | | | P |
| 7440-47-3 | Chromium | 38.5 | | E* | P |
| 7440-48-4 | Cobalt | 69.0 | | EN | P |
| 7440-50-8 | Copper | 50.2 | | | P |
| 7439-89-6 | Iron | 38600 | | E* | P |
| 7439-92-1 | Lead | 74.8 | | E | P |
| 7439-93-2 | Lithium | 3.8 | B | | P |
| 7439-95-4 | Magnesium | 1280 | | E | P |
| 7439-96-5 | Manganese | 74.3 | | EN | P |
| 7439-97-6 | Mercury | 0.04 | B | | AV |
| 7439-98-7 | Molybdnum | 2.3 | B | EN | P |
| 7440-02-0 | Nickel | 21.0 | | EN* | P |
| 7440-09-7 | Potassium | 250 | B | | P |
| 7782-49-2 | Selenium | 0.53 | B | N | P |
| 7440-22-4 | Silver | 0.12 | U | N | P |
| 7440-23-5 | Sodium | 427 | B | | P |
| 7440-24-6 | Strontium | 51.8 | | | P |
| 7440-28-0 | Thallium | 0.56 | B | | P |
| 7440-31-5 | Tin | 7.1 | B | | P |
| 11-09-6 | Uranium | 2.5 | B | | P |
| 7440-62-2 | Vanadium | 4.9 | B | | P |
| 7440-66-6 | Zinc | 679 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-010.002

FORM I - IN

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-011.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.22
Level (low/med): LOW Date Received: 08/13/98
% Solids: 98.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 2530 | | E | P |
| 7440-36-0 | Antimony | 15.2 | | N | P |
| 7440-38-2 | Arsenic | 2.0 | B | N | P |
| 7440-39-3 | Barium | 3630 | | | P |
| 7440-41-7 | Beryllium | 0.03 | B | | P |
| 7440-43-9 | Cadmium | 1.8 | | N | P |
| 7440-70-2 | Calcium | 39200 | | | P |
| 7440-47-3 | Chromium | 2220 | | E* | P |
| 7440-48-4 | Cobalt | 66.2 | | EN | P |
| 7440-50-8 | Copper | 170 | | | P |
| 7439-89-6 | Iron | 10900 | | E* | P |
| 7439-92-1 | Lead | 13700 | | E | P |
| 7439-93-2 | Lithium | 8.8 | B | | P |
| 7439-95-4 | Magnesium | 19800 | | E | P |
| 7439-96-5 | Manganese | 279 | | EN | P |
| 7439-97-6 | Mercury | 0.82 | | | AV |
| 7439-98-7 | Molybdnum | 1.7 | B | EN | P |
| 7440-02-0 | Nickel | 26.3 | | EN* | P |
| 7440-09-7 | Potassium | 221 | B | | P |
| 7782-49-2 | Selenium | 0.40 | U | N | P |
| 7440-22-4 | Silver | 0.52 | B | N | P |
| 7440-23-5 | Sodium | 329 | B | | P |
| 7440-24-6 | Strontium | 63.5 | | | P |
| 7440-28-0 | Thallium | 0.42 | B | | P |
| 7440-31-5 | Tin | 6.7 | B | | P |
| 11-09-6 | Uranium | 1.9 | B | | P |
| 7440-62-2 | Vanadium | 6.7 | B | | P |
| 7440-66-6 | Zinc | 1220 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-011.002

FORM I - IN

180

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-012.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.24
Level (low/med): LOW Date Received: 08/13/98
% Solids: 99.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 2920 | | E | P |
| 7440-36-0 | Antimony | 0.32 | B | N | P |
| 7440-38-2 | Arsenic | 0.71 | B | N | P |
| 7440-39-3 | Barium | 93.5 | | | P |
| 7440-41-7 | Beryllium | 0.18 | B | | P |
| 7440-43-9 | Cadmium | 0.73 | B | N | P |
| 7440-70-2 | Calcium | 120000 | | | P |
| 7440-47-3 | Chromium | 15.7 | | E* | P |
| 7440-48-4 | Cobalt | 1.8 | B | EN | P |
| 7440-50-8 | Copper | 15.8 | | | P |
| 7439-89-6 | Iron | 4240 | | E* | P |
| 7439-92-1 | Lead | 67.6 | | E | P |
| 7439-93-2 | Lithium | 3.8 | B | | P |
| 7439-95-4 | Magnesium | 15700 | | E | P |
| 7439-96-5 | Manganese | 114 | | EN | P |
| 7439-97-6 | Mercury | 0.03 | U | | AV |
| 7439-98-7 | Molybdnum | 0.78 | B | EN | P |
| 7440-02-0 | Nickel | 4.0 | B | EN* | P |
| 7440-09-7 | Potassium | 456 | B | | P |
| 7782-49-2 | Selenium | 0.40 | U | N | P |
| 7440-22-4 | Silver | 0.12 | U | N | P |
| 7440-23-5 | Sodium | 334 | B | | P |
| 7440-24-6 | Strontium | 37.7 | B | | P |
| 7440-28-0 | Thallium | 0.39 | U | | P |
| 7440-31-5 | Tin | 3.0 | B | | P |
| 11-09-6 | Uranium | 0.62 | U | | P |
| 7440-62-2 | Vanadium | 12.2 | | | P |
| 7440-66-6 | Zinc | 128 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-012.002

FORM I - IN

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-013.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.26
Level (low/med): LOW Date Received: 08/13/98
% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 385 | | E | P |
| 7440-36-0 | Antimony | 61.7 | | N | P |
| 7440-38-2 | Arsenic | 14.9 | | N | P |
| 7440-39-3 | Barium | 0.58 | B | | P |
| 7440-41-7 | Beryllium | 0.01 | U | | P |
| 7440-43-9 | Cadmium | 9.4 | | N | P |
| 7440-70-2 | Calcium | 4640 | | | P |
| 7440-47-3 | Chromium | 55.5 | | E* | P |
| 7440-48-4 | Cobalt | 16.0 | | EN | P |
| 7440-50-8 | Copper | 1340 | | | P |
| 7439-89-6 | Iron | 622000 | | E* | P |
| 7439-92-1 | Lead | 108 | | E | P |
| 7439-93-2 | Lithium | 3.4 | B | | P |
| 7439-95-4 | Magnesium | 1050 | | E | P |
| 7439-96-5 | Manganese | 2420 | | EN | P |
| 7439-97-6 | Mercury | 0.03 | U | | AV |
| 7439-98-7 | Molybdnum | 11.4 | B | EN | P |
| 7440-02-0 | Nickel | 37.4 | | EN* | P |
| 7440-09-7 | Potassium | 40.9 | B | | P |
| 7782-49-2 | Selenium | 22.0 | | N | P |
| 7440-22-4 | Silver | 1.1 | | N | P |
| 7440-23-5 | Sodium | 191 | B | | P |
| 7440-24-6 | Strontium | 2.3 | B | | P |
| 7440-28-0 | Thallium | 18.9 | | | P |
| 7440-31-5 | Tin | 17.1 | B | | P |
| 11-09-6 | Uranium | 13.1 | B | | P |
| 7440-62-2 | Vanadium | 21.1 | | | P |
| 7440-66-6 | Zinc | 4450 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID_=_98A5236-013.002

FORM I - IN

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1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

-015.002

Lab Name: SOUTHWEST_LABS_OF_OK Contract: KAISHILL
Lab Code: SWOK Case No.: 35234 SAS No.: SDG No.: 35234A
Matrix (soil/water): SOIL Lab Sample ID: 35234.18
Level (low/med): LOW Date Received: 08/13/98
% Solids: 98.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4980 | | E | P |
| 7440-36-0 | Antimony | 5.0 | B | N | P |
| 7440-38-2 | Arsenic | 0.63 | B | N | P |
| 7440-39-3 | Barium | 3420 | | | P |
| 7440-41-7 | Beryllium | 0.17 | B | | P |
| 7440-43-9 | Cadmium | 0.52 | B | N | P |
| 7440-70-2 | Calcium | 98800 | | | P |
| 7440-47-3 | Chromium | 23.7 | | E* | P |
| 7440-48-4 | Cobalt | 152 | | EN | P |
| 7440-50-8 | Copper | 31.9 | | | P |
| 7439-89-6 | Iron | 1230 | | E* | P |
| 7439-92-1 | Lead | 253 | | E | P |
| 7439-93-2 | Lithium | 17.4 | B | | P |
| 7439-95-4 | Magnesium | 1580 | | E | P |
| 7439-96-5 | Manganese | 63.8 | | EN | P |
| 7439-97-6 | Mercury | 0.08 | B | | AV |
| 7439-98-7 | Molybdnum | 1.0 | B | EN | P |
| 7440-02-0 | Nickel | 95.2 | | EN* | P |
| 7440-09-7 | Potassium | 933 | B | | P |
| 7782-49-2 | Selenium | 0.40 | U | N | P |
| 7440-22-4 | Silver | 0.15 | B | N | P |
| 7440-23-5 | Sodium | 1340 | | | P |
| 7440-24-6 | Strontium | 149 | | | P |
| 7440-28-0 | Thallium | 0.39 | U | | P |
| 7440-31-5 | Tin | 4.4 | B | | P |
| 11-09-6 | Uranium | 0.62 | U | | P |
| 7440-62-2 | Vanadium | 25.0 | | | P |
| 7440-66-6 | Zinc | 2720 | | E | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID = 98A5236-015.002

FORM I - IN

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# Appendix A.3.2

# Bldg. 551 Historical Chemical Data

# PCBs

# Appendix A.3.2.1

# Bldg. 551 Historical Chemical Data

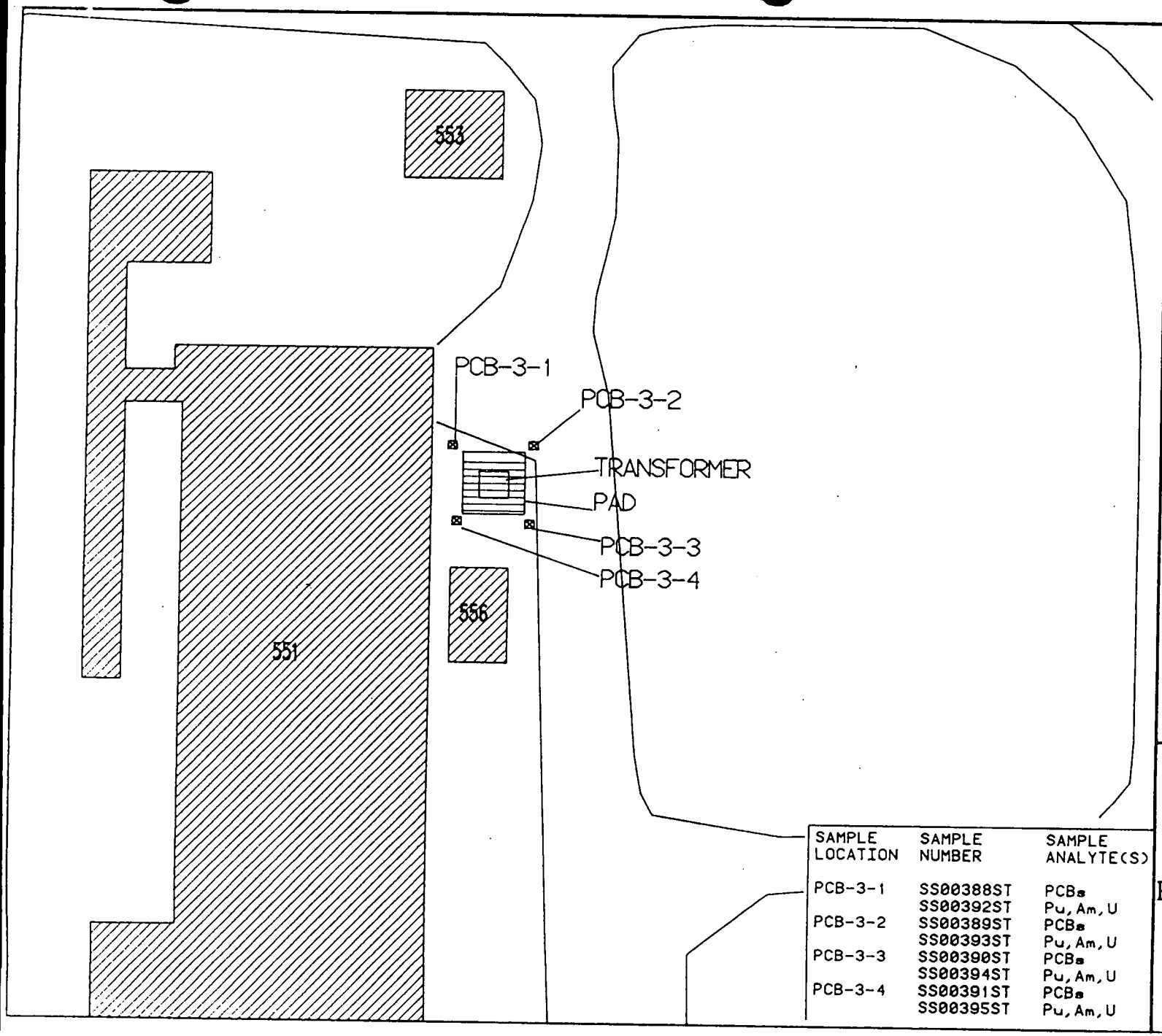
# PCBs

# Sample Locations

SITE #3 - Northeast of Building 551

Transformer T556 exists at this location on a concrete pad 20 feet east of building 551 within a bermed pad. The pad was constructed over an area on which a different transformer with no pad was located. Transformer T556 was retro-filled in 1987. This transformer is known to have leaked oil containing PCBs directly onto the soil beneath it according to discussions with personnel from Utilities (Photo #3). No documented remedial measures were initiated at this site. Transformer T556 continues to leak as evidenced by the stains on the pad in place and fresh oil present inside the east panel. This site is approximately forty feet south of IHSS 158, approximately forty feet west of IHSS 117.2 and adjacent to the northeast corner of Building 551.

Site #3 is prioritized as a Category II.




| SAMPLE LOCATION | SAMPLE NUMBER | SAMPLE ANALYTE(S) |
|---|---|---|
| PCB-3-1 | SS00388ST | PCBs |
| | SS00392ST | Pu, Am, U |
| PCB-3-2 | SS00389ST | PCBs |
| | SS00393ST | Pu, Am, U |
| PCB-3-3 | SS00390ST | PCBs |
| | SS00394ST | Pu, Am, U |
| PCB-3-4 | SS00391ST | PCBs |
| | SS00395ST | Pu, Am, U |

## MAP LEGEND

- PAVED ROADS
- 551 BUILDINGS
- APPROXIMATE TRANSFORMER/ PAD LOCATIONS (NOT TO SCALE)
- APPROXIMATE SAMPLE LOCATIONS

N

0 feet 25 50

U.S. DEPARTMENT of ENERGY
Rocky Flats Plant
Golden, Colorado

# PRELIMINARY PCB INVESTIGATION

## SITE No. 3

SEPTEMBER 25, 1991

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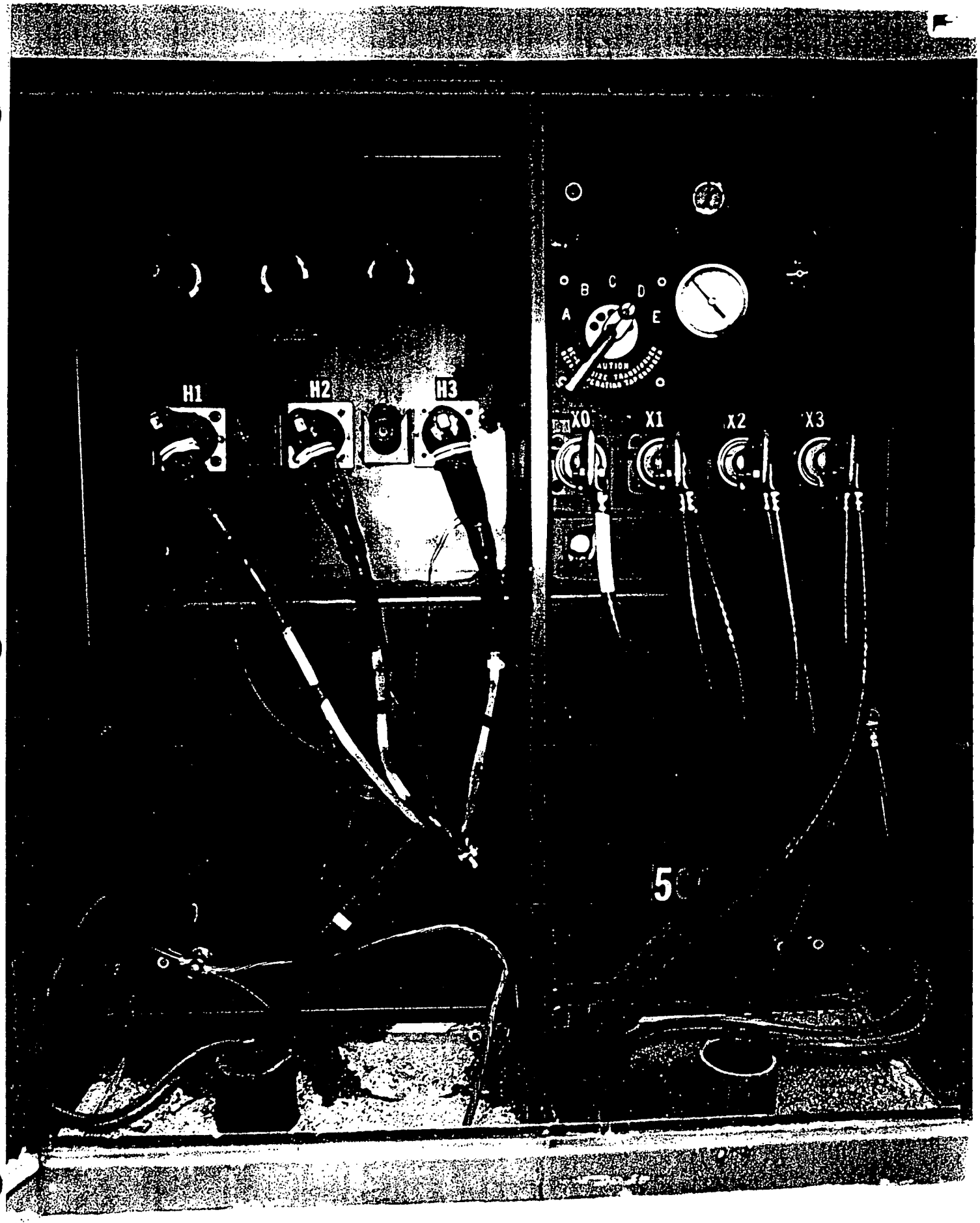


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# Appendix A.3.2.2

# Bldg. 551 Historical Chemical Data

# PCBs

# Laboratory Data

| | | |
|---|---|---|
| | Cust ID: | SS00388ST |
| Sample Information | RFW#: | 026 |
| | Matrix: | SOIL |
| | D.F.: | 0.500 |
| | Units: | ug/Kg |
| Surrogate: Di-n-butylchlorendate | 31 | % |
| Aroclor-1016 | 40 | U |
| Aroclor-1221 | 40 | U |
| Aroclor-1232 | 40 | U |
| Aroclor-1242 | 40 | U |
| Aroclor-1248 | 40 | U |
| Aroclor-1254 | 81 | U |
| Aroclor-1260 | 92 | |

| | | | |
|---|---|---|---|
| | Cust ID: | SS00389ST | SS00390ST | SS00391ST |
| Sample Information | RFW#: | 027 | 028 | 029 |
| | Matrix: | SOIL | SOIL | SOIL |
| | D.F.: | 0.500 | 0.500 | 0.500 |
| | Units: | ug/Kg | ug/Kg | ug/Kg |
| Surrogate: Di-n-butylchlorendate | 30 % | | 42 % | 28 % |
| Aroclor-1016 | 40 | U | 40 U | 40 U |
| Aroclor-1221 | 40 | U | 40 U | 40 U |
| Aroclor-1232 | 40 | U | 40 U | 40 U |
| Aroclor-1242 | 40 | U | 40 U | 40 U |
| Aroclor-1248 | 40 | U | 40 U | 40 U |
| Aroclor-1254 | 79 | U | 80 U | 81 U |
| Aroclor-1260 | 68 | J | 20 J | 63 J |

Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
Percent recovery. D- Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

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| Location | SI | QC | Sample Number | Smpl Date | D | ID | Group | Chemical | Result | Unit | Error | Qual | D.LMT | VA | RN1 | RN2 | RN3 | RN4 | V | VQUAL | VDET |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CB-3 | SO | | SS00392ST | 27-JUN-91 | N | TRG | TRADS | AMERICIUM-241 | .06616 | PCI/G | .0189 | | .02 | | | | | | | | |
| CB-3 | SO | | SS00392ST | 27-JUN-91 | N | TRG | TRADS | PLUTONIUM-239/240 | .09316 | PCI/G | .0316 | | .03 | | | | | | | | |
| CB-3 | SO | | SS00392ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-233,-234 | 1.296 | PCI/G | .296 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00392ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-235 | .08837 | PCI/G | .0662 | J | .3 | | | | | | | | |
| CB-3 | SO | | SS00392ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-238 | 1.964 | PCI/G | .393 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00393ST | 27-JUN-91 | N | TRG | TRADS | AMERICIUM-241 | .03449 | PCI/G | .014 | | .02 | | | | | | | | |
| CB-3 | SO | | SS00393ST | 27-JUN-91 | N | TRG | TRADS | PLUTONIUM-239/240 | .08382 | PCI/G | .0303 | | .03 | | | | | | | | |
| CB-3 | SO | | SS00393ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-233,-234 | 1.142 | PCI/G | .273 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00393ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-235 | .04438 | PCI/G | .0467 | J | .3 | | | | | | | | |
| CB-3 | SO | | SS00393ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-238 | 1.34 | PCI/G | .303 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00394ST | 27-JUN-91 | N | TRG | TRADS | AMERICIUM-241 | .01181 | PCI/G | .00757 | J | .02 | | | | | | | | |
| CB-3 | SO | | SS00394ST | 27-JUN-91 | N | TRG | TRADS | PLUTONIUM-239/240 | .02289 | PCI/G | .0155 | J | .03 | | | | | | | | |
| CB-3 | SO | | SS00394ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-233,-234 | 1.187 | PCI/G | .283 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00394ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-235 | .04538 | PCI/G | .0477 | J | .3 | | | | | | | | |
| CB-3 | SO | | SS00394ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-238 | 1.274 | PCI/G | .296 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00395ST | 27-JUN-91 | N | TRG | TRADS | AMERICIUM-241 | .04958 | PCI/G | .0165 | | .02 | | | | | | | | |
| CB-3 | SO | | SS00395ST | 27-JUN-91 | N | TRG | TRADS | PLUTONIUM-239/240 | .1046 | PCI/G | .0393 | | .03 | | | | | | | | |
| CB-3 | SO | | SS00395ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-233,-234 | 1.117 | PCI/G | .306 | | .3 | | | | | | | | |
| CB-3 | SO | | SS00395ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-235 | .0307 | PCI/G | .0436 | J | .3 | | | | | | | | |
| CB-3 | SO | | SS00395ST | 27-JUN-91 | N | TRG | TRADS | URANIUM-238 | 1.273 | PCI/G | .332 | | .3 | | | | | | | | |

# Appendix A.4

# Bldg. 551 RLC Chemical Data

# Appendix A.4.1

# Bldg. 551 RLC Chemical Data

# Beryllium

# Appendix A.4.1.1

# Bldg. 551 RLC Chemical Data

# Beryllium

# Chain of Custody

| COMMODORE ADVANCED SCIENCES | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 99040109 | C.O.C. # 99Z6172#001 |
|---|---|---|
| | | Page 1 of 2 |

| | | |
|---|---|---|
| Collector: DAVID FARLER | Contact/Requester: FARLER, DAVE | Telephone No.: 303-966-4340 MSIN FAX |
| RIN: 99Z6172 | Sampling Origin: 662, 551, 910 | Purchase Order/Charge Code: NG2200A1 |
| Project Title | Logbook No.: N/A | Ice Chest No.: N/A Temp. |
| To (Lab): Johns Manville | Method of Shipment: FEDERAL EXPRESS | Bill of Lading/Air Bill No. |
| Protocol | | Offsite Property No. |

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative; Packing |
|---|---|---|---|---|---|---|---|---|
| 99Z6172-001.001 | 662-99-03-26-31-B1 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-002.001 | 662-99-03-26-31-B2 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-003.001 | 662-99-03-26-31-B3 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-004.001 | 662-99-03-26-31-B4 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-005.001 | 551-99-03-26-31-B1 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-006.001 | 551-99-03-26-31-B2 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-007.001 | 551-99-03-26-31-B3 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |

| Relinquished By: Date/Time | Received By: Date/Time | Relinquished By: Date/Time | Received By: Date/Time |
|---|---|---|---|
| 4-1-99 1545 | Marilyn Andrews 4/1/99 1545 | | |
| Relinquished By: Date/Time | Received By: Date/Time | Relinquished By: Date/Time | Received By: Date/Time |
| Relinquished By: Date/Time | Received By: Date/Time | Relinquished By: Date/Time | Received By: Date/Time |
| Relinquished By: Date/Time | Received By: Date/Time | Relinquished By: Date/Time | Received By: Date/Time |

| FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|

COMMODORE ADVANCED SCIENCES

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

99040109

C.O.C. # 99Z6172#001

Page 2 of 2

RIN 99Z6172 | Contact/Requestor FARLER, DAVE | Telephone No. 303-966-4340 | MSIN | FAX

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative ; Packing |
|---|---|---|---|---|---|---|---|---|
| 99Z6172-008.001 | 551-99-03-26-31-B4 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-009.001 | 910-99-03-31-31-B1 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-010.001 | 910-99-03-31-31-B2 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-011.001 | 910-99-03-31-31-B3 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-012.001 | 910-99-03-31-31-B4 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-013.001 | 910-99-03-26-31-BLK | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-014.001 | 910-99-03-26-31-05 | FILTER | | | 910 | ~~1-FILTER N/A~~ AIR CASSETTE | ~~NR01A001~~ (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-015.001 | 910-99-03-26-31-BLK | FILTER | | | 910 | ~~1-FILTER N/A~~ AIR CASSETTE | ~~NR01A001~~ (Beryllium Filter Analysis) [Routine] | N/A None |

4/1/99

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| [signature] | 4-1-99 1545 | [signature] | 4/1/99 15:45 | | | | |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |

| FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

RFP F 3791.[illegible] /95)
Formerly [illegible]30

# Rocky Flats Environmental Technology Site

Golden [illegible] 80402-0464

Safety and Hygiene Chain of Custody Record and Analysis Request

Name of Originator: DAVID FARLER Title: IH Bldg/Ext: 881/4340 Date: 4/1/99 Page 1 of 1

| SAMPLE NUMBER Bldg/Y/M/D/P#/S# | ANALYZE FOR | VOLUME liters | SAMPLE TIME/ | MEDIA | PAB | Personal Area Bulk | REMARKS | Lab Number |
|---|---|---|---|---|---|---|---|---|
| 662-99-03-26-31-B1 | Be | — | — | Whatman | B | NR01A001 | | |
| 662-99-03-26-31-B2 | | | | | | | | |
| 662-99-03-26-31-B3 | | | | | | | | |
| 662-99-03-26-31-B4 | | | | | | | | |
| 551-99-03-26-31-B1 | | | | | | | | |
| 551-99-03-26-31-B2 | | | | | | | | |
| 551-99-03-26-31-B3 | | | | | | | | |
| 551-99-03-26-31-B4 | | | | | | | | |
| 910-99-03-31-31-B1 | | | | | | | | |
| 910-99-03-31-31-B2 | | | | | | | | |
| 910-99-03-31-31-B3 | | | | | | | | |
| 910-99-03-31-31-B4 | | | | | | | | |
| 910-99-03-26-31-BLK | | | | | | | | |
| 910-99-03-26-31-05 | | | | MCE | P | IH01C015 | | |
| 910-99-03-26-31-BLK | | | | MCE | P | | | |
| | | | | | AF | 4/1/99 | | |

| Relinquished by | Received by | Time/Date | Relinquished by | Received by | Time/Date |
|---|---|---|---|---|---|
| [signature] | [signature] | 1400 3-26-99 | [signature] | [signature] | 1440 3/26/99 |
| [signature] | [signature] | 1400 3-31-99 | [signature] | [signature] | 0730 4/1/99 |
| [signature] | H Christman | 1240 4/1/99 | | | |
| | | | | | |

**Report and Billing Instruction**

| | | | |
|---|---|---|---|
| Kaiser-Hill | ☐ | Verbal To: | 966 4340 |
| RMRS | ☐ | Fax To: | 966 3711 |
| SSOC | ☐ | Report To: | KH |
| DynCorp | ☐ | Bill To: | KH |
| WSI | ☐ | P.O.#/Release: | NG2200A1 |
| | | Lab: | JM |

**Analysis Request**

Industrial Hygiene Sample

☑ Standard Service ☐ Rush ☐ Other

Asbestos Samples

☐ Standard Service ☐ 24 Rush ☐ 2 Rush ☐ Other

Seal# (Release #) 99Z6172

Condition of Seal: ☐ Broken ☐ Unbroken

Signature:

Comments: Unable to Verify

White - Return to Originator Yellow - Lab Copy Green - Sample Custodian Blue - Originator

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# Appendix A.4.1.2

# Bldg. 551 RLC Chemical Data

# Beryllium

# Sample Locations

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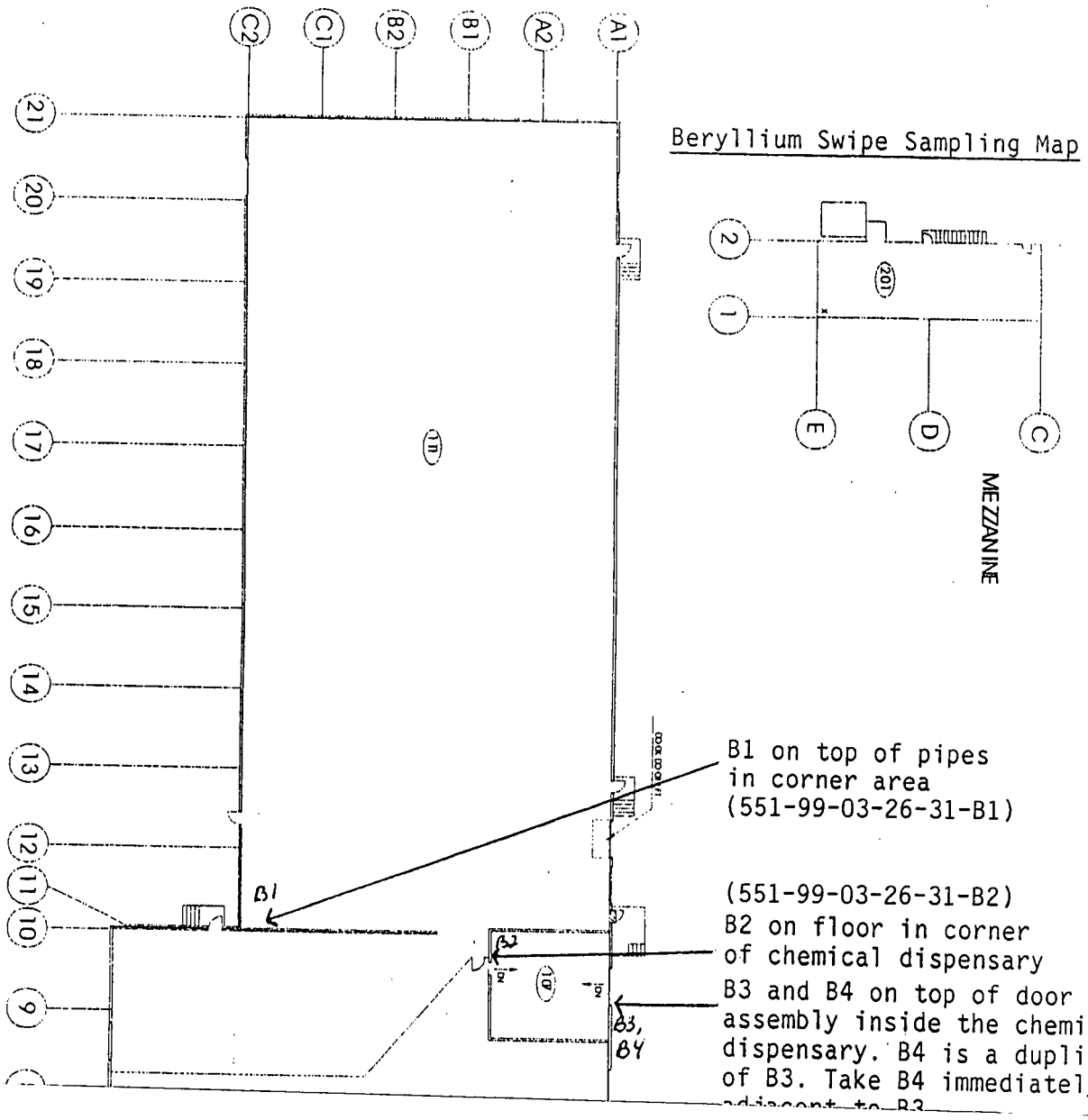
## Beryllium Swipe Sampling Map




BLDG 559 FLOOR PLAN

# Appendix A.4.1.3

# Bldg. 551 RLC Chemical Data

# Beryllium

# Laboratory Report

200

Johns Manville

COPY

Johns Manville Corporation
10100 W. Ute Avenue (80127)
P.O. Box 625005
Littleton, CO 80162-5005
303 978 2000

# Cover Page

Apr-8-99

Rocky Flats Environmental Technology Site
Mr. Roger Cichorz
P.O. Box 464
Building 881
Golden, CO 80402-0464

| | |
|---|---|
| **Laboratory Project No.:** | 99040109 |
| **Client:** | Kaiser Hill |
| **PO# / Release #:** | NG2200A1 |
| **Site Sample #:** | NR01/IH01 |
| **Seal #:** | 99Z6172 |
| **Requestor:** | Dave Farler |

Dear Mr. Cichorz,

The Johns Manville Technical Center (JMTC) has performed the following analytical services as requested. The results are calculated based upon the information supplied on the submission form. All laboratory data has been filed and are available upon request.
The industrial hygiene laboratory at JMTC has been fully accredited in all aspects by the American Industrial Hygiene Association (AIHA) since 1976. If you have any questions, please call (303) 978-2584.

**Scope of Work:**

| Analysis | # of Samples | Matrix | Method | Reporting Limit | OSHA Standard (TWA) |
|---|---|---|---|---|---|
| Beryllium | 13 | Whatman filter | EPA-SW846-3051/OSHA ID-121 | 0.1 µg | - |
| Beryllium | 2 | MCE filter | NIOSH 7300 | 0.01 µg | 0.002 mg/m3 |

I certify that this data package is in compliance with the terms and conditions of the subcontract, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard data package has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Scott A. Steiner
Industrial Hygiene Laboratory Manager

4-8-99
Date

203-978-2584 Scott

201

# Appendix A.4.1.4

# Bldg. 551 RLC Chemical Data

# Beryllium

# Laboratory Data

# JOHNS MANVILLE TECHNICAL CENTER (JMTC)



Apr-8-99

**Laboratory Project No.:** 99040109
**Client:** Kaiser Hill
**PO#/Release #:** NG2200A1
**Site Sample #:** NR01/IH01
**Seal #:** 99Z6172
**Requestor:** Dave Farler

**TABLE I:** Sample Results

| Client Sample No. | Laboratory Sample No. | Analysis | Method | Matrix | Reporting Limit | Total |
|---|---|---|---|---|---|---|
| 662-99-03-26-31-B1 | 99040109-001 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 662-99-03-26-31-B2 | 99040109-002 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 662-99-03-26-31-B3 | 99040109-003 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 662-99-03-26-31-B4 | 99040109-004 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B1 | 99040109-005 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B2 | 99040109-006 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B3 | 99040109-007 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B4 | 99040109-008 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B1 | 99040109-009 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B2 | 99040109-010 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B3 | 99040109-011 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B4 | 99040109-012 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-BLK | 99040109-013 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |

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# JOHNS MANVILLE TECHNICAL CENTER (JMTC)

Apr-8-99

| | |
|---|---|
| **Laboratory Project No.:** | 99040109 |
| **Client:** | Kaiser Hill |
| **PO#/Release #:** | NG2200A1 |
| **Site Sample #:** | NR01/IH01 |
| **Seal #:** | 99Z6172 |
| **Requestor:** | Dave Farler |

**TABLE I:** Sample Results

| Client Sample No. | Laboratory Sample No. | Analysis | Method | Matrix | Reporting Limit | Backup Section | Main Section | Total | Air Vol. / Time | Air Concentration |
|---|---|---|---|---|---|---|---|---|---|---|
| 910-99-03-26-31-05 | 99040109-014 | Beryllium | NIOSH 7300 | MCE filter | 0.01 µg | | | < 0.01 ug | | |
| 910-99-03-26-31-BLK | 99040109-015 | Beryllium | NIOSH 7300 | MCE filter | 0.01 µg | | | < 0.01 ug | | |



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# JOHNS MANVILLE TECHNICAL CENTER (JMTC)



Apr-8-99

| | |
|---|---|
| **Laboratory Project No.:** | 99040109 |
| **Client:** | Kaiser Hill |
| **PO#/Release #:** | NG2200A1 |
| **Site Sample #:** | NR01/IH01 |
| **Seal #:** | 99Z6172 |
| **Requestor:** | Dave Farler |

TABLE II: Quality Control

| QC No. | Analyte | Method | Matrix | Reporting Limit | Amount Spiked | Amount Recovered | Percent Recovery |
|---|---|---|---|---|---|---|---|
| Media Blank | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | N/A | < 0.1 ug | |
| Q9-164 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | 5.0 ug | 4.79 ug | 95.8% |
| Media Blank | Beryllium | NIOSH 7300 | MCE filter | 0.01 µg | N/A | < 0.01 ug | |
| MBS | Beryllium | NIOSH 7300 | Solution | 0.001 µg/ml | 0.5 ug/ml | 0.485 ug/ml | 97.0% |

Analyst: _____
*Anthony Carr*

Quality Assurance: _____
*Dennis Murray*

AIHA Accreditation No. [redacted]



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# Appendix B.1

# Bldg. 662 Historical Radiological Data

# Appendix B.1.1

# Bldg. 662 Historical Radiological Data

# Radiological Surveys

# RADIOLOGICAL CONTAMINATION SURVEY FORM



LOG NUMBER:

FOR: _____ P/WRE _____ PRL

_____ RWP _____ OTHER _____

| BUILDING/LOCATION: | ROOM: |
|---|---|
| 662 | YARD |
| DATE: | TIME: |
| 02-03-97 | 0800 |

ITEM DESCRIPTION: CARGO Containers and Contents (C-549-4)

COMMENTS: Rick Erickson X4064 p.7227

PERFORMED BY (PRINT NAME): J.L. Johnston

J.L. Johnston [redacted] 02-03-97

RCT SIGNATURE DATE

REVIEWED BY: Teresa Johnston

RO SUPERVISION PRINT NAME

Teresa Johnston / 2-3-97

RO SUPERVISION SIGNATURE DATE

## REMOVABLE CONTAMINATION SURVEY INSTRUMENT DATA

COPY

| MFR: | EBER. | EBER. | EBER. | EBER. |
|---|---|---|---|---|
| MODEL: | S.A.C. - 4 | S.A.C. - 4 | S.A.C. - 4 | S.A.C. - 4 |
| SERIAL #: | 861 | 824 | 767 | 892 |
| CAL DATE: | 10-09-96 | 10-09-96 | 10-08-96 | 12-11-96 |
| CAL DUE DATE: | 04-09-97 | 04-09-97 | 04-08-97 | 06-11-97 |

| MFR: | EBER. | EBER. | EBER. | EBER. |
|---|---|---|---|---|
| MODEL: | B.C. 4 | B.C. 4 | B.C. 4 | B.C. 4 |
| SERIAL #: | 771 | 384 | 385 | 381 |
| CAL DATE: | 09-12-96 | 09-18-96 | 09-18-96 | 09-18-96 |
| CAL DUE DATE: | 03-12-97 | 03-18-97 | 03-18-97 | 03-18-97 |

## TOTAL CONTAMINATION SURVEY INSTRUMENT DATA

| MFR: | N.E. TECH | | | |
|---|---|---|---|---|
| MODEL: | ELECTRA | | | |
| SERIAL #: | 1246 | | | |
| CAL DATE: | 01-31-97 | | | |
| CAL DUE DATE: | 07-31-97 | | | |
| BACKGROUND: | 1.0a/538β | | | |
| EFFICIENCY: | 24.16%a/39%β | | | |
| MDA: | 455 dpm/100cm² | | | |

MDA = CF X [2.71 + 4.65 $\sqrt{\text{BACKGROUND (CPM)}}$]

INFORMATION ONLY

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INFORMATION ONLY

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COPY

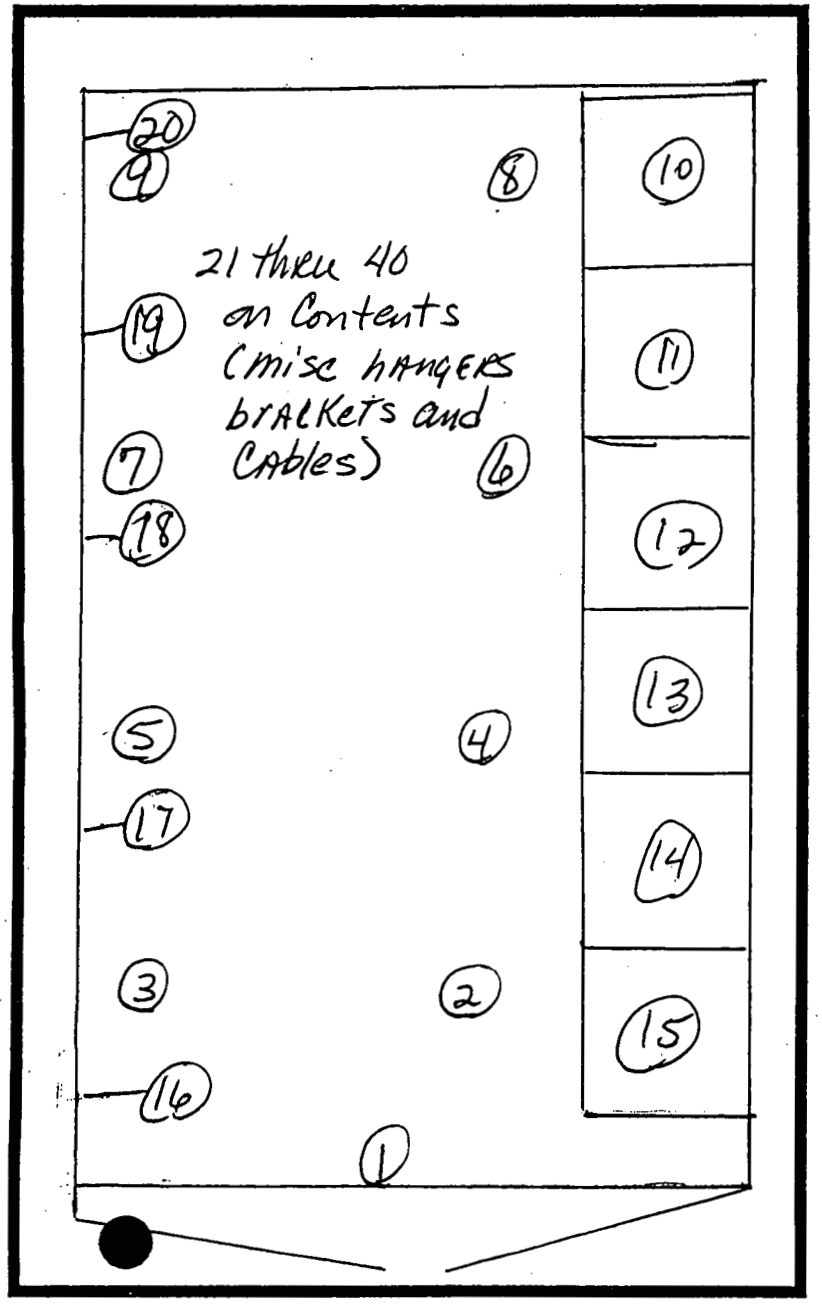
~~LOG NUMBER:~~ Bldg 662 Yard

PAGE 2 OF 3

# RADIOLOGICAL CONTAMINATION SURVEY FORM

2/3/97 Cargos

SKETCH




SURVEY RESULTS (DPM/100 CM²)

| SWIPE # | LOCATION/DESCRIPTION | REMOVABLE ALPHA | REMOVABLE BETA/GAMMA | TOTAL ALPHA (FRISK/60 SEC COUNT) | TOTAL BETA/GAMMA |
|---|---|---|---|---|---|
| 1 | DOORWAY | <18 | <205 | <60 | <455 |
| 2 | FLOOR | <18 | <205 | <60 | <455 |
| 3 | FLOOR | <18 | <205 | <60 | <455 |
| 4 | FLOOR | <18 | <205 | <60 | <455 |
| 5 | FLOOR | <18 | <205 | <60 | <455 |
| 6 | FLOOR | <18 | <205 | <60 | <455 |
| 7 | FLOOR | <18 | <205 | <60 | <455 |
| 8 | FLOOR | <18 | <205 | <60 | <455 |
| 9 | FLOOR | <18 | <205 | <60 | <455 |
| 10 | Shelves | <18 | <205 | <60 | <455 |
| 11 | Shelves | <18 | <205 | <60 | <455 |
| 12 | Shelves | <18 | <205 | <60 | <455 |
| 13 | Shelves | <18 | <205 | <60 | <455 |
| 14 | Shelves | <18 | <205 | <60 | <455 |
| 15 | Shelves | <18 | <205 | <60 | <455 |
| 16 | EAST WALL | <18 | <205 | <60 | <455 |
| 17 | EAST WALL | <18 | <205 | <60 | <455 |
| 18 | EAST WALL | <18 | <205 | <60 | <455 |
| 19 | EAST WALL | <18 | <205 | <60 | <455 |
| 20 | EAST WALL | <18 | <205 | <60 | <455 |
| 21 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 22 | Misc hangers and brackets | <18 | <205 | <60 | <455 |

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COPY

Printed with [illegible] on recycled paper

INFORMATION ONLY

LOG NUMBER: 662 Cargo

# RADIOLOGICAL CONTAMINATION SURVEY FORM



SURVEY RESULTS (DPM/100 CM²)

| SWIP E # | LOCATION/DESCRIPTION | REMOVABLE ALPHA | REMOVABLE BETA/GAMMA | TOTAL ALPHA (FRISK/60 SEC COUNT) | TOTAL BETA/GAMMA |
|---|---|---|---|---|---|
| 23 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 24 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 25 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 26 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 27 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 28 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 29 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 30 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 31 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 32 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 33 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 34 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 35 | Misc hangers and brackets | <18 | <205 | <60 | <455 |
| 36 | wire and cable | <18 | <205 | <60 | <455 |
| 37 | Wire and Cable | <18 | <205 | <60 | <455 |
| 38 | Wire and Cable | <18 | <205 | <60 | <455 |
| 39 | Wire And Cable | <18 | <205 | <60 | <455 |
| 40 | Wire and Cable | <18 | <205 | <60 | <455 |

02-03-97 [illegible]

SURVEY RESULTS (DPM/100 CM²) 2/3/97

| SWIP E # | LOCATION/DESCRIPTION | REMOVABLE ALPHA | REMOVABLE BETA/GAMMA | TOTAL ALPHA (FRISK/60 SEC COUNT) | TOTAL BETA/GAMMA |
|---|---|---|---|---|---|

02-03-97 [illegible]

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# Appendix B.2

# Bldg. 662 RLC Radiological Data

# Appendix B.2.1

# Bldg. 662 RLC Radiological Data

# Radiological Surveys

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 39 | Bkg. 39 | Bkg. 0.0 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.1 | Bkg. α 3 | Bkg. β' 460 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 49 | MDA 307 |

**Survey Type:** Contamination Survey

Building: 709

Location:

Purpose: CHARACTERIZATION SURVEYS

RWP #: - NA -

Date: 04-09-99 Time: 1430

RCT: Rex Snyder / R Snyder [redacted]
Print name / Signature / Emp. #

RCT: N / / /
Print name / Signature / Emp. #

**PRL #:**

**Comments** Wind Had blown away Tape markers. X's were marked at wooden Survey Areas. All others were taken from the floor. Pre Wood + Sludge Survey

All Results Are In dpm/100cm2 Plus Direct Scan 1m² at all Points

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 1. | < 20 | < 200 | 54 | 1878 |
| 2. | < 20 | < 200 | < 49 | < 307 Wood |
| 3. | < 20 | < 200 | < 49 | < 307 Wood |
| 4. | < 20 | < 200 | < 49 | 1653 |
| 5. | < 20 | < 200 | < 49 | < 307 Wood |
| 6. | < 20 | < 200 | 54 | 1872 |
| 7. | < 20 | < 200 | < 49 | 2055 |
| 8. | < 20 | < 200 | < 49 | < 307 Wood |
| 9. | < 20 | < 200 | < 49 | 1647 |
| 10. | < 20 | < 200 | < 49 | 1770 |
| 11. | < 20 | < 200 | 60 | < 307 |
| 12. | | | | |
| 13. | | | | |
| 14. | | | | |
| 15. | | | | |
| 16. | | | | |
| 17. | | | A | |
| 18. | | N | | |
| 19. | | | | |
| 20. | | | | |
| 21. | | | | |
| 22. | | | | |

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|
| 23. | | | | |
| 24. | | | | |
| 25. | | | | |
| 26. | | | | |
| 27. | | | | |
| 28. | | | | |
| 29. | | | | |
| 30. | | | | |
| 31. | | | | |
| 32. | | | A | |
| 33. | | N | | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |

**Date** 4/14/99 **RS Supervision:** LN Cooper / Letty L Cooper [redacted]
Print Name / Signature / Emp. #

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

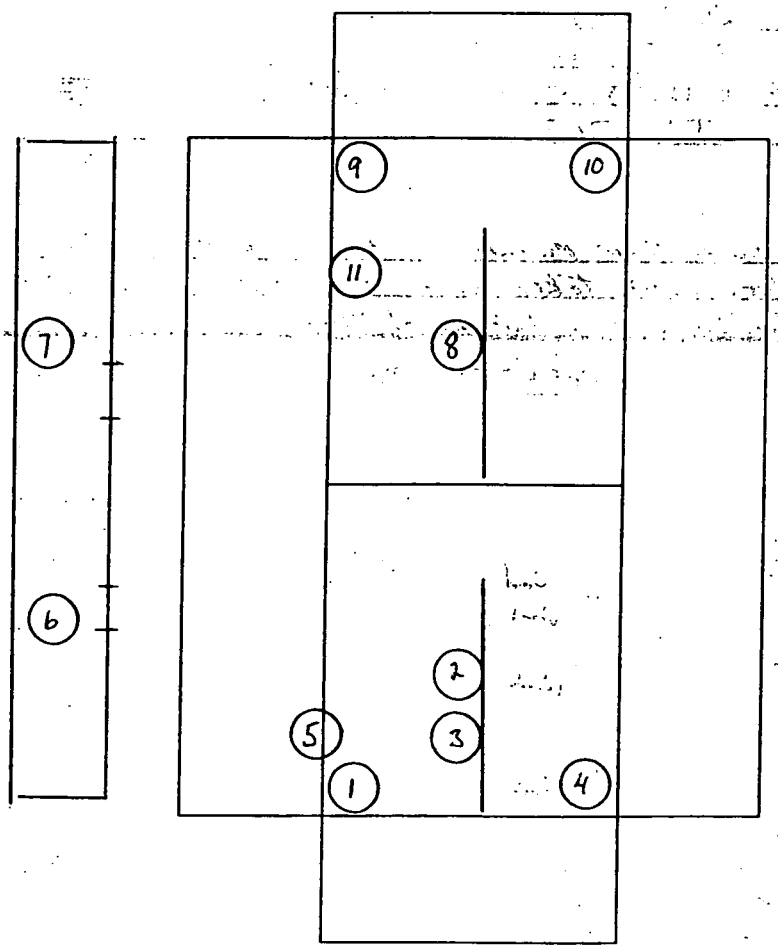
**Building 709 - Concrete Bottom Floor & Walls**

# 2, 3, + 8 = Plywood Wall

# 5 = 2x4 support Diagonal

# 8 = 4x8 support (2nd) Diagonal

# The Remaining Survey points were taken on the Floor




Pre-job Survey for Wood + Sludge Sampling

COPY

RS FORMS 07.02-01

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. |
| Model SAC-4 | Model BC-4 | Model |
| Serial# 824 | Serial# 838 | Serial# |
| Cal Due 10-13-99 | Cal Due 7-13-99 | Cal Due |
| Bkg. 0.3 | Bkg. 43 | Bkg. |
| Efficiency .33 | Efficiency .25 | Efficiency .99 |
| MDA 20 | MDA 200 | MDA 4-21-99 |
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. |
| Model SAC-4 | Model BC-4 | Model |
| Serial# 842 | Serial# 874 | Serial# |
| Cal Due 6-9-99 | Cal Due 6-7-99 | Cal Due |
| Bkg. 0.2 | Bkg. 41 | Bkg. |
| Efficiency .33 | Efficiency .25 | Efficiency |
| MDA 20 | MDA 200 | MDA |

Survey Type: CONTAMINATION
Building: 709
Location: INSIDE 709
Purpose: SAMPLE BOTTLES FROM 709 BLD

RWP #: NA

Date: 4-21-99 Time: 1545

RCT: KENT S. STOVALL / [signature] [redacted]
Print name Signature Emp. #

RCT: / /
Print name Signature Emp. #

PRL #:

Comments: SURVEY of SAMPLE BOTTLES BLD. 709.

## SURVEY RESULTS

| Swipe # | Location/Description Results in DPM/100CM² | Removable Alpa | Removable Beta | Total Alpa | Total Beta |
|---|---|---|---|---|---|
| 1 | 99A6333-013.001 | <20 | <200 | | |
| 2 | -013.002 | <20 | <200 | | |
| 3 | -012.001 | <20 | <200 | | |
| 4 | -011.001 | <20 | <200 | | |
| 5 | -011.002 | <20 | <200 | | |
| 6 | -010.001 | <20 | <200 | | |
| 7 | -010.002 | <20 | <200 | | |
| 8 | -010.003 | <20 | <200 | | |
| 9 | -009.001 | <20 | <200 | | |
| 10 | -009.002 | <20 | <200 | | |
| 11 | -009.003 | <20 | <200 | | |
| 12 | -008.001 | <20 | <200 | | |
| 13 | -008.002 | <20 | <200 | | |
| 14 | -008.003 | <20 | <200 | | |
| 15 | -007.001 | <20 | <200 | | |
| 16 | 99A6333-007.002 | <20 | <200 | | |
| 17 | -007.003 | <20 | <200 | | |
| 18 | -006.001 | <20 | <200 | | |
| 19 | -006.002 | <20 | <200 | | |
| 20 | -006.003 | <20 | <200 | | |
| 21 | -015.001 | <20 | <200 | | |
| 22 | -015.002 | <20 | <200 | | |
| 23 | -015.003 | <20 | <200 | | |
| 24 | -014.001 | <20 | <200 | | |
| 25 | -014.002 | <20 | <200 | | |
| 26 | -003.001 | <20 | <200 | | |
| 27 | -003.002 | <20 | <200 | | |
| 28 | -004.001 | <20 | <200 | | |
| 29 | -004.002 | <20 | <200 | | |
| 30 | -005.001 | <20 | <200 | | |
| 31 | -005.002 | <20 | <200 | | |

Date Reviewed: 4/22/99 RS Supervision: W. Cooper / [signature] [redacted]
Print Name Signature

245

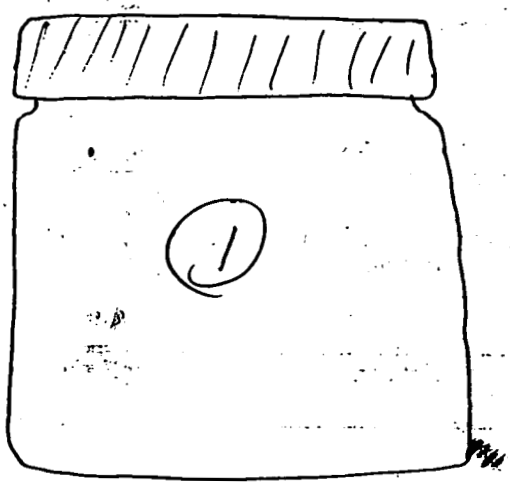
RS FORMS 07.02-01

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## RADIOLOGICAL SAFETY

**Drawing Showing Survey Points**

TYPICAL SAMPLE JAR



COPY

RS FORMS 07.02-01

Pg. 1 of 3

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. |
| Model SAC-4 | Model BC-4 | Model |
| Serial# 824 | Serial# 838 | Serial# |
| Cal Due 10-13-99 | Cal Due 7-13-99 | Cal Due |
| Bkg. 0.0 | Bkg. 45 | Bkg. |
| Efficiency .33 | Efficiency .25 | Efficiency |
| MDA 20 | MDA 200 | MDA |
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. NE TECH |
| Model SAC-4 | Model BC-4 | Model ELECTRA |
| Serial# 842 | Serial# 874 | Serial# 15516 |
| Cal Due 6-9-99 | Cal Due 6-7-99 | Cal Due 9-22-99 |
| Bkg. 0.1 | Bkg. 40 | Bkg α 7, β 496 |
| Efficiency .33 | Efficiency .25 | Efficiency α 22.3/β 22.1 |
| MDA 20 | MDA 200 | MDA α 67 β 331 |

Survey Type: CONTAMINATION

Building: 709

Location: INSIDE 709 BLD. (SEE MAP)

Purpose: SURVEY DURING SAMPLING

RWP #: NA

Date: 4-22-99 Time: 1000

RCT: KENT S. STOVALL / [signature] [redacted]
Print name / Signature

RCT: / /
Print name / Signature / Emp. #

PRL #:

Comments:

## SURVEY RESULTS

| # | Location/Description Results in DPM/100CM² | Removable Alpa | Removable Beta | Total Alpa | Total Beta | Swipe # | Location/Description Results in DPM/100CM² | Removable Alpa | Removable Beta | Total Alpa | Total Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SLUDGE/DIRT SAMPLES PRE | <20 | <200 | <67 | 354 | 16 | AIR SAMPLER FILTER | <20 | <200 | NA | NA |
| 2 | (SEE MAP) | <20 | <200 | <67 | <331 | 17 | | | | | |
| 3 | | <20 | <200 | <67 | <331 | 18 | | | | | |
| 4 | | <20 | <200 | <67 | 435 | 19 | | | | | |
| 5 | | <20 | <200 | <67 | <331 | 20 | | | | | |
| 6 | | <20 | <200 | <67 | 534 | 21 | | | | | |
| 7 | WOOD WALLS/BEAMS #7 PRE | <20 | <200 | <67 | <331 | 22 | | | | | |
| 8 | (SEE MAP) #7 POST | <20 | <200 | <67 | <331 | 23 | | | | | |
| 9 | #8 PRE | <20 | <200 | <67 | <331 | 24 | | | | | |
| 10 | #8 POST | <20 | <200 | <67 | <331 | 25 | | | | | |
| 11 | #9 PRE | <20 | <200 | <67 | <331 | 26 | | | | | |
| 12 | #9 POST | <20 | <200 | <67 | <331 | 27 | | | | | |
| 13 | AIR CHECK SAMPLER | <20 | <200 | <67 | <331 | 28 | | | | | |
| 14 | SERIAL NO. 562659 | <20 | <200 | <67 | <331 | 29 | | | | | |
| | | <20 | <200 | <67 | <331 | 30 | | | | | |

4-22-99 LGJ

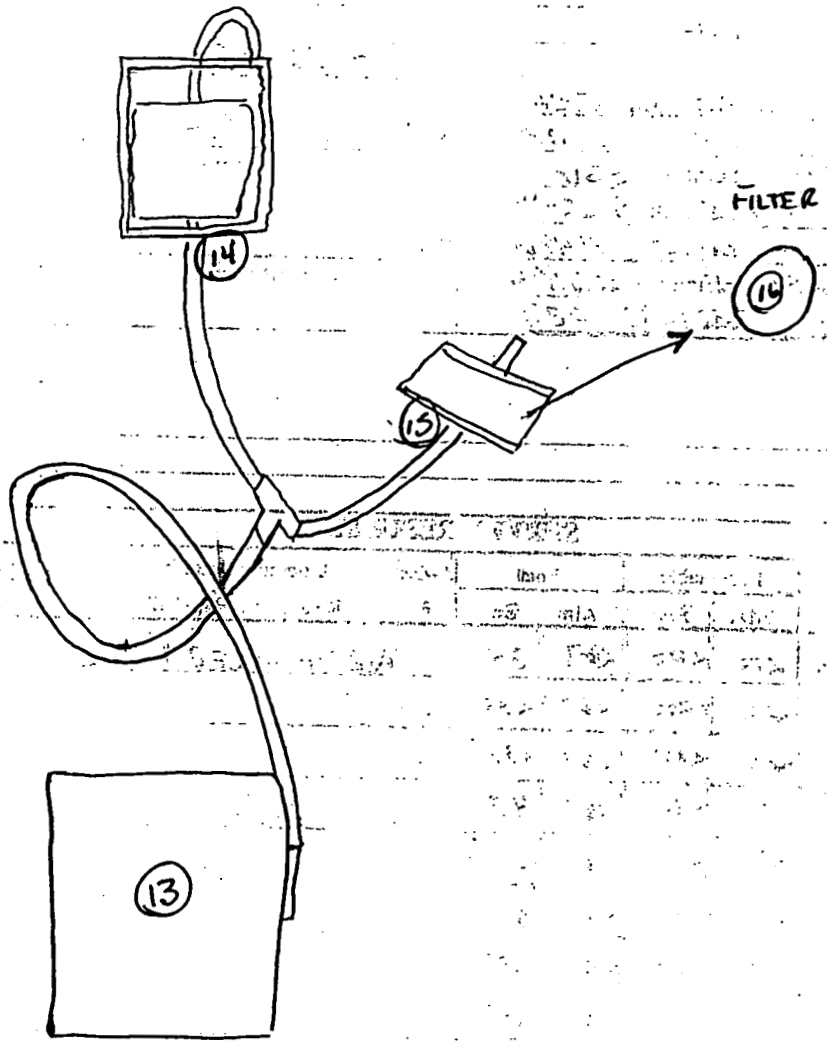
Date Reviewed: 4/22/99 RS Supervision: W Cooper / [signature] [redacted]
Print Name / Signature

247

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points



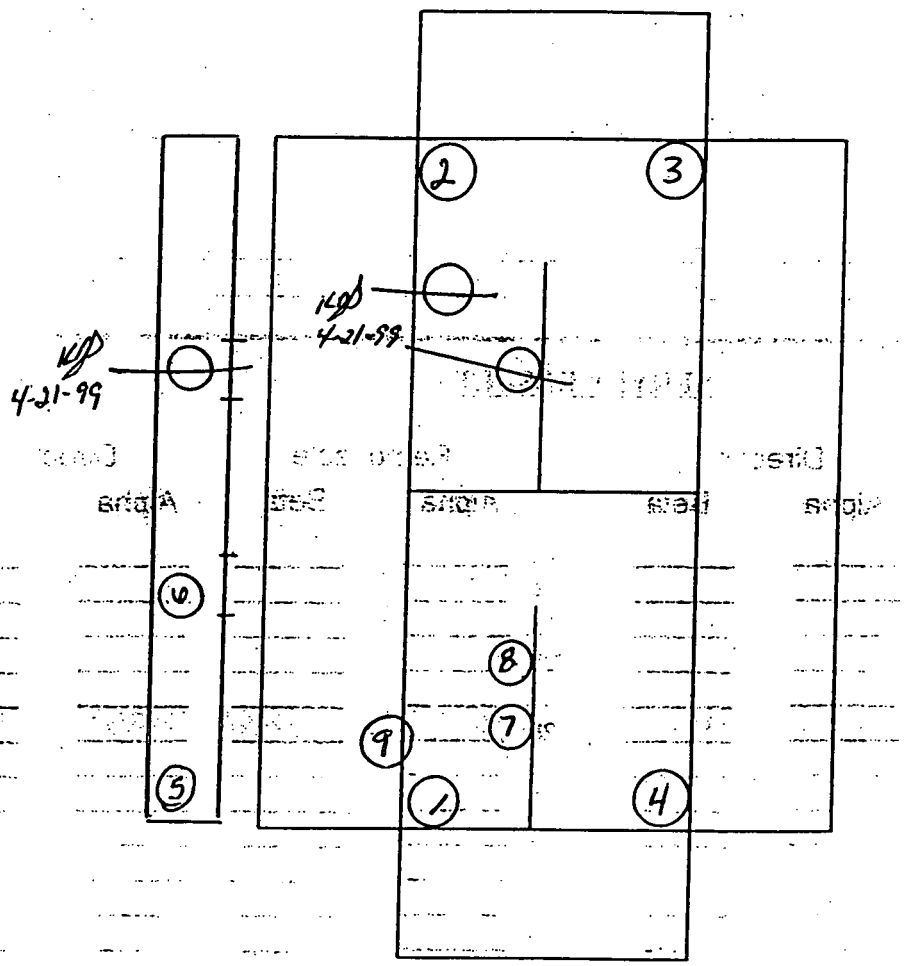
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 709 - Concrete**
**Bottom Floor & Walls**

COPY



ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. |
| Model SAC-4 | Model SAC-4 | Model |
| Serial# 824 | Serial# 842 | Serial# 4-26-99 |
| Cal Due 10-13-99 | Cal Due 6/3/99 | Cal Due |
| Bkg. 0.0 | Bkg. 0.3 | Bkg. |
| Efficiency .33 | Efficiency .33 | Efficiency |
| MDA 20 | MDA 20 | MDA |
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. NE TECH |
| Model BC-4 | Model BC-4 | Model ELECTRA |
| Serial# 838 | Serial# 874 | Serial# 1556 |
| Cal Due 7-13-99 | Cal Due 6-7-99 | Cal Due 9-22-99 |
| Bkg. 43 | Bkg. 34 | Bkg. <22.3 β32.1 |
| Efficiency .25 | Efficiency .25 | Efficiency <1.0 β 515 |
| MDA 200 | MDA 200 | MDA <33 β 347 |

Survey Type: CONTAMINATION
Building: ~~906~~ 709
Location: INSIDE ~~906~~ BLD. 709 BLD.
Purpose: SAMPLE JARS

RWP #: NA

Date: 4-26-99 Time: 1100

RCT: KENT J. STOVALL [signature] [redacted]
Print name Signature Emp. #

RCT: / /
Print name Signature Emp. #

PRL #:
Comments:

COPY

## SURVEY RESULTS

| Swipe # | Location/Description Results in DPM/100CM² | Removable Alpa | Removable Beta | Total Alpa | Total Beta | Swipe # | Location/Description Results in DPM/100CM² | Removable Alpa | Removable Beta | Total Alpa | Total Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 99A6333-001.001 | <20 | <200 | <33 | <347 | 16 | | | | | |
| 2 | -001.002 | <20 | <200 | <33 | <347 | 17 | | | | | |
| 3 | -002.001 | <20 | <200 | <33 | <347 | 18 | | | | | |
| 4 | -002.002 | <20 | <200 | <33 | <347 | 19 | | | | | |
| 5 | | | | | | 20 | | | | | |
| 6 | | | | | | 21 | | | | | |
| 7 | | | | | | 22 | | | | | |
| 8 | | | | | | 23 | | | | | |
| 9 | 4-26-99 | | | | | 24 | 4-26-99 | | | | |
| 10 | KJS | | | | | 25 | KJS | | | | |
| 11 | | | | | | 26 | | | | | |
| 12 | | | | | | 27 | | | | | |
| 13 | | | | | | 28 | | | | | |
| 14 | | | | | | 29 | | | | | |
| | | | | | | 30 | | | | | |

Date Reviewed: 4/26/99 RS Supervision: LN Cooper [signature] [redacted]
Print Name Signature

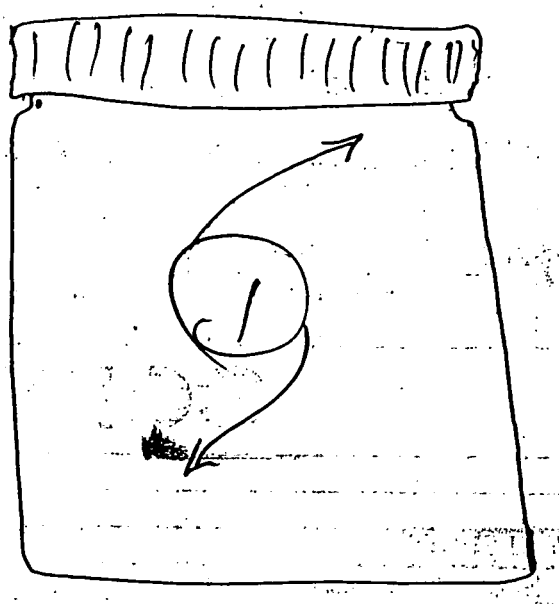
250

RS FORMS 07.02-01

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## RADIOLOGICAL SAFETY

**Drawing Showing Survey Points**

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# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSRUMENT DATA

| | | | | | |
|---|---|---|---|---|---|
| Mfg. | Eberline | Mfg. | Eberline | Mfg. | NE Electra |
| Model | SAC-4 | Model | SAC-4 | Model | DP6 |
| Serial# | 824 | Serial# | 842 | Serial# | 1556 |
| Cal Due | 10-13-99 | Cal Due | 6-9-99 | Cal Due | 9-22-99 |
| Bkg. | <6 | Bkg. | <6 | Bkg. | <8/<1000 |
| Efficienc | 0.33 | Efficienc | 0.33 | Efficienc | .17/.33 |
| MDA | <20 | MDA | <20 | MDA | <94/<455 |
| Mfg. | Ebeline | Mfg. | Ebeline | Mfg. | Ludlum |
| Model | BC-4 | Model | BC-4 | Model | 2929 |
| Serial# | 838 | Serial# | 874 | Serial# | 4-26-99 |
| Cal Due | 7-13-99 | Cal Due | 6-7-99 | Cal Due | N/A |
| Bkg. | <94.9 | Bkg. | <94.9 | Bkg. | |
| Efficienc | 0.25 | Efficienc | 0.25 | Efficienc | N/A |
| MDA | 200 | MDA | 200 | MDA | >20/<200 |

Survey Type: Contamination
Building: ~~906~~ 707
Location: SAMPLE LOCATIONS PRE/POST
Purpose: CONTAMINATION

RWP #: NA

Date: 4-26-99 Time: 1115

RCT: KENT J. STOVALL / Kent J. Stovall [redacted]
Print name / Signature / Emp. #

RCT: / /
Print name / Signature / Emp. #

COPY

PRL #: NA
Comments:

## SURVEY RESULTS

| Swipe # | Location/Description Results in DPM/100sq/cm | Removable Alpha | Removable Beta | Total Removable+Fixed Alpha | Total Removable+Fixed Beta |
|---|---|---|---|---|---|
| 1 | SEE MAP LOC. #1 PRE | <20 | <200 | <33 | <347 |
| 2 | LOC. #1 POST | <20 | <200 | <33 | <347 |
| 3 | LOC #2 PRE | <20 | <200 | <33 | <347 |
| 4 | LOC. #2 POST | <20 | <200 | <33 | <347 |
| 5 | DRILL | <20 | <200 | <33 | <347 |
| 6 | SCALE | <20 | <200 | <33 | <347 |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |

| Swipe # | Location/Description Results in DPM/100sq/cm | Removable Alpha | Removable Beta | Total Removable+Fixed Alpha | Total Removable+Fixed Beta |
|---|---|---|---|---|---|
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |

4-26-99 KCD

4-26-99 KCD

Date Reviewed: 4/26/99 RS Supervision: L Cooper / L Cooper [redacted]
Print Name / Signature / Emp. #

252

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

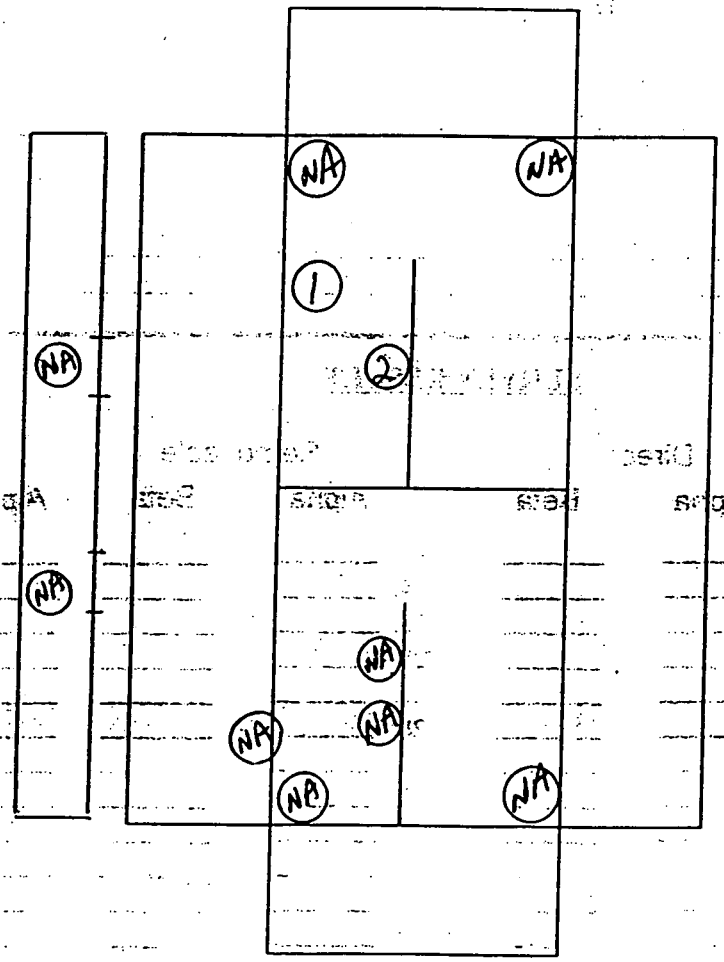
4-26-99

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

**Building 709 - Concrete**
**Bottom Floor & Walls**




NOTE:

* ALL LOCATIONS WITH (NA) WERE COMPLETED ON A PREVIOUS SURVEY.

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 41 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 1680 | Serial # 1680 |
| Cal Due 6/16/99 | Cal Due 8-10-99 | Cal Due 8-10-99 |
| Bkg. 0.1 | Bkg. 5 | Bkg. 490 |
| Efficiency 33% | Efficiency 22.9% | Efficiency 347% |
| MDA <20 | MDA 59 | MDA 316 |

**Survey Type:** Contamination Survey
Building: 709
Location:
Purpose: CHARACTERIZATION SURVEYS
RWP #: - NA -
Date: 05-05-99 Time: 1400
RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #
RCT: / /
Print name Signature Emp. #

PRL # :
Comments Exterior Survey Points (10 Roof) + Ceiling Survey 10 points from Inside Building
All Results Are In dpm/100cm2.

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | <20 | <200 | <59 | <316 | 23. | | | | |
| 2. | <20 | <200 | <59 | <316 | 24. | | | | |
| 3. | <20 | <200 | <59 | <316 | 25. | | | | |
| 4. | <20 | <200 | <59 | <316 | 26. | | | | |
| 5. | <20 | <200 | <59 | <316 | 27. | | | | |
| 6. | <20 | <200 | <59 | 357 Roof | 28. | | | | |
| 7. | <20 | <200 | <59 | <316 | 29. | | | | |
| 8. | <20 | <200 | <59 | <316 | 30. | | | | |
| 9. | <20 | <200 | <59 | <316 | 31. | | | | |
| 10. | <20 | <200 | <59 | <316 | 32. | | | | |
| 11. | <20 | <200 | <59 | <316 | 33. | | | | |
| 12. | <20 | <200 | <59 | <316 | 34. | | | | |
| 13. | <20 | <200 | <59 | <316 | 35. | | | | |
| 14. | <20 | <200 | <59 | <316 | 36. | | | | |
| 15. | <20 | <200 | <59 | <316 | 37. | | | | |
| 16. | <20 | <200 | <59 | <316 | 38. | | | | |
| 17. | <20 | <200 | <59 | <316 | 39. | | | | |
| 18. | <20 | <200 | <59 | <316 | 40. | | | | |
| 19. | <20 | <200 | <59 | <316 | 41. | | | | |
| 20. | <20 | <200 | <59 | <316 | 42. | | | | |
| 21. | | | | | 43. | | | | |
| 22. | | | | | 44. | | | | |

Date 5/6/99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name Signature Emp. #

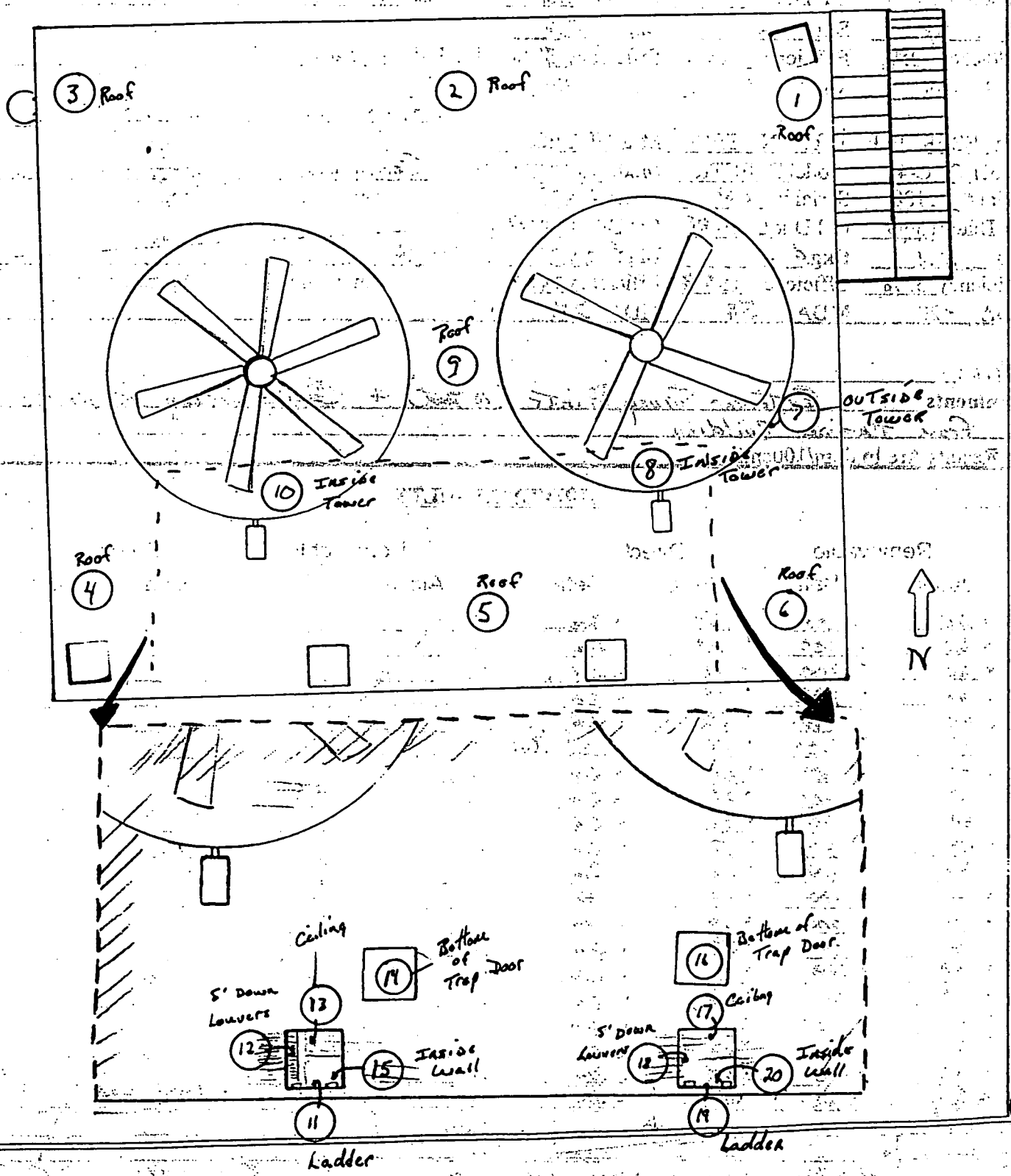
255

RS FORMS 07.02-01

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## RADIOLOGICAL SAFETY

### Drawing Showing Survey Points




256

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 41 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 1680 | Serial # 1680 |
| Cal Due 6/16/99 | Cal Due 8-10-99 | Cal Due 8-10-99 |
| Bkg. 0.1 | Bkg. 5 | Bkg. 490 |
| Efficiency 33% | Efficiency 22.9% | Efficiency 34.7% |
| MDA <20 | MDA 59 | MDA 316 |

**Survey Type:** Contamination Survey

Building: 709

Location:

Purpose: CHARACTERIZATION SURVEYS

RWP #: - IVA -

Date: 05-05-99 Time: 1430

RCT: Rex Snyder / RSnyder [redacted]
Print name Signature

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments Walls < 2 meter Survey Points Plus Direct scan at survey points 1 m²

All Results Are In dpm/100cm2.

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 59 | < 316 | 23. | | | | |
| 2. | < 20 | < 200 | < 59 | 933 | 24. | | | | |
| 3. | < 20 | < 200 | < 59 | < 316 | 25. | | | | |
| 4. | < 20 | < 200 | < 59 | 921 | 26. | | | | |
| 5. | < 20 | < 200 | < 59 | < 316 | 27. | | | | |
| 6. | < 20 | < 200 | < 59 | 1125 | 28. | | | | |
| 7. | < 20 | < 200 | < 59 | < 316 | 29. | | | | |
| 8. | < 20 | < 200 | < 59 | < 316 | 30. | | | | |
| 9. | < 20 | < 200 | < 59 | < 316 | 31. | | | | |
| 10. | < 20 | < 200 | < 59 | < 316 | 32. | | | | |
| 11. | < 20 | < 200 | < 59 | < 316 | 33. | | | | |
| 12. | < 20 | < 200 | < 59 | < 316 | 34. | | | | |
| 13. | < 20 | < 200 | < 59 | < 316 | 35. | | | | |
| 14. | < 20 | < 200 | < 59 | 915 | 36. | | | | |
| 15. | < 20 | < 200 | < 59 | < 316 | 37. | | | | |
| 16. | < 20 | < 200 | < 59 | < 316 | 38. | | | | |
| 17. | < 20 | < 200 | < 59 | < 316 | 39. | | | | |
| 18. | < 20 | < 200 | < 59 | 957 | 40. | | | | |
| 19. | < 20 | < 200 | < 59 | < 316 | 41. | | | | |
| 20. | < 20 | < 200 | < 59 | < 316 | 42. | | | | |
| 21. | | | | | 43. | | | | |
| 22. | | | | | 44. | | | | |

Date 5/6/99 RS Supervision: LN Cooper / LN Cooper [redacted]
Print Name Signature Emp. #

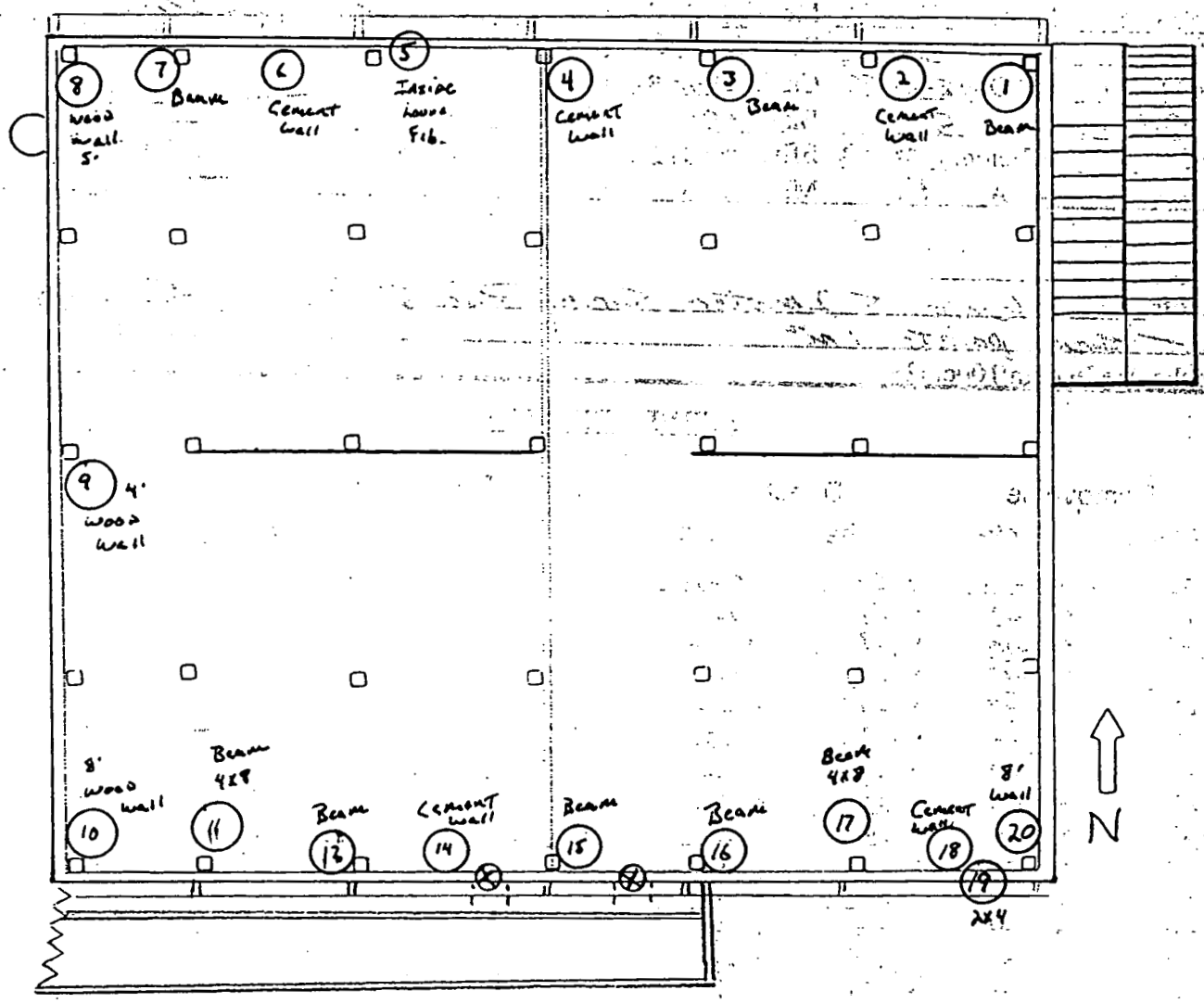
257

RS FORMS 07.02-01

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## RADIOLOGICAL SAFETY

Drawing Showing Survey Points




258

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

✓ OK

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg. EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 41 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 1680 | Serial # 1680 |
| Cal Due 6/16/99 | Cal Due 8-10-99 | Cal Due 8-10-99 |
| Bkg. 0.1 | Bkg. 9 5 | Bkg. B' 490 |
| Efficiency 33% | Efficiency 26.9% | Efficiency 34.7% |
| MDA <20 | MDA 59 | MDA 316 |

**Survey Type:** Contamination Survey

Building: 709

Location:

Purpose: CHARACTERIZATION SURVEYS

RWP #: - NA -

Date: 05-05-99 Time: 1500

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments: Exterior Survey Points (20 points)

All Results Are In dpm/100cm2.

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 59 | < 316 | 23. | | | | |
| 2. | < 20 | < 200 | < 59 | 996 | 24. | | | | |
| 3. | < 20 | < 200 | < 59 | < 316 | 25. | | | | |
| 4. | < 20 | < 200 | < 59 | < 316 | 26. | | | | |
| 5. | < 20 | < 200 | < 59 | 1137 | 27. | | | | |
| 6. | < 20 | < 200 | < 59 | < 316 | 28. | | | | |
| 7. | < 20 | < 200 | < 59 | < 316 | 29. | | | | |
| 8. | < 20 | < 200 | < 59 | < 316 | 30. | | | | |
| 9. | < 20 | < 200 | < 59 | < 316 | 31. | | | | |
| 10. | < 20 | < 200 | < 59 | < 316 | 32. | | | | |
| 11. | < 20 | < 200 | < 59 | < 316 | 33. | | | | |
| 12. | < 20 | < 200 | < 59 | < 316 | 34. | | | | |
| 13. | < 20 | < 200 | < 59 | < 316 | 35. | | | | |
| 14. | < 20 | < 200 | < 59 | 897 | 36. | | | | |
| 15. | < 20 | < 200 | < 59 | 825 | 37. | | | | |
| 16. | < 20 | < 200 | < 59 | < 316 | 38. | | | | |
| 17. | < 20 | < 200 | < 59 | < 316 | 39. | | | | |
| 18. | < 20 | < 200 | < 59 | < 316 | 40. | | | | |
| 19. | < 20 | < 200 | < 59 | < 316 | 41. | | | | |
| 20. | < 20 | < 200 | < 59 | < 316 | 42. | | | | |
| 21. | | | | | 43. | | | | |
| 22. | | | | | 44. | | | | |

Date 5/6/99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name Signature

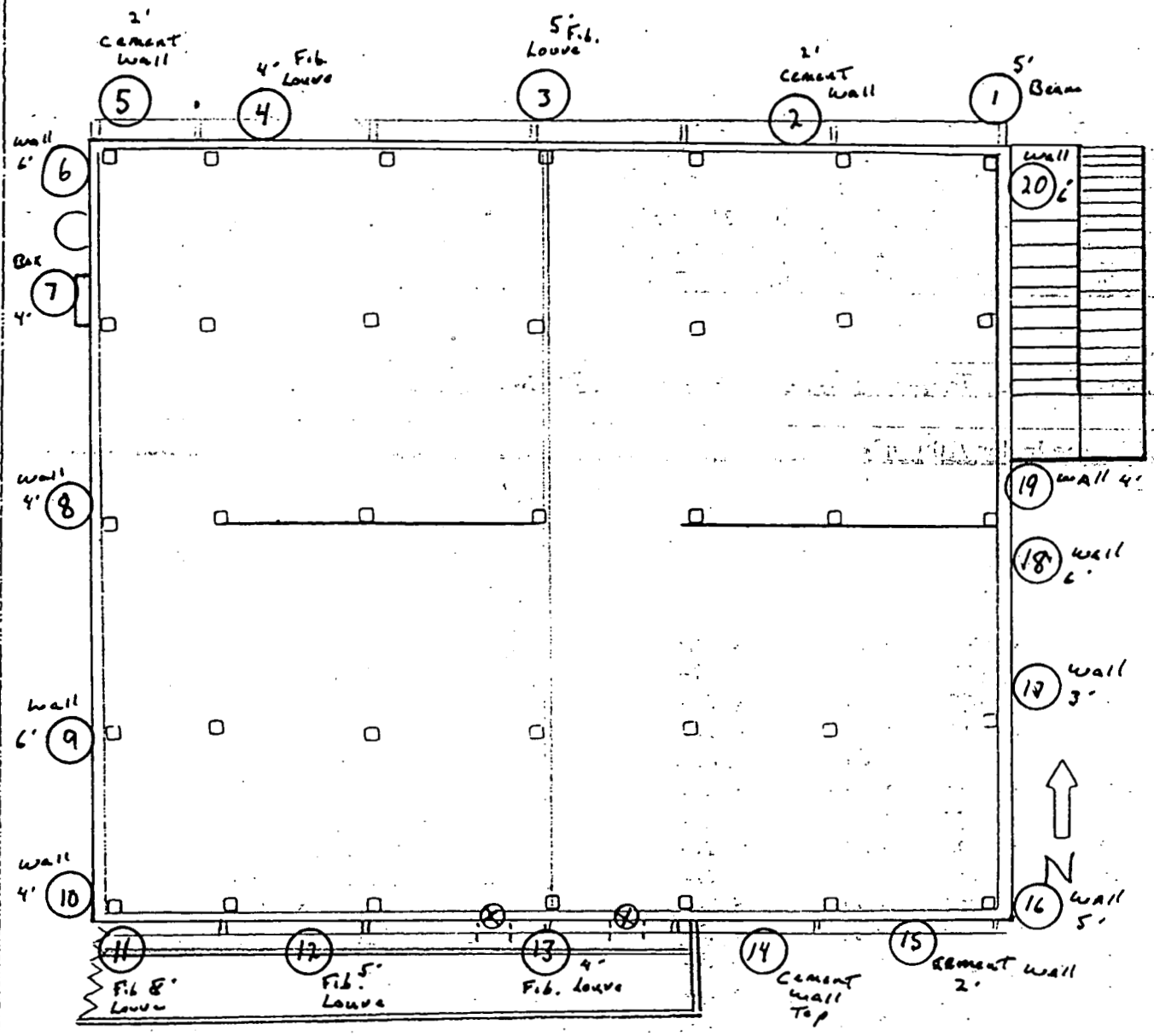
259

RS FORMS 07.02-01

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## RADIOLOGICAL SAFETY

Drawing Showing Survey Points




709 Building

Exterior Survey

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 37 | Bkg. 0.2 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.0 | Bkg. 0 3 | Bkg. 507 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 49 | MDA 322 |

Survey Type: Contamination Survey

Building: 662

Location:

Purpose: Characterization Survey

RWP #: - IVA -

Date: 04-14-99 Time: 1300

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments Survey Points on Building Systems < 2meters

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 49 | < 322 | 23. | | | | |
| 2. | < 20 | < 200 | < 49 | < 322 | 24. | | | | |
| 3. | < 20 | < 200 | < 49 | < 322 | 25. | | | | |
| 4. | < 20 | < 200 | < 49 | < 322 | 26. | | | | |
| 5. | < 20 | < 200 | < 49 | < 322 | 27. | | | | |
| 6. | < 20 | < 200 | < 49 | < 322 | 28. | | | | |
| 7. | < 20 | < 200 | < 49 | < 322 | 29. | | | | |
| 8. | < 20 | < 200 | < 49 | < 322 | 30. | | | | |
| 9. | < 20 | < 200 | < 49 | < 322 | 31. | | | | |
| 10. | < 20 | < 200 | < 49 | < 322 | 32. | | | | |
| 11. | < 20 | < 200 | < 49 | < 322 | 33. | | | A | |
| 12. | < 20 | < 200 | < 49 | < 322 | 34. | | N | | |
| 13. | < 20 | < 200 | < 49 | < 322 | 35. | | | | |
| 14. | < 20 | < 200 | < 49 | < 322 | 36. | | | | |
| 15. | < 20 | < 200 | < 49 | < 322 | 37. | | | | |
| 16. | | | | | 38. | | | | |
| 17. | | | | | 39. | | | | |
| 18. | | | | | 40. | | | | |
| 19. | | | A | | 41. | | | | |
| 20. | | N | | | 42. | | | | |
| 21. | | | | | 43. | | | | |
| 22. | | | | | 44. | | | | |

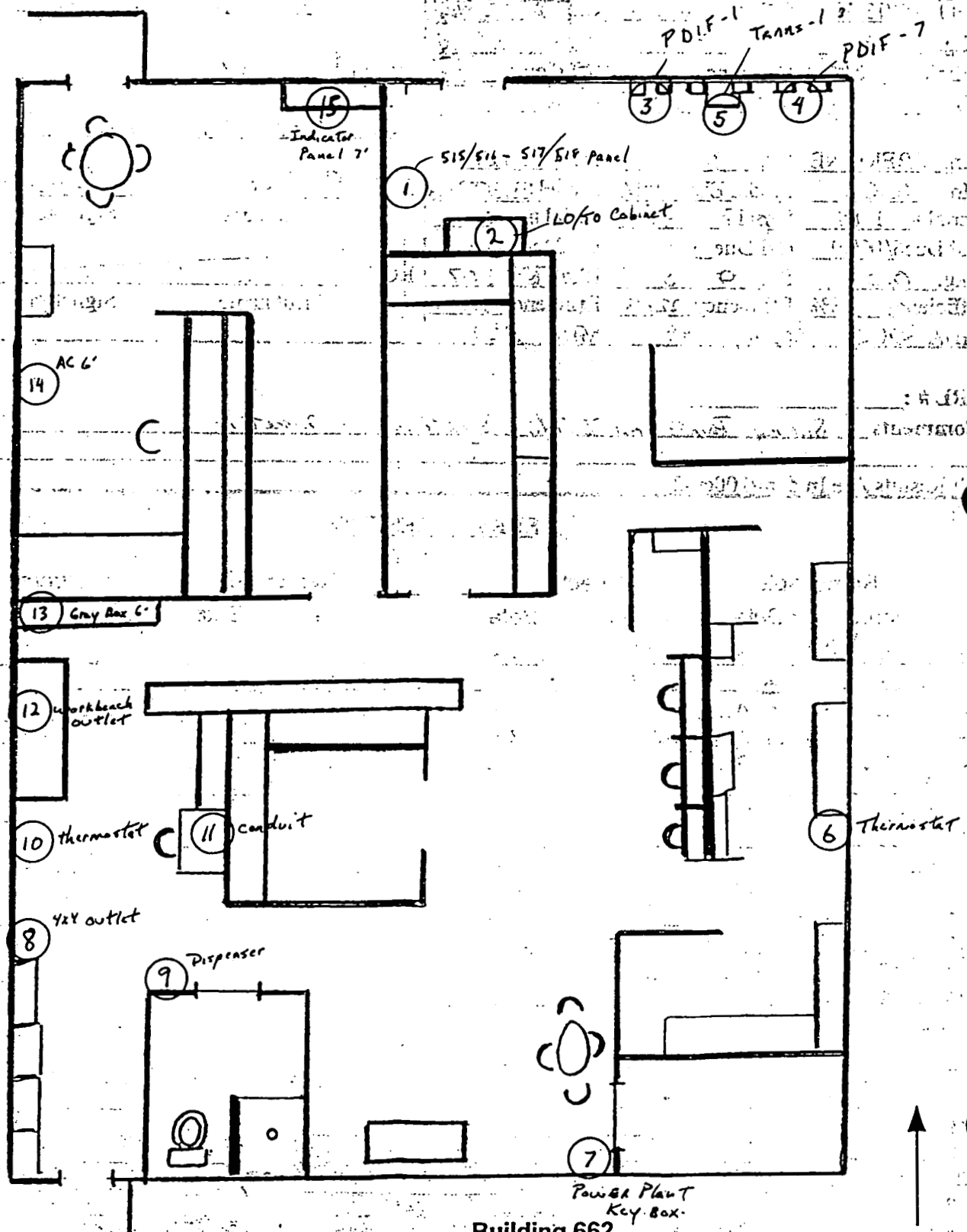
Date 4-14-99 RS Supervision: G. E. OSBURN / [signature] [redacted]
Print Name Signature

214

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points




Building 662

✓ OK

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 37 | Bkg. 0.2 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.0 | Bkg. 9 3 | Bkg. 8 507 |
| Efficiency 33% | Efficiency 220% | Efficiency 320% |
| MDA <20 | MDA 49 | MDA 322 |

Survey Type: Contamination Survey

Building: 662

Location:

Purpose: Characterization Survey

RWP #: - N/A -

Date: 04-14-99 Time: 1400

RCT: Rex Snyder / [signature] [redacted]
Print name Signature Emp. #

RCT: N / A /
Print name Signature Emp. #

PRL #:

Comments Survey Points on Floor + Wall < 2 meter. All Points were scanned direct 1m² area

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 49 | 423 | 23. | < 20 | < 200 | < 49 | < 322 |
| 2. | < 20 | < 200 | < 49 | < 322 | 24. | < 20 | < 200 | < 49 | < 322 |
| 3. | < 20 | < 200 | < 49 | 342 | 25. | < 20 | < 200 | < 49 | < 322 |
| 4. | < 20 | < 200 | < 49 | 438 | 26. | < 20 | < 200 | < 49 | 519 |
| 5. | < 20 | < 200 | < 49 | < 322 | 27. | < 20 | < 200 | < 49 | < 322 |
| 6. | < 20 | < 200 | < 49 | 582 | 28. | < 20 | < 200 | < 49 | 411 |
| 7. | < 20 | < 200 | < 49 | < 322 | 29. | < 20 | < 200 | < 49 | 486 |
| 8. | < 20 | < 200 | < 49 | 759 | 30. | < 20 | < 200 | < 49 | 894 |
| 9. | < 20 | < 200 | < 49 | 612 | 31. | | | | |
| 10. | < 20 | < 200 | < 49 | 402 | 32. | | | | |
| 11. | < 20 | < 200 | < 49 | 1116 | 33. | | | | |
| 12. | < 20 | < 200 | 96 | 1068 | 34. | | | | |
| 13. | < 20 | < 200 | < 49 | < 322 | 35. | | | | |
| 14. | < 20 | < 200 | < 49 | 996 | 36. | | | | |
| 15. | < 20 | < 200 | < 49 | 1071 | 37. | | | | |
| 16. | < 20 | < 200 | < 49 | 507 | 38. | | | | |
| 17. | < 20 | < 200 | < 49 | < 322 | 39. | | | | |
| 18. | < 20 | < 200 | < 49 | 393 | 40. | | | | |
| 19. | < 20 | < 200 | < 49 | 453 | 41. | | | | |
| 20. | < 20 | < 200 | < 49 | 489 | 42. | | | | |
| 21. | < 20 | < 200 | < 49 | < 322 | 43. | | | | |
| 22. | < 20 | < 200 | < 49 | 387 | 44. | | | | |

N A

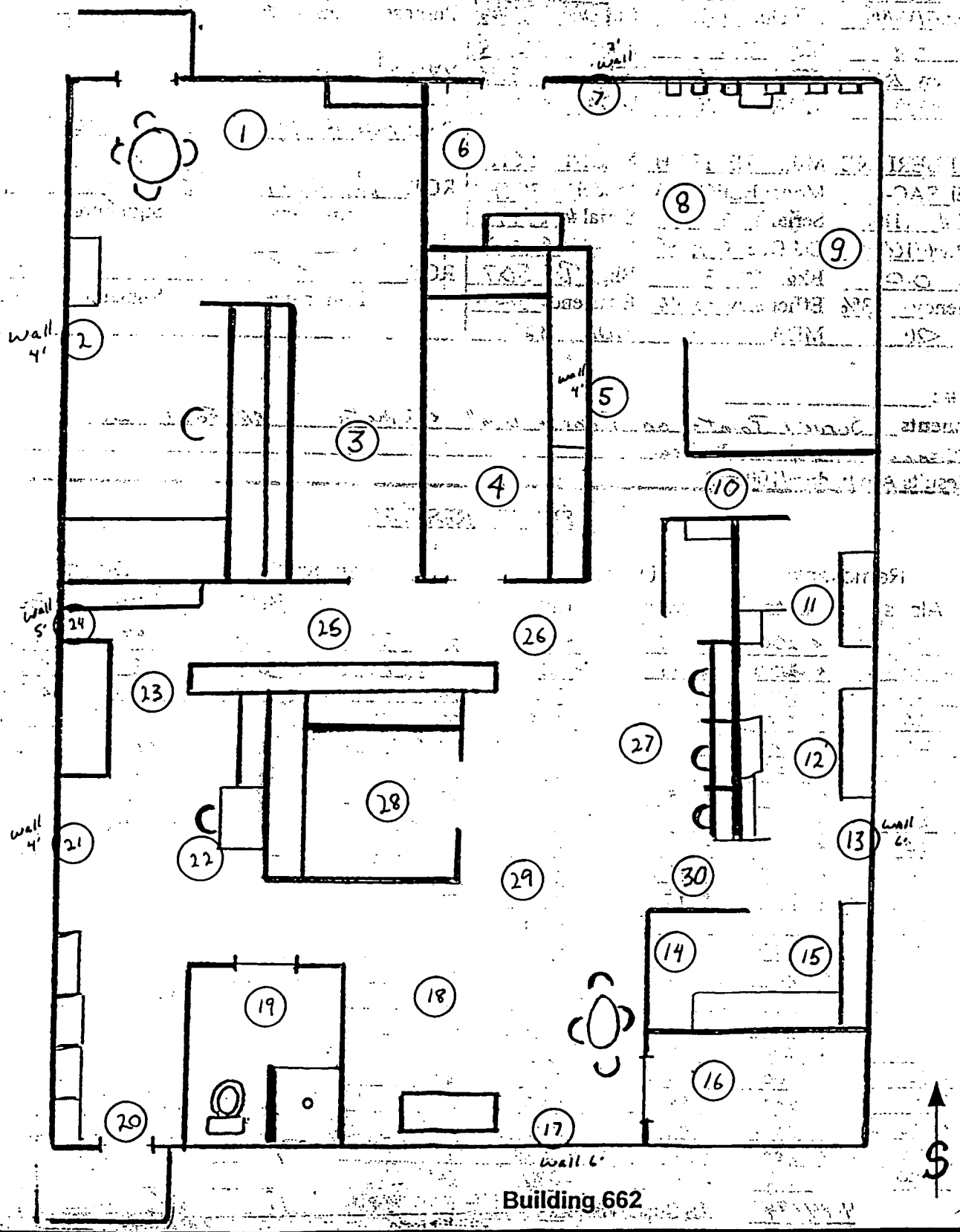
Date 4-14-99 RS Supervision: G. E. OSBURN / [signature] [redacted]
Print Name Signature

216

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SIT

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points




Building 662

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 43 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.0 | Bkg. 0.2 | Bkg. 8.490 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 37.0% |
| MDA <20 | MDA 43 | MDA 316 |

Survey Type: Contamination Survey

Building: 662

Location:

Purpose: Characterization Survey

RWP #: — NA —

Date: 04-15-99 Time: 1300

RCT: Rex Snyder Print name [redacted] Signature

RCT: N I A I Print name Signature Emp. #

PRL # :

Comments Survey Points 10 on ceiling + walls over 2 meter + 15 points on Building Systems > 2 meter

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 43 | < 316 | 23. | < 20 | < 200 | < 43 | < 316 |
| 2. | < 20 | < 200 | < 43 | < 316 | 24. | < 20 | < 200 | < 43 | < 316 |
| 3. | < 20 | < 200 | < 43 | < 316 | 25. | < 20 | < 200 | < 43 | < 316 |
| 4. | < 20 | < 200 | < 43 | < 316 | 26. | | | | |
| 5. | < 20 | < 200 | < 43 | < 316 | 27. | | | | |
| 6. | < 20 | < 200 | < 43 | < 316 | 28. | | | | |
| 7. | < 20 | < 200 | < 43 | < 316 | 29. | | | | |
| 8. | < 20 | < 200 | < 43 | < 316 | 30. | | | | |
| 9. | < 20 | < 200 | < 43 | < 316 | 31. | | | | |
| 10. | < 20 | < 200 | < 43 | < 316 | 32. | | | | |
| 11. | < 20 | < 200 | < 43 | < 316 | 33. | | | | |
| 12. | < 20 | < 200 | < 43 | < 316 | 34. | | | | |
| 13. | < 20 | < 200 | < 43 | < 316 | 35. | | | | |
| 14. | < 20 | < 200 | < 43 | < 316 | 36. | | | | |
| 15. | < 20 | < 200 | < 43 | < 316 | 37. | | | | |
| 16. | < 20 | < 200 | < 43 | < 316 | 38. | | | | |
| 17. | < 20 | < 200 | < 43 | < 316 | 39. | | | | |
| 18. | < 20 | < 200 | < 43 | < 316 | 40. | | | | |
| 19. | < 20 | < 200 | < 43 | < 316 | 41. | | | | |
| 20. | < 20 | < 200 | < 43 | < 316 | 42. | | | | |
| 21. | < 20 | < 200 | < 43 | < 316 | 43. | | | | |
| 22. | < 20 | < 200 | < 43 | < 316 | 44. | | | | |

N A

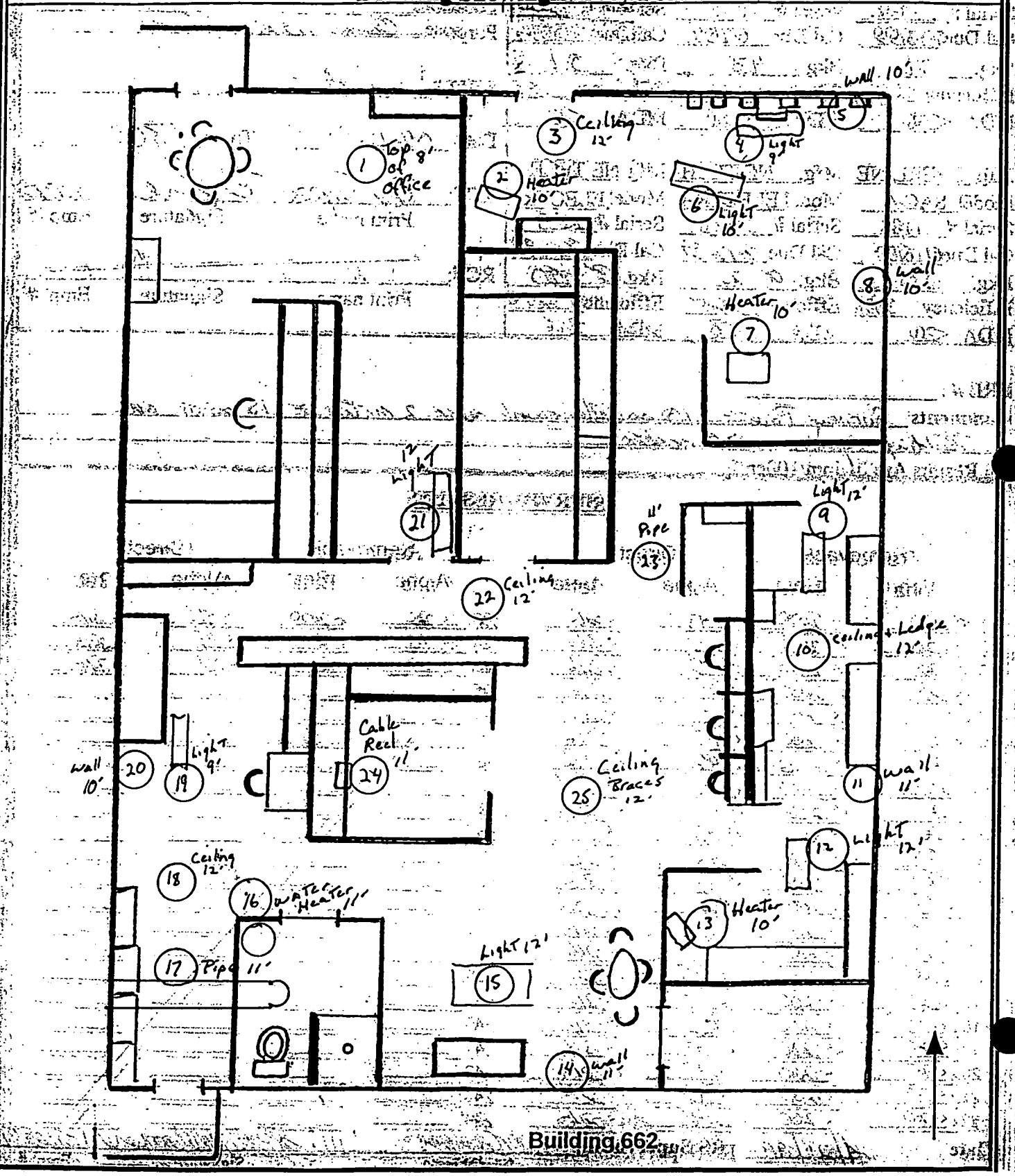
Date 4/21/99 RS Supervision: LN Cooper Print Name [redacted] Signature

218

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points




Building 662

219

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
|---|---|---|
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 43 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |

| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
|---|---|---|
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2343 | Serial # 2343 |
| Cal Due 6/16/99 | Cal Due 8-12-99 | Cal Due 8-12-99 |
| Bkg. 0.0 | Bkg. α 2 | Bkg. β 490 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 22.0% |
| MDA <20 | MDA 43 | MDA 316 |

Survey Type: Contamination Survey

Building: 662

Location:

Purpose: Characterization Survey

RWP #: – NA

Date: 04-15-99 Time: 1600

RCT: Rex Snyder / [signature] [redacted]
Print name Signature

RCT: N / A /
Print name Signature Emp. #

PRL #:

Comments: 30 Survey Points on Exterior walls. Roof is slanted + metal with no access. Drip, Run, + Splash points were targeted for wall survey points.

All Results Are In dpm/100cm2 4 Samples taken at Edge of Roof + 2 Points on 1st Floor

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | 60 | < 316 | 23. | < 20 | < 200 | < 43 | < 316 |
| 2. | < 20 | < 200 | 54 | < 316 | 24. | < 20 | < 200 | < 43 | < 316 |
| 3. | < 20 | < 200 | 72 | < 316 | 25. | < 20 | < 200 | < 43 | < 316 |
| 4. | < 20 | < 200 | 54 | < 316 | 26. | < 20 | < 200 | < 43 | < 316 |
| 5. | < 20 | < 200 | < 43 | < 316 | 27. | < 20 | < 200 | < 43 | < 316 |
| 6. | < 20 | < 200 | 60 | < 316 | 28. | < 20 | < 200 | < 43 | < 316 |
| 7. | < 20 | < 200 | 48 | < 316 | 29. | < 20 | < 200 | < 43 | < 316 |
| 8. | < 20 | < 200 | 78 | < 316 | 30. | < 20 | < 200 | < 43 | < 316 |
| 9. | < 20 | < 200 | < 43 | < 316 | 31. | < 20 | < 200 | ~~[illegible]~~ 210 | < 316 |
| 10. | < 20 | < 200 | < 43 | < 316 | 32. | < 20 | < 200 | 226 | < 316 |
| 11. | < 20 | < 200 | 48 | < 316 | 33. | < 20 | < 200 | 232 | < 316 |
| 12. | < 20 | < 200 | 84 | < 316 | 34. | < 20 | < 200 | 330 | < 316 |
| 13. | < 20 | < 200 | < 43 | < 316 | 35. | < 20 | < 200 | 288 | 1113 |
| 14. | < 20 | < 200 | 48 | < 316 | 36. | < 20 | < 200 | 126 | 978 |
| 15. | < 20 | < 200 | < 43 | < 316 | 37. | | | | |
| 16. | < 20 | < 200 | 96 | < 316 | 38. | | | | |
| 17. | < 20 | < 200 | 84 | < 316 | 39. | | N | A | |
| 18. | < 20 | < 200 | 54 | < 316 | 40. | | | | |
| 19. | < 20 | < 200 | < 43 | < 316 | 41. | | | | |
| 20. | < 20 | < 200 | 48 | < 316 | 42. | | | | |
| 21. | < 20 | < 200 | 54 | < 316 | 43. | | | | |
| 22. | < 20 | < 200 | < 43 | < 316 | 44. | | | | |

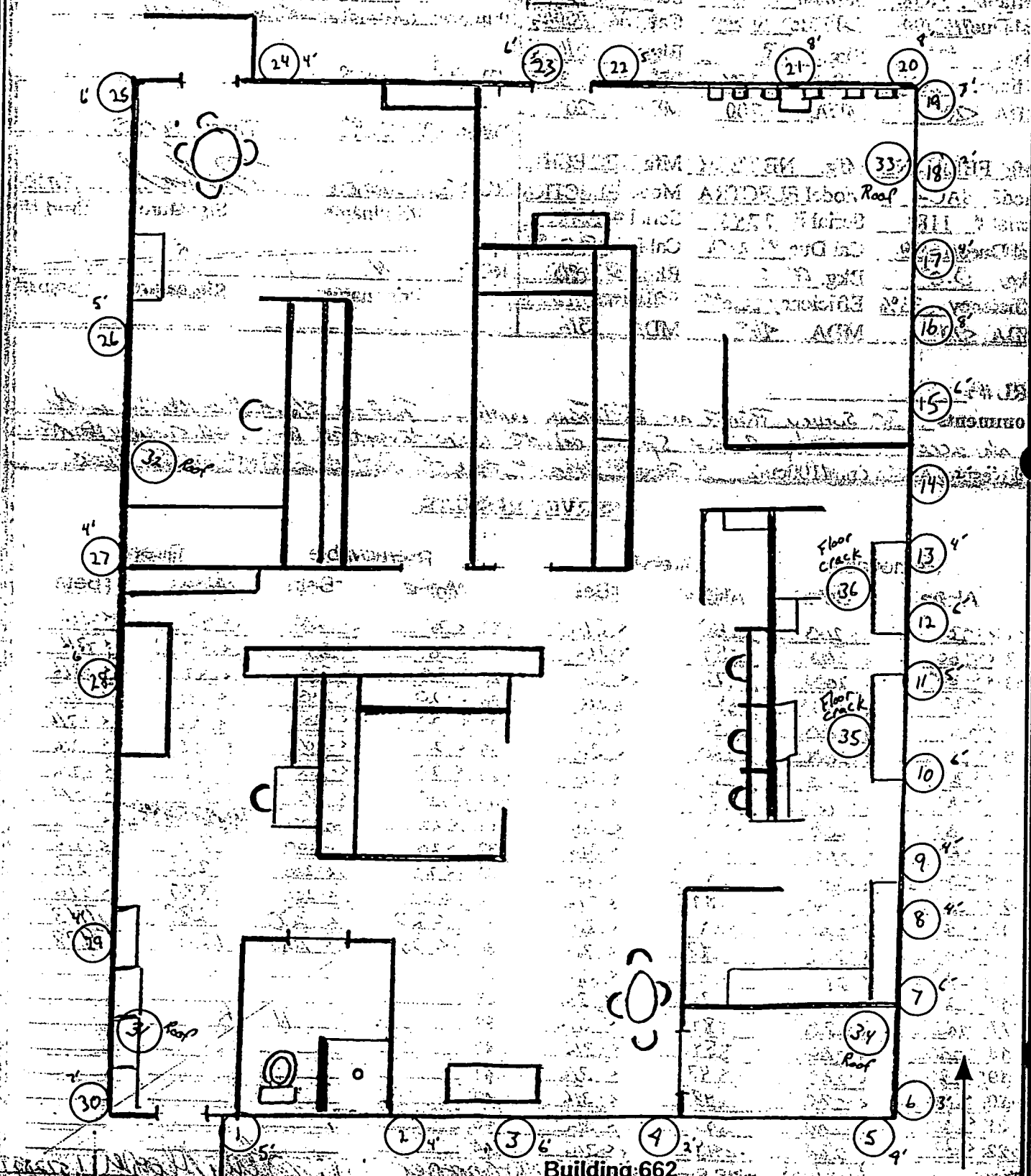
Date 4/21/99 RS Supervision L N Cooper / [signature] [redacted]

220

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points



# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSTRUMENT DATA

| | | |
|---|---|---|
| Mfg. EBERLINE | Mfg. EBERLINE | Mfg EBERLINE |
| Model BC-4 | Model BC-4 | Model SAC-4 |
| Serial # 838 | Serial # 874 | Serial # 959 |
| Cal Due 7/13/99 | Cal Due 6/7/99 | Cal Due 7/5/99 |
| Bkg. 44 | Bkg. 37 | Bkg. 0.1 |
| Efficiency 25% | Efficiency 25% | Efficiency 33% |
| MDA <200 | MDA <200 | MDA <20 |
| Mfg. EBERLINE | Mfg. NE TECH | Mfg. NE TECH |
| Model SAC-4 | Model ELECTRA | Model ELECTRA |
| Serial # 1188 | Serial # 2344 | Serial # 2344 |
| Cal Due 6/16/99 | Cal Due 8-2-99 | Cal Due 8-2-99 |
| Bkg. 0.1 | Bkg. 5 | Bkg. 501 |
| Efficiency 33% | Efficiency 22.0% | Efficiency 32.0% |
| MDA <20 | MDA 60 | MDA 320 |

Survey Type: Contamination Survey

Building: 662

Location:

Purpose: Asbestos Sampling - Pre + Post Job

RWP #: - NA -

Date: 05-13-99 Time: 1545

RCT: Rex Snyder / [signature] [redacted]
Print name Signature

RCT: N / A /
Print name Signature Emp. #

PRL # :

Comments Contam Survey for Asbestos Sampling #1 to 9 Pre Job Area Survey #10 to 18 Survey on Samples 1 thru 9, #19 to 27 Post Job area Survey

All Results Are In dpm/100cm2

## SURVEY RESULTS

| | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta | | Removable Alpha | Removable Beta | Direct Alpha | Direct Beta |
|---|---|---|---|---|---|---|---|---|---|
| 1. | < 20 | < 200 | < 60 | < 320 | 23. | < 20 | < 200 | < 60 | < 320 |
| 2. | < 20 | < 200 | < 60 | 747 | 24. | < 20 | < 200 | < 60 | < 320 |
| 3. | < 20 | < 200 | < 60 | < 320 | 25. | < 20 | < 200 | < 60 | < 320 |
| 4. | < 20 | < 200 | < 60 | < 320 | 26. | < 20 | < 200 | < 60 | < 320 |
| 5. | < 20 | < 200 | < 60 | < 320 | 27. | < 20 | < 200 | < 60 | < 320 |
| 6. | < 20 | < 200 | < 60 | < 320 | 28. | | | | |
| 7. | < 20 | < 200 | < 60 | < 320 | 29. | | | | |
| 8. | < 20 | < 200 | < 60 | < 320 | 30. | | | | |
| 9. | < 20 | < 200 | < 60 | < 320 | 31. | | | | |
| 10. | < 20 | < 200 | < 60 | < 320 | 32. | | | | |
| 11. | < 20 | < 200 | < 60 | < 320 | 33. | | | | |
| 12. | < 20 | < 200 | < 60 | < 320 | 34. | | | | |
| 13. | < 20 | < 200 | < 60 | < 320 | 35. | | | | |
| 14. | < 20 | < 200 | < 60 | < 320 | 36. | | | | |
| 15. | < 20 | < 200 | < 60 | < 320 | 37. | | | | |
| 16. | < 20 | < 200 | < 60 | < 320 | 38. | | | | |
| 17. | < 20 | < 200 | < 60 | < 320 | 39. | | | | |
| 18. | < 20 | < 200 | < 60 | < 320 | 40. | | | | |
| 19. | < 20 | < 200 | < 60 | < 320 | 41. | | | | |
| 20. | < 20 | < 200 | < 60 | < 320 | 42. | | | | |
| 21. | < 20 | < 200 | < 60 | < 320 | 43. | | | | |
| 22. | < 20 | < 200 | < 60 | 822 | 44. | | | | |

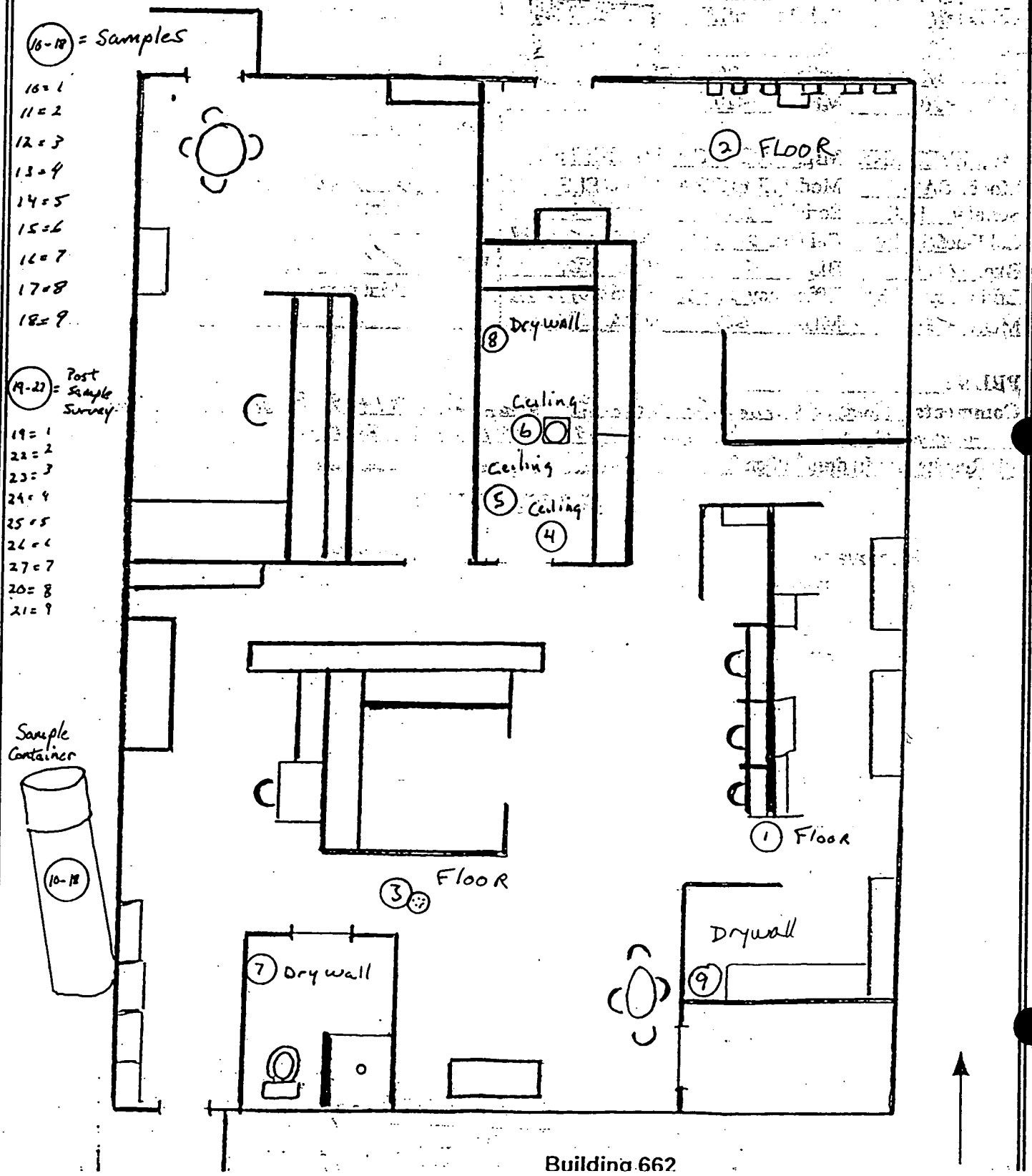
N A

222 Date [illegible]

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SIT

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points




Building 662

223

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

## INSRUMENT DATA

| | | |
|---|---|---|
| Mfg. Eberline | Mfg. Eberline | Mfg. NE Electra |
| Model SAC-4 | Model SAC-4 | Model DP6 |
| Serial# 835 | Serial# 824 | Serial# 1682 |
| Cal Due 10-26-99 | Cal Due 10-13-99 | Cal Due 8-12-99 |
| Bkg. 0.4 | Bkg. 0.3 | Bkg. 27/454 |
| Efficienc 0.33 | Efficienc 0.33 | Efficienc 22.2%/30.6% |
| MDA <20 | MDA <20 | MDA 42/333 |
| Mfg. Ebeline | Mfg. Ebeline | Mfg. |
| Model BC-4 | Model BC-4 | Model |
| Serial# 905 | Serial# 702 | Serial# |
| Cal Due 9-30-99 | Cal Due 11-20-99 | Cal Due |
| Bkg. 38 | Bkg. 40 | Bkg. |
| Efficienc 0.25 | Efficienc 0.25 | Efficienc |
| MDA <200 | MDA <200 | MDA |

Survey Type: Contamination

Building: 662

Location: Inside & Roof of Building

Purpose: Re-Characterization Survey

RWP #: N/A

Date: 7-27-99 Time: 1400

RCT: P. Vestal / [signature] [redacted]
Print name / Signature / Emp. #

RCT: / /
Print name / Signature / Emp. #

PRL #:

Comments: This was a resurvey of original locations #35 & #36 inside the building and #31, #32, #33 & #34 on roof of building. Each location was surveyed twice

## SURVEY RESULTS

| Swipe # | Location/Description Results in DPM/100sq/cm | Removable Alpha | Removable Beta | Total Removable+Fixed Alpha | Total Removable+Fixed Beta | Swipe # | Location/Description Results in DPM/100sq/cm | Removable Alpha | Removable Beta | Total Removable+Fixed Alpha | Total Removable+Fixed Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1st Reading | <20 | <200 | 342 | 1197 | 16 | | | | | |
| 2 | 2nd Reading | <20 | <200 | 258 | 1143 | 17 | | | | | |
| 3 | 1st Reading | <20 | <200 | 306 | 1032 | 18 | | | | | |
| 4 | 2nd Reading | <20 | <200 | 366 | 1170 | 19 | | | | | |
| 5 | 1st Reading | <20 | <200 | 258 | ~~315~~ <333 | 20 | | | | | |
| 6 | 2nd Reading | <20 | <200 | 204 | 417 | 21 | | | | | |
| 7 | 1st Reading | <20 | <200 | 276 | 339 | 22 | | | | | |
| 8 | 2nd Reading | <20 | <200 | 432 | 426 | 23 | | | | | |
| 9 | 1st Reading | <20 | <200 | 288 | ~~201~~ <333 | 24 | | | | | |
| 10 | 2nd Reading | <20 | <200 | 540 | <333 | 25 | | | | | |
| 11 | 1st Reading | <20 | <200 | 300 | <333 | 26 | | | | | |
| 12 | 2nd Reading | <20 | <200 | 450 | <333 | 27 | | | | | |
| 13 | | | | | | 28 | | | | | |
| 14 | | | | | | 29 | | | | | |
| 15 | | | | | | 30 | | | | | |

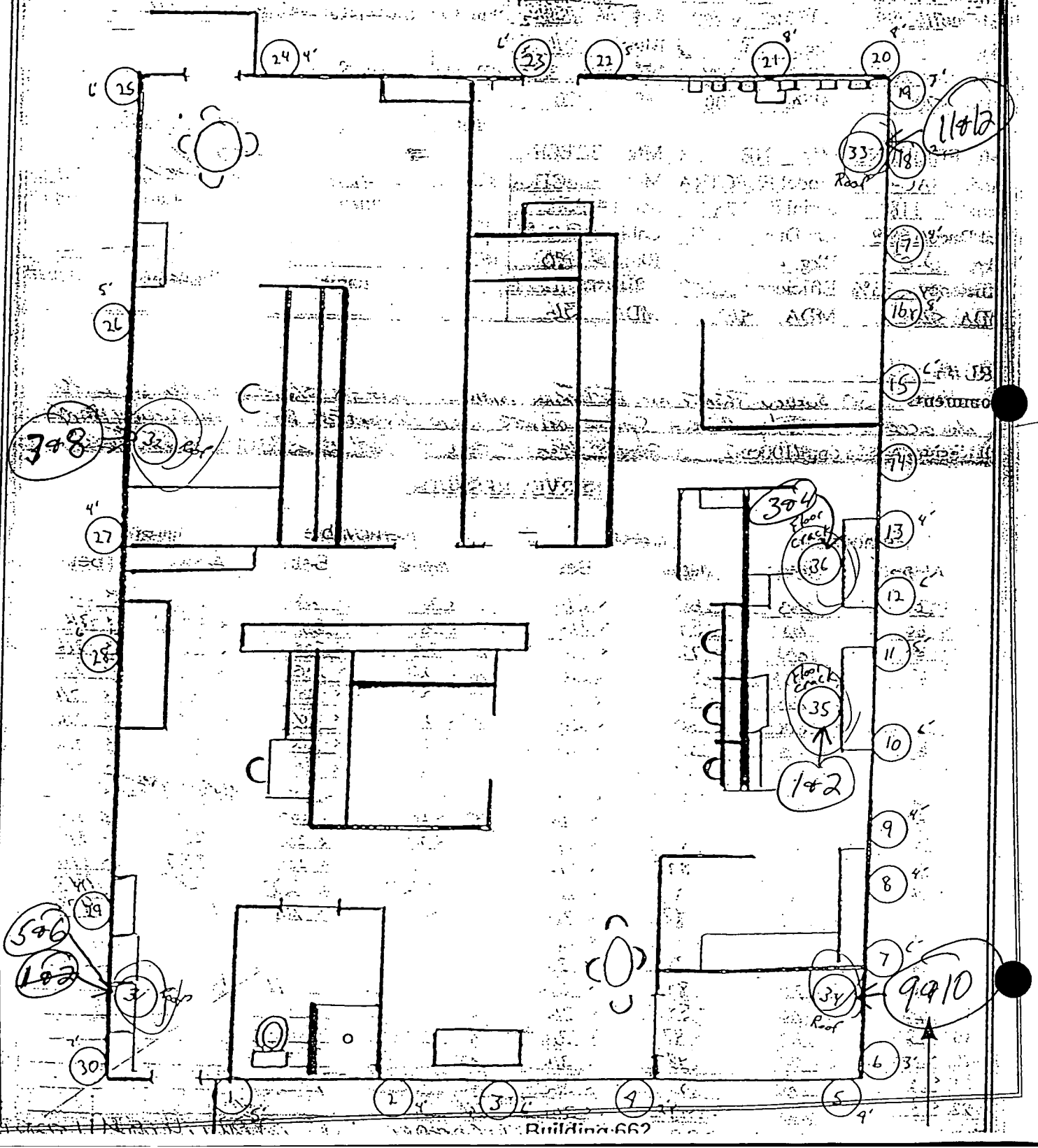
Date Reviewed: 7-27-99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name / Signature

224

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points




Building 662

# Appendix B.3

# Bldg. 662 RLC Chemical Data

# Appendix B.3.1

# Bldg. 662 RLC Chemical Data

# Beryllium

# Appendix B.3.1.1

# Bldg. 662 RLC Chemical Data

# Beryllium

# Chain of Custody

228

| COMMODORE ADVANCED SCIENCES | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 99040109 | C.O.C.# 99Z6172#001 |
|---|---|---|
| | | Page 1 of 2 |

| | | |
|---|---|---|
| Collector DAVID FARLER | Contact/Requester FARLER, DAVE | Telephone No. 303-966-4340 MSIN FAX |
| RIN 99Z6172 | Sampling Origin 662, 551, 910 | Purchase Order/Charge Code NG2200A1 |
| Project Title | Logbook No. N/A | Ice Chest No. N/A Temp. |
| To (Lab) Johns Manville | Method of Shipment FEDERAL EXPRESS | Bill of Lading/Air Bill No. |
| Protocol | | Offsite Property No. |

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative; Packing |
|---|---|---|---|---|---|---|---|---|
| 99Z6172-001.001 | 662-99-03-26-31-B1 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-002.001 | 662-99-03-26-31-B2 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-003.001 | 662-99-03-26-31-B3 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-004.001 | 662-99-03-26-31-B4 | FILTER | | | 662 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-005.001 | 551-99-03-26-31-B1 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-006.001 | 551-99-03-26-31-B2 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-007.001 | 551-99-03-26-31-B3 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| [signature] | 4-1-99 1545 | Marilyn Andrews | 4/1/99 1545 | | | | |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |

| FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|
| | | | |



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COMMODORE ADVANCED SCIENCES

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

99040109

C.O.C. # 99Z6172#001

Page 2 of 2

RIN 99Z6172 | Contact/Requestor FARLER, DAVE | Telephone No. 303-966-4340 | MSIN | FAX

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative ; Packing |
|---|---|---|---|---|---|---|---|---|
| 99Z6172-008.001 | 551-99-03-26-31-B4 | FILTER | | | 551 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-009.001 | 910-99-03-31-31-B1 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-010.001 | 910-99-03-31-31-B2 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-011.001 | 910-99-03-31-31-B3 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-012.001 | 910-99-03-31-31-B4 | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-013.001 | 910-99-03-26-31-BLK | FILTER | | | 910 | 1-FILTER N/A | NR01A001 (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-014.001 | 910-99-03-26-31-05 | FILTER | | | 910 | ~~1-FILTER N/A~~ AIR CASSETTE | ~~NR01A001~~ (Beryllium Filter Analysis) [Routine] | N/A None |
| 99Z6172-015.001 | 910-99-03-26-31-BLK | FILTER | | | 910 | ~~1-FILTER N/A~~ AIR CASSETTE | ~~NR01A001~~ (Beryllium Filter Analysis) [Routine] | N/A None |

4/1/99

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| | 4-1-99 1545 | Marilyn Andrews | 4/1/99 15:45 | | | | |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |

FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

10

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RFP F 3791.[illegible]/95)
Formerly RF-[illegible]

# Rocky Flats Environmental Technology Site

Golden, [illegible] 80402-0464

Safety and Hygiene Chain of Custody Record and Analysis Request

Name of Originator: DAVID FARLER Title: IH Bldg/Ext: 181/4340 Date: 4/1/99 Page 1 of 1

| SAMPLE NUMBER Bldg/Y/M/D/P#/S# | ANALYZE FOR | VOLUME liters | SAMPLE TIME/ | MEDIA | P A B | Personal Area Bulk | REMARKS | Lab Number |
|---|---|---|---|---|---|---|---|---|
| 662-99-03-26-31-B1 | Ke | – | – | whatman | B | NR01A001 | | |
| 662-99-03-26-31-B2 | | | | | | | | |
| 662-99-03-26-31-B3 | | | | | | | | |
| 662-99-03-26-31-B4 | | | | | | | | |
| 551-99-03-26-31-B1 | | | | | | | | |
| 551-99-03-26-31-B2 | | | | | | | | |
| 551-99-03-26-31-B3 | | | | | | | | |
| 551-99-03-26-31-B4 | | | | | | | | |
| 910-99-03-31-31-B1 | | | | | | | | |
| 910-99-03-31-31-B2 | | | | | | | | |
| 910-99-03-31-31-B3 | | | | | | | | |
| 910-99-03-31-31-B4 | | | | | | | | |
| 910-99-03-26-31-BLK | | | | | | | | |
| 910-99-03-26-31-05 | | | | MCE | P | IH01C015 | | |
| 910-99-03-26-31-BLK | | | | MCE | P | | | |
| | | | | | AF | 4/1/99 | | |

| Relinquished by | Received by | Time/Date | Relinquished by | Received by | Time/Date |
|---|---|---|---|---|---|
| [signature] | [signature] | 1400 3-26-99 | [signature] | [signature] | 1440 3/26/99 |
| [signature] | [signature] | 1400 3-31-99 | [signature] | [signature] | 0730 4/1/99 |
| [signature] | H Christman | 1240 4/1/99 | | | |
| | | | | | |

**Report and Billing Instruction**

- Kaiser-Hill ☐
- RMRS ☐
- SSOC ☐
- DynCorp ☐
- WSI ☐

Verbal To: 966 4340
Fax To: 966 3711
Report To: KH
Bill To: KH
P.O.#/Release: NG2200A1
Lab: JM

**Analysis Request**

Industrial Hygiene Sample
☑ Standard Service ☐ Rush ☐ Other

Asbestos Samples
☐ Standard Service ☐ 24 Rush ☐ 2 Rush ☐ Other

Seal# (Release #) 9926172

Condition of Seal: ☐ Broken ☐ Unbroken

Signature:

Comments: Unable to Verify

White - Return to Originator Yellow - Lab Copy Green - Sample Custodian Blue - Originator

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# Appendix B.3.1.2

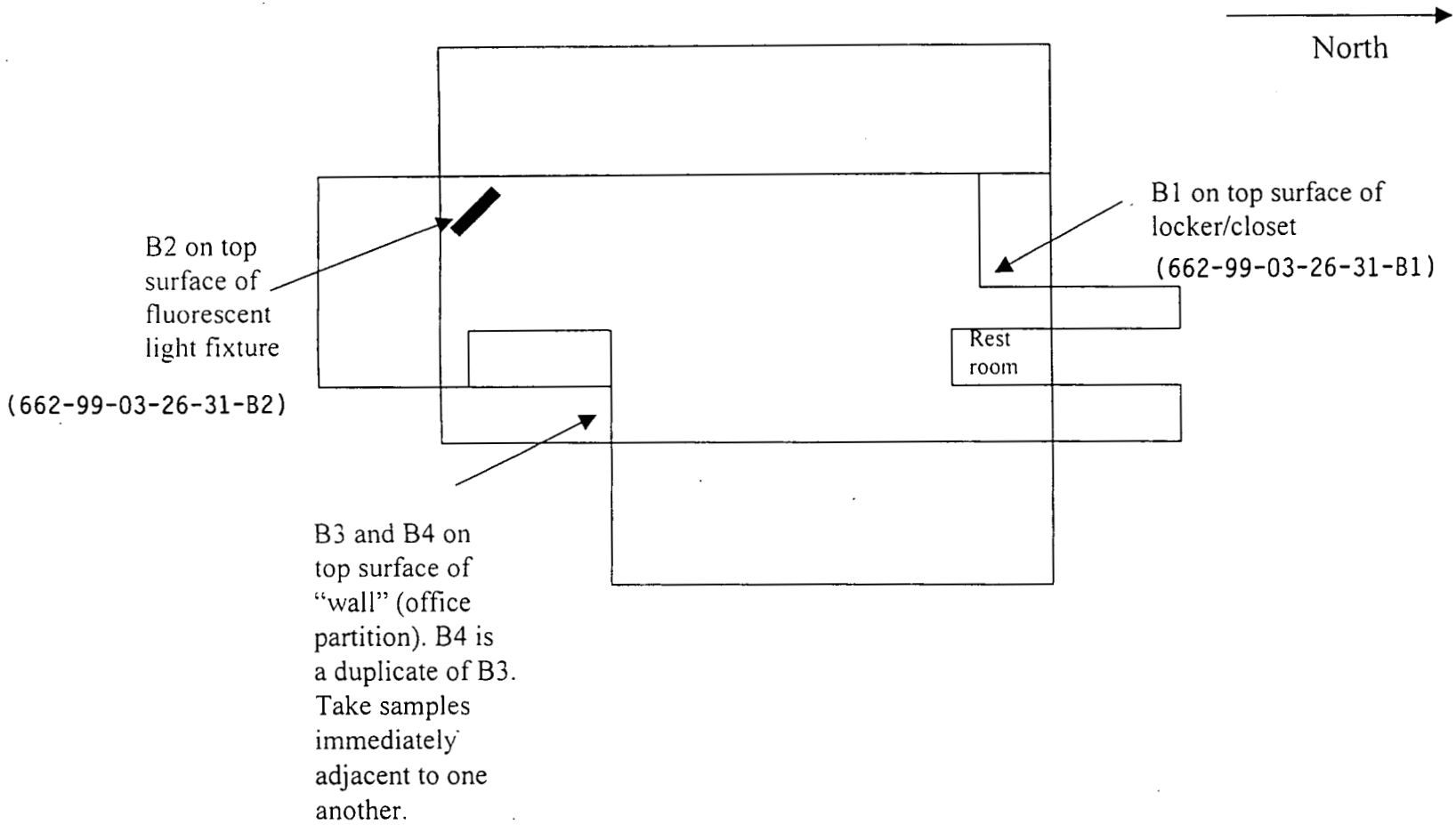
# Bldg. 662 RLC Chemical Data

# Beryllium

# Sample Locations

# Building 662 Floor & Walls

## Locations of Beryllium Smear Samples




Group A RLCP Survey

28/62 P1
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# Appendix B.3.1.3

# Bldg. 662 RLC Chemical Data

# Beryllium

# Laboratory Report

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Johns Manville

COPY

Johns Manville Corporation
10100 W. Ute Avenue (80127)
P.O. Box 625005
Littleton, CO 80162-5005
303 978 2000

# Cover Page

Apr-8-99

Rocky Flats Environmental Technology Site
Mr. Roger Cichorz
P.O. Box 464
Building 881
Golden, CO 80402-0464

| | |
|---|---|
| **Laboratory Project No.:** | 99040109 |
| **Client:** | Kaiser Hill |
| **PO# / Release #:** | NG2200A1 |
| **Site Sample #:** | NR01/IH01 |
| **Seal #:** | 99Z6172 |
| **Requestor:** | Dave Farler |

Dear Mr. Cichorz,

The Johns Manville Technical Center (JMTC) has performed the following analytical services as requested. The results are calculated based upon the information supplied on the submission form. All laboratory data has been filed and are available upon request.
The industrial hygiene laboratory at JMTC has been fully accredited in all aspects by the American Industrial Hygiene Association (AIHA) since 1976. If you have any questions, please call (303) 978-2584.

**Scope of Work:**

| Analysis | # of Samples | Matrix | Method | Reporting Limit | OSHA Standard (TWA) |
|---|---|---|---|---|---|
| Beryllium | 13 | Whatman filter | EPA-SW846-3051/OSHA ID-121 | 0.1 µg | - |
| Beryllium | 2 | MCE filter | NIOSH 7300 | 0.01 µg | 0.002 mg/m3 |

I certify that this data package is in compliance with the terms and conditions of the subcontract, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard data package has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Scott A. Steiner
Industrial Hygiene Laboratory Manager

4-8-99
Date

303-978-2584 Scott

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# Appendix B.3.1.4

# Bldg. 662 RLC Chemical Data

# Beryllium

# Laboratory Data

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# JOHNS MANVILLE TECHNICAL CENTER (JMTC)



Apr-8-99

**Laboratory Project No.:** 99040109
**Client:** Kaiser Hill
**PO#/Release #:** NG2200A1
**Site Sample #:** NR01/IH01
**Seal #:** 99Z6172
**Requestor:** Dave Farler

TABLE I: Sample Results

| Client Sample No. | Laboratory Sample No. | Analysis | Method | Matrix | Reporting Limit | Total |
|---|---|---|---|---|---|---|
| 662-99-03-26-31-B1 | 99040109-001 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 662-99-03-26-31-B2 | 99040109-002 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 662-99-03-26-31-B3 | 99040109-003 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 662-99-03-26-31-B4 | 99040109-004 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B1 | 99040109-005 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B2 | 99040109-006 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B3 | 99040109-007 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 551-99-03-26-31-B4 | 99040109-008 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B1 | 99040109-009 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B2 | 99040109-010 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B3 | 99040109-011 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-B4 | 99040109-012 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |
| 910-99-03-31-31-BLK | 99040109-013 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | < 0.1 ug |

# JOHNS MANVILLE TECHNICAL CENTER (JMTC)

Apr-8-99

| | |
|---|---|
| **Laboratory Project No.:** | 99040109 |
| **Client:** | Kaiser Hill |
| **PO#/Release #:** | NG2200A1 |
| **Site Sample #:** | NR01/IH01 |
| **Seal #:** | 99Z6172 |
| **Requestor:** | Dave Farler |

**TABLE I:** Sample Results

| Client Sample No. | Laboratory Sample No. | Analysis | Method | Matrix | Reporting Limit | Backup Section | Main Section | Total | Air Vol. / Time | Air Concentration |
|---|---|---|---|---|---|---|---|---|---|---|
| 910-99-03-26-31-05 | 99040109-014 | Beryllium | NIOSH 7300 | MCE filter | 0.01 µg | | | < 0.01 ug | | |
| 910-99-03-26-31-BLK | 99040109-015 | Beryllium | NIOSH 7300 | MCE filter | 0.01 µg | | | < 0.01 ug | | |

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# JOHNS MANVILLE TECHNICAL CENTER (JMTC)



Apr-8-99

| | |
|---|---|
| **Laboratory Project No.:** | 99040109 |
| **Client:** | Kaiser Hill |
| **PO#/Release #:** | NG2200A1 |
| **Site Sample #:** | NR01/IH01 |
| **Seal #:** | 99Z6172 |
| **Requestor:** | Dave Farler |

TABLE II: Quality Control

| QC No. | Analyte | Method | Matrix | Reporting Limit | Amount Spiked | Amount Recovered | Percent Recovery |
|---|---|---|---|---|---|---|---|
| Media Blank | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | N/A | < 0.1 ug | |
| Q9-164 | Beryllium | EPA-SW846-3051/OSHA ID-121 | Whatman filter | 0.1 µg | 5.0 ug | 4.79 ug | 95.8% |
| Media Blank | Beryllium | NIOSH 7300 | MCE filter | 0.01 µg | N/A | < 0.01 ug | |
| MBS | Beryllium | NIOSH 7300 | Solution | 0.001 µg/ml | 0.5 ug/ml | 0.485 ug/ml | 97.0% |

Analyst: _____
*Anthony Carr*

Quality Assurance: _____
*Dennis Murray*

AIHA Accreditation No. [redacted]

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# Appendix C.1

# Bldg. 709 RLC Radiological Data

# Appendix C.1.1

# Bldg. 709 RLC Radiological Data

# Radiological Surveys

# Appendix C.1.2

# Bldg. 709 RLC Radiological Data

# Radiochemical Samples

# Appendix C.1.2.1

# Bldg. 709 RLC Radiological Data

# Radiochemical Samples

# Chain of Custody

Commodore Advanced Sciences, Inc.

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 99A[illegible]3#006

Page 1 of 1

| | | |
|---|---|---|
| Collector: J Wingerd [signature] 572672 | Contact/Requester: WOJTASZEK, PAUL | Telephone No.: 3125 MSIN FAX |
| RIN: 99A6333 | Sampling Origin: Bbldg 709 Tower | Purchase Order/Charge Code: NG220000 |
| Project Title: NA | Logbook No.: MILKER | Ice Chest No.: N/A Temp. |
| To (Lab): S. Cohen & Associates | Method of Shipment: FED X | Bill of Lading/Air Bill No.: 4533 2124 5285 |
| Protocol: NA | | Offsite Property No.: N/A |

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

KH199-1546

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative ; Packing |
|---|---|---|---|---|---|---|---|---|
| 99A6333-006.003 | NA | SLUDGE | 4/21/99 | 1130 | Bldg 709 Tower | 125-G P/G | RC01B004 (Isotopic Waste) [Rush] 01 | None None |
| 99A6333-007.003 | | | | 1120 | Bldg 709 Tower | 125-G P/G | RC01B004 (Isotopic Waste) [Rush] 02 | None None |
| 99A6333-008.003 | | | | 1100 | Bldg 709 Tower | 125-G P/G | RC01B004 (Isotopic Waste) [Rush] 03 | None None |
| 99A6333-009.003 | | | | 1045 | Bldg 709 Tower | 125-G P/G | RC01B004 (Isotopic Waste) [Rush] 04 | None None |
| 99A6333-010.003 | | | | 1030 | Bldg 709 Tower | 125-G P/G | RC01B004 (Isotopic Waste) [Rush] 05 | None None |
| 99A6333-012.001 | | | | 1030 | Bldg 709 Tower | 125-G P/G | RC01B004 (Isotopic Waste) [Rush] 06 | None None |
| 99A6333-015.003 | | AQUEOUS | | 1115 | | 4-L P | RC01B001 (Isotopic Water) [Rush] KH199-1547-01 | HN03 4 degrees C |

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| J Wingerd CAS | 4/21/99 1520 | Fridge #2 CAS T891R | 4/21/99 1520 | Fridge #2 | 4/27/99 1500 | R Mahe | 4/27/99 1500 |
| R Mahe | 4/27/99 1500 | Fed-Ex | | | | | |
| | | [illegible] CPA | 4-28-99 0900 | | | | |
| | | | | | | | |

007

| FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|

26 Sample 015.003 Volume received is 2.6-L instead of 4-L as stated on COC. CA

# Appendix C.1.2.2

# Bldg. 709 RLC Radiological Data

# Radiochemical Samples

# Sample Locations

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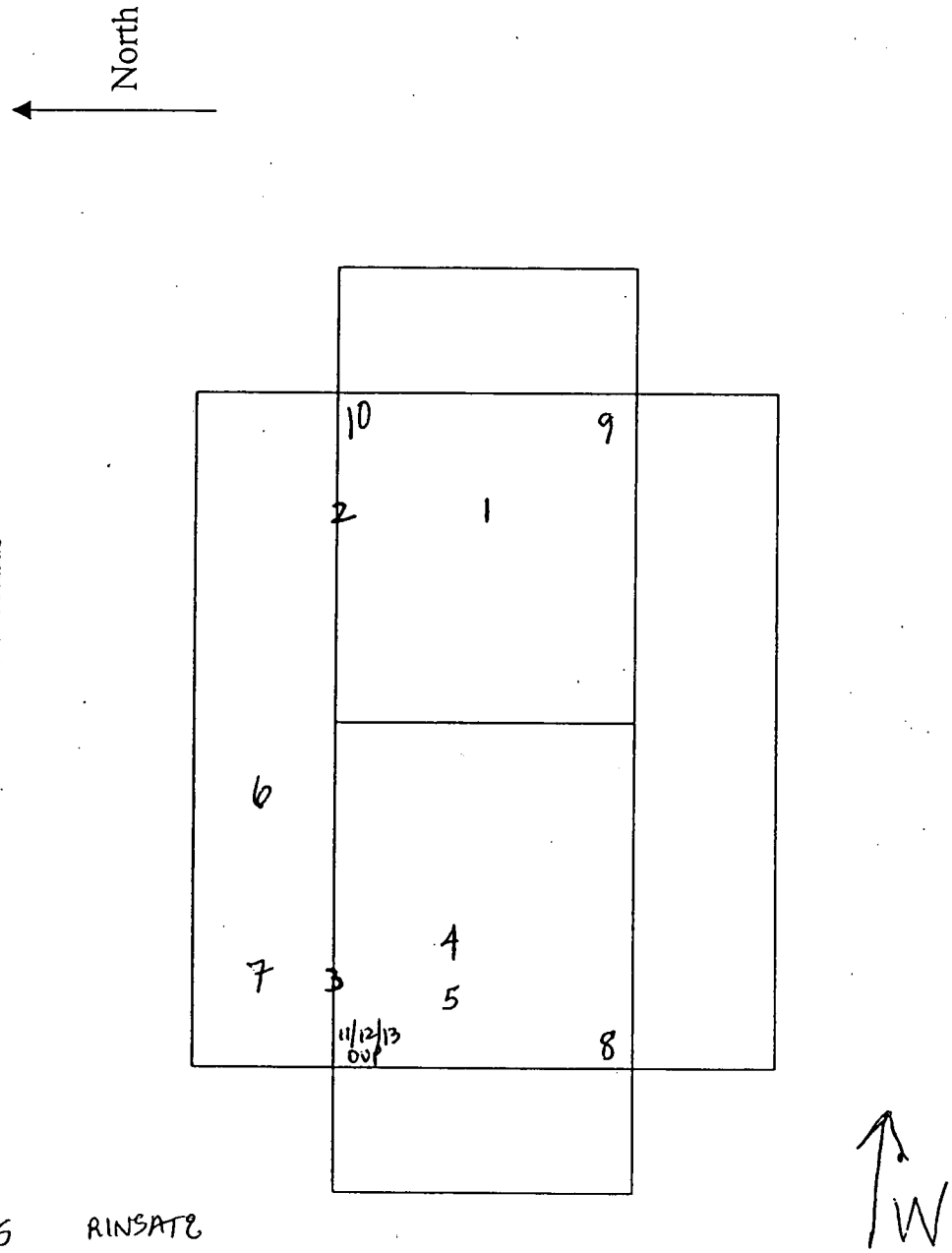
COPY

Rad Engineering: _____ Date

Peer Review: _____ Date

# Building 709 - Concrete Bottom Floor & Walls

Group A RLCP Survey




| | EVENTS | RINSATE |
|---|---|---|
| SLUDGE | 6-13 | 15 |
| WOOD | 1-5 | 14 |

SAMPLE LOCATIONS w/ EVENT #'S

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# RADIOLOGICAL SAFETY

## Drawing Showing Survey Points

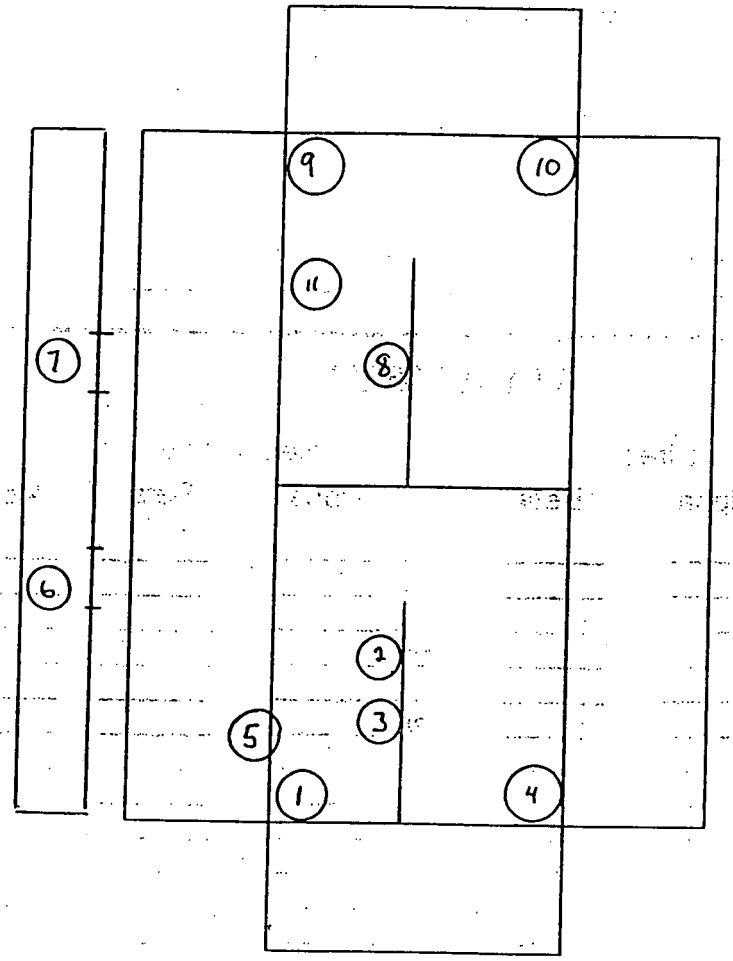
**Building 709 - Concrete Bottom Floor & Walls**

# 2, 3, + 8 = plywood wall

# 5 = Diagnal 2x4 support

11 # 8 = Diagnal 4x8 support (2nd)

# The Remaining survey points were taken on the floor.




Post job Survey
After wood + Sludge Samples taken

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# Appendix C.1.2.3

# Bldg. 709 RLC Radiological Data

# Radiochemical Samples

# Laboratory Report

**CASE NARRATIVE**
**RIN 99A6333**
**Laboratory Report Identification Number: 1546, 1547**
**PSA Module RC01B.3**

May 11, 1999

## I. Introduction

On April 28, 1999, six waste samples and one water sample, (RIN 99A6333), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The chain-of-custody accompanying the samples requested they be analyzed on a "rush" basis. The samples were analyzed in accordance with Kaiser-Hill specifications stated in the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RCO1-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

## II. Analytical Methodology

The radioanalytical results reported for each sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. All samples were analyzed by Eichrom Industries, Inc. extraction chromatography method (ACW03) for isotopic uranium, plutonium, and americium.

## III. Analytical Results

Deficiencies

None

Matrix Interferences

There were no indications of matrix interference.

Dilutions

No dilutions were required.

Detection Limits

The required detection limits (RDL) were met for all sample analyses.

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009

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Reanalysis

There were no reanalysis.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CTR

There were no contacts with the contract technical representative (CTR) regarding these samples.

## IV. Quality Control

Site Samples Used for Quality Control Samples:

| Site Sample Number | Laboratory Sample Number | Type of Quality Control Analysis Sample |
|---|---|---|
| Laboratory Type II Water | SCAQC-1546-LC1 | Laboratory Control Sample |
| 99A6333-006.003 Bldg 709 Tower | SCAQC-1546-LD1 | Laboratory Duplicate Sample |
| Laboratory Type II Water | SCAQC-1546-PB | Preparation Blank |

Site Samples Used for Quality Control Samples:

| Site Sample Number | Laboratory Sample Number | Type of Quality Control Analysis Sample |
|---|---|---|
| Laboratory Type II Water | SCAQC-1547-LC1 | Laboratory Control Sample |
| 99A6333-015.003 Bldg 709 Tower | SCAQC-1547-LD1 | Laboratory Duplicate Sample |
| Laboratory Type II Water | SCAQC-1547-PB | Preparation Blank |

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,

Joe Stinson

Joe Stinson
Laboratory Manager

5/4/99
Date

# Appendix C.1.2.4

# Bldg. 709 RLC Radiological Data

## Radiochemical Samples

## Laboratory Data

# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: [redacted]

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6333#006 | Matrix: | Waste |
| Site Sample ID: | 006.003 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1546 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1546-01 | 4.99 | 0.905 | 1.35 | 0.069 |
| ACW03 | U-235 | KH199-1546-01 | 0.219 | 0.167 | 0.179 | 0.085 |
| ACW03 | U-238 | KH199-1546-01 | 3.95 | 0.772 | 1.10 | 0.121 |
| ACW03 | PU-239/240 | KH199-1546-01 | 0.181 | 0.089 | 0.096 | 0.059 |
| ACW03 | AM-241 | KH199-1546-01 | 0.167 | 0.130 | 0.135 | 0.137 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

012



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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6333#006 | Matrix: | Waste |
| Site Sample ID: | 007.003 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1546 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1546-02 | 8.13 | 1.13 | 1.98 | 0.039 |
| ACW03 | U-235 | KH199-1546-02 | 0.345 | 0.163 | 0.193 | 0.084 |
| ACW03 | U-238 | KH199-1546-02 | 8.24 | 1.14 | 2.01 | 0.080 |
| ACW03 | PU-239/240 | KH199-1546-02 | 0.260 | 0.084 | 0.099 | 0.037 |
| ACW03 | AM-241 | KH199-1546-02 | 0.118 | 0.077 | 0.081 | 0.076 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6333#006 | Matrix: | Waste |
| Site Sample ID: | 008.003 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1546 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1546-03 | 5.14 | 0.981 | 1.42 | 0.080 |
| ACW03 | U-235 | KH199-1546-03 | 0.218 | 0.179 | 0.191 | 0.098 |
| ACW03 | U-238 | KH199-1546-03 | 4.16 | 0.848 | 1.19 | 0.079 |
| ACW03 | PU-239/240 | KH199-1546-03 | 0.055 | 0.057 | 0.058 | 0.062 |
| ACW03 | AM-241 | KH199-1546-03 | 0.151 | 0.132 | 0.135 | 0.142 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6333#006 | Matrix: | Waste |
| Site Sample ID: | 009.003 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1546 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1546-04 | 4.59 | 0.858 | 1.26 | 0.065 |
| ACW03 | U-235 | KH199-1546-04 | 0.000 | 0.000 | 0.000 | 0.081 |
| ACW03 | U-238 | KH199-1546-04 | 3.24 | 0.677 | 0.937 | 0.115 |
| ACW03 | PU-239/240 | KH199-1546-04 | 0.177 | 0.083 | 0.090 | 0.052 |
| ACW03 | AM-241 | KH199-1546-04 | 0.079 | 0.092 | 0.093 | 0.106 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6333#006 | Matrix: | Waste |
| Site Sample ID: | 010.003 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1546 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1546-05 | 4.14 | 0.687 | 1.08 | 0.039 |
| ACW03 | U-235 | KH199-1546-05 | 0.294 | 0.150 | 0.174 | 0.085 |
| ACW03 | U-238 | KH199-1546-05 | 3.92 | 0.660 | 1.03 | 0.090 |
| ACW03 | PU-239/240 | KH199-1546-05 | 0.051 | 0.031 | 0.033 | 0.013 |
| ACW03 | AM-241 | KH199-1546-05 | 0.031 | 0.066 | 0.066 | 0.080 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99A6333#006 | Matrix: | Waste |
| Site Sample ID: | 012.001 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1546 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/g) | 2 σ Counting Error (pCi/g) | Total Error (pCi/g) | MDA (pCi/g) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1546-06 | 4.38 | 0.753 | 1.16 | 0.081 |
| ACW03 | U-235 | KH199-1546-06 | 0.145 | 0.111 | 0.119 | 0.056 |
| ACW03 | U-238 | KH199-1546-06 | 4.20 | 0.728 | 1.11 | 0.080 |
| ACW03 | PU-239/240 | KH199-1546-06 | 0.101 | 0.053 | 0.057 | 0.041 |
| ACW03 | AM-241 | KH199-1546-06 | 0.113 | 0.101 | 0.104 | 0.110 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | 99a6333#006 | Matrix: | Water |
| Site Sample ID: | 015.003 | | | | |
| Other Sample ID: | Bldg 709 Tower | Collection Date: | 4/21/99 | Date Received: | 4/28/99 |
| | | Batch Number: | 1547 | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/L) | 2 σ Counting Error (pCi/L) | Total Error (pCi/L) | MDA (pCi/L) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | KH199-1547-01 | 0.003 | 0.012 | 0.013 | 0.028 |
| ACW03 | U-235 | KH199-1547-01 | 0.000 | 0.000 | 0.000 | 0.019 |
| ACW03 | U-238 | KH199-1547-01 | 0.017 | 0.020 | 0.020 | 0.016 |
| ACW03 | PU-239/240 | KH199-1547-01 | 0.006 | 0.007 | 0.007 | 0.005 |
| ACW03 | AM-241 | KH199-1547-01 | 0.009 | 0.009 | 0.009 | 0.006 |

**Quality Control Samples**

| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
|---|---|---|---|
| U | SCAQC-1547-LC1 | SCAQC-1547-LD1 | SCAQC-1547-PB |
| Pu | SCAQC-1547-LC1 | SCAQC-1547-LD1 | SCAQC-1547-PB |
| Am | SCAQC-1547-LC1 | SCAQC-1547-LD1 | SCAQC-1547-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

## Quality Control Sample
## Preparation Blank (PB)

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | None | Matrix: | Water |
| Site Sample ID: | N/A | | | | |
| Other Sample ID: | PB | Collection Date: | 4/28/99 | Date Received: | 4/28/99 |
| | | | | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (dpm) | 2 σ Counting Error (dpm) | Total Error (dpm) | MDA (dpm) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | SCAQC-1546-PB | -0.006 | 0.012 | 0.012 | 0.069 |
| ACW03 | U-235 | SCAQC-1546-PB | 0.000 | 0.000 | 0.000 | 0.048 |
| ACW03 | U-238 | SCAQC-1546-PB | 0.023 | 0.042 | 0.043 | 0.069 |
| ACW03 | PU-239/240 | SCAQC-1546-PB | 0.009 | 0.012 | 0.013 | 0.012 |
| ACW03 | AM-241 | SCAQC-1546-PB | 0.015 | 0.030 | 0.030 | 0.037 |

| Quality Control Samples | | | |
|---|---|---|---|
| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
| U | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Pu | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |
| Am | SCAQC-1546-LC1 | SCAQC-1546-LD1 | SCAQC-1546-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

## Quality Control Sample
## Preparation Blank (PB)

Report Identification Number: 99A6333

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Kaiser-Hill | Chain-of-Custody Number: | None | Matrix: | Water |
| Site Sample ID: | Blank 1 | | | | |
| Other Sample ID: | PB | Collection Date: | 4/28/99 | Date Received: | 4/28/99 |
| | | | | Laboratory Code: | SCA |

| Method Number | Radionuclide | Laboratory Sample ID | Activity (pCi/L) | 2 σ Counting Error (pCi/L) | Total Error (pCi/L) | MDA (pCi/L) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | SCAQC-1547-PB | 0.003 | 0.010 | 0.010 | 0.021 |
| ACW03 | U-235 | SCAQC-1547-PB | 0.000 | 0.000 | 0.000 | 0.015 |
| ACW03 | U-238 | SCAQC-1547-PB | 0.003 | 0.010 | 0.010 | 0.021 |
| ACW03 | PU-239/240 | SCAQC-1547-PB | 0.000 | 0.008 | 0.008 | 0.013 |
| ACW03 | AM-241 | SCAQC-1547-PB | 0.009 | 0.020 | 0.020 | 0.025 |

| Quality Control Samples | | | |
|---|---|---|---|
| Radionuclide | Laboratory Control Sample (LC) | Laboratory Duplicate Analysis (LD) | Preparation Blank (PB) |
| U | SCAQC-1547-LC1 | SCAQC-1547-LD1 | SCAQC-1547-PB |
| Pu | SCAQC-1547-LC1 | SCAQC-1547-LD1 | SCAQC-1547-PB |
| Am | SCAQC-1547-LC1 | SCAQC-1547-LD1 | SCAQC-1547-PB |

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# Sanford Cohen & Associates
# Southeastern Environmental Laboratory

## Radioanalytical Results

## Quality Control Sample Evaluation

Report Identification Number: 99A6333

Project Name: Kaiser-Hill | Laboratory Code: SCA

### Laboratory Contol Sample (LC1) Evaluation

| Method Number | Radionuclide | Laboratory Sample ID | (CV) Decay Corrected Activity of Spike Added (dpm) | (OV) Laboratory Control Sample Activity (dpm) | Laboratory Control Sample % Recovery (Accuracy) | Number of σ Between CV and OV |
|---|---|---|---|---|---|---|
| ACW03 | AM-241 | SCAQC-1546-LC1 | 4.24 ∓ 0.117 | 4.95 ∓ 1.12 | 117 | 0.941 |
| ACW03 | PU-239/240 | SCAQC-1546-LC1 | 4.55 ∓ 0.100 | 4.80 ∓ 1.08 | 105 | 0.342 |
| ACW03 | U-233/234 | SCAQC-1546-LC1 | 8.02 ∓ 0.321 | 7.69 ∓ 1.80 | 95.9 | 0.270 |
| ACW03 | U-238 | SCAQC-1546-LC1 | 8.02 ∓ 0.321 | 8.76 ∓ 2.04 | 109 | 0.533 |
| ACW03 | AM-241 | SCAQC-1547-LC1 | 1.91 ∓ 0.053 | 1.98 ∓ 0.450 | 104 | 0.241 |
| ACW03 | PU-239/240 | SCAQC-1547-LC1 | 2.05 ∓ 0.045 | 2.06 ∓ 0.468 | 100 | 0.031 |
| ACW03 | U-233/234 | SCAQC-1547-LC1 | 3.61 ∓ 0.145 | 3.33 ∓ 0.799 | 92.2 | 0.522 |
| ACW03 | U-238 | SCAQC-1547-LC1 | 3.61 ∓ 0.145 | 3.90 ∓ 0.925 | 108 | 0.462 |

### Laboratory Duplicate Sample (LD1) Evaluation

| Method Number | Radionuclide | Laboratory Sample ID | Original Sample Activity (pCi/g) | Duplicate Sample Activity (pCi/g) | Difference Between Original Activity and Duplicate Sample Activity (F) | Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E) |
|---|---|---|---|---|---|---|
| ACW03 | U-233/234 | SCAQC-1546-LD1 | 4.99 ∓ 1.35 | 5.70 ∓ 1.54 | 0.715 | 0.349 |
| ACW03 | U-235 | SCAQC-1546-LD1 | 0.219 ∓ 0.179 | 0.156 ∓ 0.162 | 0.062 | 0.257 |
| ACW03 | U-238 | SCAQC-1546-LD1 | 3.95 ∓ 1.10 | 4.71 ∓ 1.31 | 0.760 | 0.444 |
| ACW03 | PU-239/240 | SCAQC-1546-LD1 | 0.181 ∓ 0.096 | 0.115 ∓ 0.074 | 0.066 | 0.544 |
| ACW03 | AM-241 | SCAQC-1546-LD1 | 0.167 ∓ 0.135 | 0.181 ∓ 0.117 | 0.014 | 0.078 |
| ACW03 | U-233/234 | SCAQC-1547-LD1 | 0.003 ∓ 0.013 | 0.025 ∓ 0.025 | 0.022 | 0.762 |
| ACW03 | U-235 | SCAQC-1547-LD1 | 0.000 ∓ 0.000 | 0.007 ∓ 0.014 | 0.007 | 0.494 |
| ACW03 | U-238 | SCAQC-1547-LD1 | 0.017 ∓ 0.020 | 0.005 ∓ 0.011 | 0.012 | 0.516 |
| ACW03 | PU-239/240 | SCAQC-1547-LD1 | 0.006 ∓ 0.007 | 0.004 ∓ 0.005 | 0.002 | 0.272 |
| ACW03 | AM-241 | SCAQC-1547-LD1 | 0.009 ∓ 0.009 | 0.008 ∓ 0.008 | 0.001 | 0.074 |

Activity Expressed in pCi/L

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# Appendix C.2

# Bldg. 709 RLC Chemical Data

# Appendix C.2.1

# Bldg. 709 RLC Chemical Data

# Metals

# Appendix C.2.1.1

# Bldg. 709 RLC Chemical Data

# Metals

# Chain of Custody

Commodore Advanced Sciences, Inc.

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

99048739

C.O.C. # 99A6333#002

Page 1 of 1

| | | |
|---|---|---|
| Collector: Jwingard [signature] | Contact/Requester: WOJTASZEK, PAUL | Telephone No.: 3125 MSIN FAX |
| RIN: 99A6333 512632 | Sampling Origin: Bldg 709 Tower | Purchase Order/Charge Code: NG220000 |
| Project Title: NA | Logbook No.: MILKIER | Ice Chest No.: N/A Temp. |
| To (Lab): General Engineering | Method of Shipment: FED X | Bill of Lading/Air Bill No.: NA 4533 2124 5296 |
| Protocol: NA | | Offsite Property No.: N/A |

POSSIBLE SAMPLE HAZARDS/REMARKS: ** ** Quote # 39901

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative; Packing |
|---|---|---|---|---|---|---|---|---|
| 99A6333-001.002 | | Post poned | 4/21/99 | JSW | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] | None 4 degrees C |
| 99A6333-002.002 | | Post poned | 4/21/99 | JSW | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] | None 4 degrees C |
| 99A6333-003.002 | NA | SOLID | 4/21/99 | 1500 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-004.002 | | | | 1430 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-005.002 | | | | 1430 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-014.002 | | AQUEOUS | | 1505 | | 1-L P/G | SS05B021 (Mtls w/Hg Unfiltered SW846) [Rush] .2 | None 4 degrees C |
| | | | | | JSW 4/29/99 | | | |

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| [signature] CAS | 1520 4/21/99 | Fridge #2 CAS 5891R | 4/21/99 1520 | Fridge #2 | 4/27/99 1500 | K Mahe | 4/27/99 1500 |
| K Mahe | 4/27/99 1500 | Fed-Ex | | | | P. Moreau | 4-28-99 09:30 |
| | | | | | | | |
| | | | | | | | |

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

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Commodore A[illegible]ced Sciences, Inc.

# CHAIN OF CUSTODY/SAMP[illegible] ANALYSIS REQUEST

C.O.C. # 99A6333#004

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| | | |
|---|---|---|
| Collector Jwingard | Contact/Requester WOJTASZEK, PAUL | Telephone No. 3125 MSIN FAX |
| RIN 99A6333 | Sampling Origin Bldg 709 Tower | Purchase Order/Charge Code NG220000 |
| Project Title NA | Logbook No. MILKER | Ice Chest No. N/A Temp. |
| To (Lab) General Engineering | Method of Shipment FED-X | Bill of Lading/Air Bill No. 4533 2124 5296 |
| Protocol NA | | Offsite Property No. N/A |

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative; Packing |
|---|---|---|---|---|---|---|---|---|
| 99A6333-006.002 | NA | SLUDGE | 4/21/99 | 1130 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-007.002 | | | | 1120 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-008.002 | | | | 1100 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-009.002 | | | | 1045 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-010.002 | | | | 1030 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-011.002 | | | | 1030 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |
| 99A6333-013.002 | | | | 1030 | | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] .1 | None 4 degrees C |

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| JWingard CAS | 4/21/99 1520 | Fridge #2 CAS TB91R | 4/21/99 1520 | Fridge #2 | 4/27/99 1500 | KMahe | 4/27/99 1500 |
| KMahe | 4/27/99 1500 | Fed-Ex | | | | P. Warner | 4-28-99/09:30 |
| | | | | | | | |
| | | | | | | | |

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

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Commodore [illegible]anced Sciences, Inc.

# CHAIN OF CUSTODY/SAM[illegible]E ANALYSIS REQUEST

C.O.C.# 99A6333#00[illegible]



| RIN | Contact/Requestor | Telephone No. | MSIN | FAX |
|---|---|---|---|---|
| 99A6333 | WOJTASZEK, PAUL | 3125 | | |

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative; Packing |
|---|---|---|---|---|---|---|---|---|
| 2 99A6333-015.002 | NA | AQUEOUS | 4/21/99 | 1115 | | 1-L P/G | SS05B021 (Mtls w/Hg Unfiltered SW846) [Rush] .2 | None 4 degrees C |
| ~~99A6333-016.002~~ | canceled | JSW | 4/21/99 | | | ~~125-G P/G~~ | ~~SS08B008 (TCLP Metals for UTS) [Rush]~~ | ~~None~~ 4 degrees C |

JS 4/21/99

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| Wingard CAS | 4/21/99 1520 | Fridge #2 CAS T591R | 4/21/99 1520 | Fridge #2 | 4/27/99 1500 | Kmake | 4/27/99 1500 |
| Kmake | 4/27/99 1500 | Fed-Ex | | | | P. Nover | 4-28-99 / 09:30 |
| | | | | | | | |
| | | | | | | | |

| FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

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99048151c

Commodore [redacted]nced Sciences, Inc.

# CHAIN OF CUSTODY/SAM[redacted]E ANALYSIS REQUEST

C.O.C. # 99A6333#00[redacted]

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| | | |
|---|---|---|
| Collector J. Wingard / D. Zigmunt | Contact/Requester WOJTASZEK, PAUL | Telephone No. 3125 MSIN FAX |
| RIN 99A6333 | Sampling Origin 709 | Purchase Order/Charge Code NG220000 |
| Project Title NA | Logbook No. MILKER | Ice Chest No. Temp. |
| To (Lab) General Engineering | Method of Shipment FED-X | Bill of Lading/Air Bill No. |
| Protocol CAS. SOP.003 | | Offsite Property No. |

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

| Bottle No. | Customer Number | Matrix | Date | Time | Location | No/Type Container | Sample Analysis | Preservative; Packing |
|---|---|---|---|---|---|---|---|---|
| 99A6333-001.002 | NA | SOLID | 4/26/99 | 1015 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] | None 4 degrees C |
| 99A6333-002.002 | ↓ | ↓ | ↓ | 1022 | Bldg 709 Tower | 125-G P/G | SS08B008 (TCLP Metals for UTS) [Rush] | None 4 degrees C |

DA 4/26/99

| Relinquished By: | Date/Time | Received By: | Date/Time | Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|---|---|---|---|
| J. Wingard CAS | 4/26/99 1050 | Fridge #2 T891R CAS | 4/26/99 1050 | Fridge #2 T891R CAS | 4-26-99/1400 | J. Miller CAS | 4-26-99/1400 |
| J. Miller | 4-26-99/1500 | Fed Ex | | | | | |
| | | B. Francis | 4/29/99 | | | | |
| | | | | | | | |

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

10

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# Appendix C.2.1.2

# Bldg. 709 RLC Chemical Data

# Metals

# Sample Locations

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# Building 709 - Concrete Bottom Floor & Walls




Rad Engineering: _____ Date

Peer Review: _____ Date

Group A RLCP Survey

COPY

# Appendix C.2.1.3

# Bldg. 709 RLC Chemical Data

# Metals

# Laboratory Report

# Case Narrative for
# KHCO
## SDG 99A6333.002

COPY

**Metals Analysis by ICP**
**Lithium Analysis by ICP-MS**
**Mercury by CVAA**

**Sample Analysis**
The following samples were prepared following 3005A and analyzed for metals using the environmental protection agency (EPA) methods 6010A, 6020, and 7470 that include the use of inductively coupled plasma (ICP), inductively coupled plasma mass spectrometer (ICP-MS), and cold vapor atomic absorption (CVAA), respectively:

| Laboratory Identification | Sample Description |
|---|---|
| 9904873-01 | 99A6333-003.002 |
| 9904873-02 | 99A6333-004.002 |
| 9904873-03 | 99A6333-005.002 |
| 9904873-05 | 99A6333-006.002 |
| 9904873-06 | 99A6333-007.002 |
| 9904873-07 | 99A6333-008.002 |
| 9904873-08 | 99A6333-009.002 |
| 9904873-09 | 99A6333-010.002 |
| 9904873-10 | 99A6333-011.002 |
| 9904873-11 | 99A6333-013.002 |
| 9904873-13 | 99A6333-001.002 |
| 9904873-14 | 99A6333-002.002 |
| QC607278-ICP | Preparation Blank (PBW) |
| QC607279-ICP | TCLP Preparation Blank (PBT) |
| QC607280-ICP | TCLP Laboratory Control Sample (LCST) |
| QC607281-ICP | 99A6333-003.002D-Sample Duplicate (DUP) |
| QC607282-ICP | 99A6333-003.002L-Serial Dilution (SD) |
| QC607283-ICP | 99A6333-003.002S-Matrix Spike (MS) |
| QC608658-ICPMS | Preparation Blank (PBW) |
| QC608659-ICPMS | TCLP Preparation Blank #1 (PBT1) |
| QC608660-ICPMS | TCLP Preparation Blank #2 (PBT2) |
| QC608661-ICPMS | Laboratory Control Sample (LCSW) |
| QC608662-ICPMS | 99A6333-002.002L-Serial Dilution (SD) |
| QC608663-ICPMS | 99A6333-002.002D-Sample Duplicate (DUP) |
| QC608664-ICPMS | 99A6333-002.002S-Matrix Spike (MS) |
| QC607301-CVAA | Preparation Blank (PB) |
| QC607302-CVAA | Laboratory Control Sample (LCSW) |
| QC607305-CVAA | 99A6333-003.002S-Matrix Spike (MS) |
| QC607306-CVAA | 99A6333-003.002D-Sample Duplicate (DUP) |
| QC607664-CVAA | TCLP Preparation Blank (PBT) |

**System Configurations**
The ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.

A Hewlett Packard 4500 Series inductively coupled plasma mass spectrometer (ICP-MS) was employed to analyze the samples. It is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and electron multiplier detector. Internal standards of scandium, yttrium, indium, and lutetium were utilized to cover the mass spectrum. Operating conditions were set at 1300W power and argon flows of 16 L/min, 1.0 L/min, and 1.0 L/min for the plasma, auxiliary, and carrier gases respectively.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

**Sample Preparation**
All samples were prepared in accordance with appropriate protocol.

**Instrument Calibration**
The instruments were calibrated per instrument manufacturer's specifications and EPA methodology. However, the recoveries for mercury, arsenic and magnesium were above the advisory limits in the CRDL. The ICS-AB standards were above the upper advisory limit for sodium and potassium.

**Holding Time**
All samples were analyzed within the required holding times.

**Blanks**
The preparation blanks met all quality control criteria or all elements except manganese. The TCLP blank was above the CRDL for selenium and sodium. CCV1 and CCB5 were above the CRDL for magnesium and sodium, respectively. All sample concentrations were greater than 10X the blanks' concentration or below the CRDL.

**Spike Analyses**
Sample 99A6333-003.002 was designated as the quality control sample for the ICP and CVAA batches. Sample 99A6333-002.002 was designated as the quality control sample for the ICPMS batch. Each batch included a matrix spike (MS) and a sample duplicate (DUP). The matrix spike met the recommended quality control criteria (%R between

75% and 125%) for all elements except potassium. The sample duplicates met the recommended quality control criteria (RPD of 20%).

COPY

**Laboratory Control Samples**
The laboratory control samples (LCS) met the recommended acceptance criteria for percent recovery (%R) and relative percent difference (RPD) for all elements.

**Sample Dilutions**
All samples were analyzed undiluted.

**Serial Dilution Analysis**
ICP and ICP-MS serial dilutions (SD) were analyzed on samples 99A6333-002.002 and 99A6333-003.002. Quality control criteria of ≤10% were met for all analytes with sample concentration greater than 50X the IDL, with the exception of potassium, as indicated by the "E" qualifier.

**Non Conformance Reports**
Nonconformance Reports were not issued for this sample delivery group (SDG).

**General Comments**
The flagging conventions demonstrated in this package are assigned based on IDL and CRDL values. All qualifiers assigned for this SDG have been determined after both IDL and CRDL values have been corrected for preparation and dilution factors except the serial dilution analysis.

This case narrative was reviewed by: [illegible]

Date: 5/25/01

# Case Narrative for
# KHCO
## SDG 99A6333.002

COPY

**Metals Analysis by ICP**
**Lithium Analysis by ICP-MS**
**Mercury by CVAA**

**Sample Analysis**
The following samples were prepared following 3005A and analyzed for metals using the environmental protection agency (EPA) methods 6010A, 6020, and 7470 that include the use of inductively coupled plasma (ICP), inductively coupled plasma mass spectrometer (ICP-MS), and cold vapor atomic absorption (CVAA), respectively:

| Laboratory Identification | Sample Description |
|---|---|
| 9904873-01 | 99A6333-003.002 |
| 9904873-02 | 99A6333-004.002 |
| 9904873-03 | 99A6333-005.002 |
| 9904873-05 | 99A6333-006.002 |
| 9904873-06 | 99A6333-007.002 |
| 9904873-07 | 99A6333-008.002 |
| 9904873-08 | 99A6333-009.002 |
| 9904873-09 | 99A6333-010.002 |
| 9904873-10 | 99A6333-011.002 |
| 9904873-11 | 99A6333-013.002 |
| 9904873-13 | 99A6333-001.002 |
| 9904873-14 | 99A6333-002.002 |
| QC607278-ICP | Preparation Blank (PBW) |
| QC607279-ICP | TCLP Preparation Blank (PBT) |
| QC607280-ICP | TCLP Laboratory Control Sample (LCST) |
| QC607281-ICP | 99A6333-003.002D-Sample Duplicate (DUP) |
| QC607282-ICP | 99A6333-003.002L-Serial Dilution (SD) |
| QC607283-ICP | 99A6333-003.002S-Matrix Spike (MS) |
| QC608658-ICPMS | Preparation Blank (PBW) |
| QC608659-ICPMS | TCLP Preparation Blank #1 (PBT1) |
| QC608660-ICPMS | TCLP Preparation Blank #2 (PBT2) |
| QC608661-ICPMS | Laboratory Control Sample (LCSW) |
| QC608662-ICPMS | 99A6333-002.002L-Serial Dilution (SD) |
| QC608663-ICPMS | 99A6333-002.002D-Sample Duplicate (DUP) |
| QC608664-ICPMS | 99A6333-002.002S-Matrix Spike (MS) |
| QC607301-CVAA | Preparation Blank (PB) |
| QC607302-CVAA | Laboratory Control Sample (LCSW) |
| QC607305-CVAA | 99A6333-003.002S-Matrix Spike (MS) |
| QC607306-CVAA | 99A6333-003.002D-Sample Duplicate (DUP) |
| QC607664-CVAA | TCLP Preparation Blank (PBT) |

**System Configurations**
The ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.

A Hewlett Packard 4500 Series inductively coupled plasma mass spectrometer (ICP-MS) was employed to analyze the samples. It is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and electron multiplier detector. Internal standards of scandium, yttrium, indium, and lutetium were utilized to cover the mass spectrum. Operating conditions were set at 1300W power and argon flows of 16 L/min, 1.0 L/min, and 1.0 L/min for the plasma, auxiliary, and carrier gases respectively.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

**Sample Preparation**
All samples were prepared in accordance with appropriate protocol.

**Instrument Calibration**
The instruments were calibrated per instrument manufacturer's specifications and EPA methodology. However, the recoveries for mercury, arsenic and magnesium were above the advisory limits in the CRDL. The ICS-AB standards were above the upper advisory limit for sodium and potassium.

**Holding Time**
All samples were analyzed within the required holding times.

**Blanks**
The preparation blanks met all quality control criteria or all elements except manganese. The TCLP blank was above the CRDL for selenium and sodium. CCV1 and CCB5 were above the CRDL for magnesium and sodium, respectively. All sample concentrations were greater than 10X the blanks' concentration or below the CRDL.

**Spike Analyses**
Sample 99A6333-003.002 was designated as the quality control sample for the ICP and CVAA batches. Sample 99A6333-002.002 was designated as the quality control sample for the ICPMS batch. Each batch included a matrix spike (MS) and a sample duplicate (DUP). The matrix spike met the recommended quality control criteria (%R between

75% and 125%) for all elements except potassium. The sample duplicates met the recommended quality control criteria (RPD of 20%).

COPY

**Laboratory Control Samples**
The laboratory control samples (LCS) met the recommended acceptance criteria for percent recovery (%R) and relative percent difference (RPD) for all elements.

**Sample Dilutions**
All samples were analyzed undiluted.

**Serial Dilution Analysis**
ICP and ICP-MS serial dilutions (SD) were analyzed on samples 99A6333-002.002 and 99A6333-003.002. Quality control criteria of ≤10% were met for all analytes with sample concentration greater than 50X the IDL, with the exception of potassium, as indicated by the "E" qualifier.

**Non Conformance Reports**
Nonconformance Reports were not issued for this sample delivery group (SDG).

**General Comments**
The flagging conventions demonstrated in this package are assigned based on IDL and CRDL values. All qualifiers assigned for this SDG have been determined after both IDL and CRDL values have been corrected for preparation and dilution factors except the serial dilution analysis.

This case narrative was reviewed by: [signature]

Date: 5/25/11

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# Case Narrative for KHCO
## SDG 99A6333.002A

**Metals Analysis by ICP**
**Lithium Analysis by ICP-MS**
**Mercury by CVAA**

### Sample Analysis

The following samples were prepared following 3005A and analyzed for metals using the SW-846 methods 6010A, 6020, and 7470 that include the use of inductively coupled plasma (ICP), inductively coupled plasma mass spectrometer (ICP-MS), and cold vapor atomic absorption (CVAA), respectively:

| Laboratory Identification | Sample Description |
|---|---|
| 9904873-04 | 99A6333-014.002 |
| 9904873-12 | 99A6333-015.002 |
| QC606634-ICP | Preparation Blank (PBW) |
| QC606635-ICP | Laboratory Control Sample (LCSW) |
| QC606639-ICP | 99A6333-015.002D-Sample Duplicate (DUP) |
| QC606640-ICP | 99A6333-015.002L-Serial Dilution (SD) |
| QC606641-ICP | 99A6333-015.002S-Matrix Spike (MS) |
| QC606830-ICPMS | Preparation Blank (PBW) |
| QC606831-ICPMS | 99A6333-015.002L-Serial Dilution (SD) |
| QC606832-ICPMS | 99A6333-015.002S-Matrix Spike (MS) |
| QC606833-ICPMS | 99A6333-015.002D-Sample Duplicate (DUP) |
| QC606834-ICPMS | Laboratory Control Sample (LCSW) |
| QC607202-CVAA | Preparation Blank (PBW) |
| QC607203-CVAA | Laboratory Control Sample (LCSW) |
| QC607204-CVAA | 99A6333-015.002S-Matrix Spike (MS) |
| QC607205-CVAA | 99A6333-015.002D-Sample Duplicate (DUP) |

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### System Configurations

The ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.

A Hewlett Packard 4500 Series inductively coupled plasma mass spectrometer (ICP-MS) was employed to analyze the samples. It is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and electron multiplier detector. Internal standards of scandium, yttrium, indium, and lutetium were utilized to cover the mass spectrum. Operating conditions were set at 1300W power and argon flows of 16 L/min, 1.0 L/min, and 1.0 L/min for the plasma, auxiliary, and carrier gases respectively.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

**Sample Preparation**
All samples were prepared in accordance with appropriate protocol.

**Instrument Calibration**
The instruments were calibrated per instrument manufacturer's specifications and EPA methodology. However, the recovery for mercury was above the advisory limits and the recovery for thallium was below the advisory limits in the CRDL. The ICS-AB2 and 3 standards were above the upper advisory limit for sodium and potassium.

**Holding Time**
All samples were analyzed within the required holding times.

**Blanks**
The preparation blanks met all quality control criteria.

**Spike Analyses**
Sample 99A6333-015.002 was designated as the quality control sample for the ICP, ICPMS, and CVAA batches. Each batch included a matrix spike (MS) and a sample duplicate (DUP). The matrix spike met the recommended quality control criteria (%R between 75% and 125%) for all elements. The sample duplicates met the recommended quality control criteria (RPD of 20%).

**Laboratory Control Samples**
The laboratory control samples (LCS) met the recommended acceptance criteria for percent recovery (%R).

**Sample Dilutions**
All samples were analyzed undiluted.

**Serial Dilution Analysis**
ICP and ICP-MS serial dilutions (SD) were analyzed on sample 99A6333-015.002. Quality control criteria of ≤10% were met for all analytes with sample concentration greater than 50X the IDL.

**Non Conformance Reports**
Nonconformance Reports were not issued for this sample delivery group (SDG).

**General Comments**
The flagging conventions demonstrated in this package are assigned based on IDL and CRDL values. All qualifiers assigned for this SDG have been determined after both IDL and CRDL values have been corrected for preparation and dilution factors except the serial dilution analysis.

This case narrative was reviewed by: [signature]

Date: 5/25/99

FAXED 6/2/99

RECEIVED JUN 1999

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# Case Narrative for KHCO

**SDG 99A6333.002A**

**Metals Analysis by ICP**
**Lithium Analysis by ICP-MS**
**Mercury by CVAA**

## Sample Analysis

The following samples were prepared following 3005A and analyzed for metals using the SW-846 methods 6010A, 6020, and 7470 that include the use of inductively coupled plasma (ICP), inductively coupled plasma mass spectrometer (ICP-MS), and cold vapor atomic absorption (CVAA), respectively:

| Laboratory Identification | Sample Description |
|---|---|
| 9904873-04 | 99A6333-014.002 |
| 9904873-12 | 99A6333-015.002 |
| QC606634-ICP | Preparation Blank (PBW) |
| QC606635-ICP | Laboratory Control Sample (LCSW) |
| QC606639-ICP | 99A6333-015.002D-Sample Duplicate (DUP) |
| QC606640-ICP | 99A6333-015.002L-Serial Dilution (SD) |
| QC606641-ICP | 99A6333-015.002S-Matrix Spike (MS) |
| QC606830-ICPMS | Preparation Blank (PBW) |
| QC606831-ICPMS | 99A6333-015.002L-Serial Dilution (SD) |
| QC606832-ICPMS | 99A6333-015.002S-Matrix Spike (MS) |
| QC606833-ICPMS | 99A6333-015.002D-Sample Duplicate (DUP) |
| QC606834-ICPMS | Laboratory Control Sample (LCSW) |
| QC607202-CVAA | Preparation Blank (PBW) |
| QC607203-CVAA | Laboratory Control Sample (LCSW) |
| QC607204-CVAA | 99A6333-015.002S-Matrix Spike (MS) |
| QC607205-CVAA | 99A6333-015.002D-Sample Duplicate (DUP) |

ENTERED

## System Configurations

The ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP were set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.



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A Hewlett Packard 4500 Series inductively coupled plasma mass spectrometer (ICP-MS) was employed to analyze the samples. It is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and electron multiplier detector. Internal standards of scandium, yttrium, indium, and lutetium were utilized to cover the mass spectrum. Operating conditions were set at 1300W power and argon flows of 16 L/min, 1.0 L/min, and 1.0 L/min for the plasma, auxiliary, and carrier gases respectively.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

**Sample Preparation**
All samples were prepared in accordance with appropriate protocol.

**Instrument Calibration**
The instruments were calibrated per instrument manufacturer's specifications and EPA methodology. However, the recovery for mercury was above the advisory limits and the recovery for thallium was below the advisory limits in the CRDL. The ICS-AB2 and 3 standards were above the upper advisory limit for sodium and potassium.

**Holding Time**
All samples were analyzed within the required holding times.

**Blanks**
The preparation blanks met all quality control criteria.

**Spike Analyses**
Sample 99A6333-015.002 was designated as the quality control sample for the ICP, ICPMS, and CVAA batches. Each batch included a matrix spike (MS) and a sample duplicate (DUP). The matrix spike met the recommended quality control criteria (%R between 75% and 125%) for all elements. The sample duplicates met the recommended quality control criteria (RPD of 20%).

**Laboratory Control Samples**
The laboratory control samples (LCS) met the recommended acceptance criteria for percent recovery (%R).

**Sample Dilutions**
All samples were analyzed undiluted.

**Serial Dilution Analysis**
ICP and ICP-MS serial dilutions (SD) were analyzed on sample 99A6333-015.002. Quality control criteria of $\leq$10% were met for all analytes with sample concentration greater than 50X the IDL.

**Non Conformance Reports**
Nonconformance Reports were not issued for this sample delivery group (SDG).

**General Comments**
The flagging conventions demonstrated in this package are assigned based on IDL and CRDL values. All qualifiers assigned for this SDG have been determined after both IDL and CRDL values have been corrected for preparation and dilution factors except the serial dilution analysis.

This case narrative was reviewed by: [signature]

Date: 5/25/99

# Appendix C.2.1.4

# Bldg. 709 RLC Chemical Data

# Metals

# Laboratory Data

# Form 1: Inorganic Analyses Data Sheet

G No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-01 Client ID: [redacted]

Contract: KHCO00497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 1030 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 165 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 21000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 1800 | µg/L | | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 3080 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 5.7 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 3230 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 297 | µg/L | B | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 2600 | µg/L | B | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 298 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1420000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 114 | µg/L | B | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 63.8 | µg/L | B | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 46.5 | µg/L | U | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

304

# Form 1: Inorganic Analyses Data Sheet

DG No.: 99A6333.002 **Method Type:** Total Metals

**Sample ID:** 9904873-02 **Client ID:** [redacted]

**Contract:** KHC000497 **Lab Code:** GEL **Case No.:** **SAS No.:**

**Matrix:** TCLP **Date Received:** 4/28/99 **Level:** LOW

**% Solids:** 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 808 | µg/L | B | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 1590 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 125 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 67900 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 3060 | µg/L | | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 6800 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 4.9 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 9630 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 347 | µg/L | B | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 2540 | µg/L | U | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 191 | µg/L | U | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1390000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 378 | µg/L | B | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 130 | µg/L | B | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

**Color Before:** **Clarity Before:** **Texture:**

**Color After:** **Clarity After:** **Artifacts:**

Comments:



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# Form 1: Inorganic Analyses Data Sheet

DG No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-03 Client ID: [redacted]

Contract: KHCO00497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 1910 | µg/L | B | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 2330 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 115 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 79200 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 3960 | µg/L | | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 10700 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 6.7 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 11200 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 483 | µg/L | B | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 2540 | µg/L | U | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 191 | µg/L | U | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1420000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 468 | µg/L | B | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 387 | µg/L | B | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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# Form 1: Inorganic Analyses Data Sheet

G No.: 99A6333.002 | Method Type: Total Metals

Sample ID: 9904873-05 | Client ID: [redacted]

Contract: KHCO00497 | Lab Code: GEL | Case No.: | SAS No.:

Matrix: TCLP | Date Received: 4/28/99 | Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 1570 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 68.4 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 394000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 42.1 | µg/L | U | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 509 | µg/L | B | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 17.7 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 32900 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 4690 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 26500 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 198 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1380000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 1780 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 8370 | µg/L | | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

**Color Before:** | **Clarity Before:** | **Texture:**

**Color After:** | **Clarity After:** | **Artifacts:**

Comments:



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# Form 1: Inorganic Analyses Data Sheet

DG No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-06 Client ID: [redacted]

Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 1940 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 161 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 439000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 42.1 | µg/L | U | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 732 | µg/L | B | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 34.0 | µg/L | | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 35700 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 2500 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 44000 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 191 | µg/L | U | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1400000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 2210 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 8060 | µg/L | | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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# Form 1: Inorganic Analyses Data Sheet

G No.: 99A6333.002 **Method Type:** Total Metals

**Sample ID:** 9904873-07 **Client ID:** [redacted]

**Contract:** KHCO00497 **Lab Code:** GEL **Case No.:** **SAS No.:**

**Matrix:** TCLP **Date Received:** 4/28/99 **Level:** LOW

**% Solids:** 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 1580 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 178 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 281000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 48.5 | µg/L | B | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 955 | µg/L | B | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 17.1 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 20400 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 3600 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 26500 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 228 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1380000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 1370 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 3010 | µg/L | | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

**Color Before:** **Clarity Before:** **Texture:**

**Color After:** **Clarity After:** **Artifacts:**

Comments:



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# Form 1: Inorganic Analyses Data Sheet

DG No.: 99A6333.002 | Method Type: Total Metals

Sample ID: 9904873-08 | Client ID [redacted]

Contract: KHCO00497 | Lab Code: GEL | Case No.: | SAS No.:

Matrix: TCLP | Date Received: 4/28/99 | Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 780 | µg/L | B | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 3660 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 132 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 97.3 | µg/L | B | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 269000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 92.8 | µg/L | B | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 1100 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 1420 | µg/L | B | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 27.2 | µg/L | | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 20200 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 2610 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 48600 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 221 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1440000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 1410 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 4820 | µg/L | | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: | Clarity Before: | Texture:

Color After: | Clarity After: | Artifacts:

Comments:

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# Form 1: Inorganic Analyses Data Sheet

DG No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-09 Client I[redacted]

Contract: KHCO00497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 3120 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 160 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 77.2 | µg/L | B | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 371000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 68.5 | µg/L | B | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 781 | µg/L | B | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 29.3 | µg/L | | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 19700 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 3390 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 38300 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 210 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1390000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 1750 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 4620 | µg/L | | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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# Form 1: Inorganic Analyses Data Sheet

G No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-10 Client ID: [redacted]

Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 3740 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 298 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 478000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 151 | µg/L | B | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 1580 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 29.3 | µg/L | | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 45200 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 5060 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 51100 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 266 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1370000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 2410 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 1770 | µg/L | B | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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# Form 1: Inorganic Analyses Data Sheet

G No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-11 Client ID [redacted]

Contract: KHCO00497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 3460 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 271 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 460000 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 151 | µg/L | B | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 1680 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 1200 | µg/L | B | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 27.1 | µg/L | | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 46700 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 5270 | µg/L | | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 54300 | µg/L | | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 257 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1340000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 2320 | µg/L | | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 66.2 | µg/L | B | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 1800 | µg/L | B | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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# Form 1: Inorganic Analyses Data Sheet

DG No.: 99A6333.002 Method Type: Total Metals

Sample ID: 9904873-13 Client ID: [redacted]

Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Matrix: TCLP Date Received: 4/29/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 740 | µg/L | U | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 1790 | µg/L | | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 113 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 67300 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 3290 | µg/L | | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 3990 | µg/L | | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 3.0 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 10700 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 267 | µg/L | B | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 2540 | µg/L | U | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 211 | µg/L | B | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1350000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 382 | µg/L | B | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 206 | µg/L | B | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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# Form 1: Inorganic Analyses Data Sheet

SDG No.: 99A6333.002 | Method Type: Total Metals

Sample ID: 9904873-14 | Client ID: [redacted]

Contract: KHC000497 | Lab Code: GEL | Case No.: | SAS No.:

Matrix: TCLP | Date Received: 4/29/99 | Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 794 | µg/L | B | | P | 740 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-36-0 | Antimony | 187 | µg/L | U | | P | 187 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-38-2 | Arsenic | 266 | µg/L | U | | P | 266 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-39-3 | Barium | 268 | µg/L | B | | P | 12.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-41-7 | Beryllium | 13.9 | µg/L | U | | P | 13.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-43-9 | Cadmium | 33.9 | µg/L | U | | P | 33.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-70-2 | Calcium | 58500 | µg/L | | | P | 778 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-47-3 | Chromium | 42.1 | µg/L | U | | P | 42.1 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-48-4 | Cobalt | 44.3 | µg/L | U | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-50-8 | Copper | 252 | µg/L | B | | P | 74.0 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-89-6 | Iron | 843 | µg/L | U | | P | 843 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-92-1 | Lead | 129 | µg/L | U | | P | 129 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-93-2 | Lithium | 2.0 | µg/L | B | | P | 0.24 | HP ICPMS | may0599.20 |
| 7439-95-4 | Magnesium | 8160 | µg/L | | | P | 524 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-96-5 | Manganese | 189 | µg/L | B | | P | 44.3 | TJA61 Trace2 ICPAES | 990504-4 |
| 7439-97-6 | Mercury | 1.2 | µg/L | U | | AV | 1.2 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 91.2 | µg/L | U | | P | 91.2 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-02-0 | Nickel | 103 | µg/L | U | | P | 103 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-09-7 | Potassium | 2540 | µg/L | U | EN | P | 2,540 | TJA61 Trace2 ICPAES | 990504-4 |
| 7782-49-2 | Selenium | 191 | µg/L | U | | P | 191 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-22-4 | Silver | 88.8 | µg/L | U | | P | 88.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-23-5 | Sodium | 1330000 | µg/L | | | P | 7,300 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-24-6 | Strontium | 380 | µg/L | B | | P | 11.9 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-28-0 | Thallium | 563 | µg/L | U | | P | 563 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-31-5 | Tin | 396 | µg/L | U | | P | 396 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-61-1 | Uranium | 2270 | µg/L | U | | P | 2,270 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-62-2 | Vanadium | 46.8 | µg/L | U | | P | 46.8 | TJA61 Trace2 ICPAES | 990504-4 |
| 7440-66-6 | Zinc | 244 | µg/L | B | | P | 46.5 | TJA61 Trace2 ICPAES | 990504-4 |

**Color Before:** | **Clarity Before:** | **Texture:**

**Color After:** | **Clarity After:** | **Artifacts:**

Comments:



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## Form 3b: Preparation Blank Summary

DG No.: 99A6333.002
Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Preparation Blank Matrix: TCLP

| Sample ID | Analyte | Result (µg/L) | Acceptance Window | Conc Qual | M | IDL | CRDL |
|---|---|---|---|---|---|---|---|
| QC607278 | | | | | | | |
| | Aluminum | 19.004 | +/-50.000 | B | P | 7.402 | 50.000 |
| | Antimony | 3.272 | +/-10.000 | B | P | 1.873 | 10.000 |
| | Arsenic | 2.660 | +/-10.000 | U | P | 2.660 | 10.000 |
| | Barium | 0.172 | +/-10.000 | B | P | 0.120 | 10.000 |
| | Beryllium | 0.139 | +/-5.000 | U | P | 0.139 | 5.000 |
| | Cadmium | 0.339 | +/-5.000 | U | P | 0.339 | 5.000 |
| | Calcium | 18.512 | +/-100.000 | B | P | 7.780 | 100.000 |
| | Chromium | 0.607 | +/-10.000 | B | P | 0.421 | 10.000 |
| | Cobalt | 0.443 | +/-10.000 | U | P | 0.443 | 10.000 |
| | Copper | 0.740 | +/-10.000 | U | P | 0.740 | 10.000 |
| | Iron | 8.425 | +/-50.000 | U | P | 8.425 | 50.000 |
| | Lead | 1.286 | +/-5.000 | U | P | 1.286 | 5.000 |
| | Magnesium | 8.004 | +/-10.000 | B | P | 5.235 | 10.000 |
| | Manganese | 25.634 | +/-10.000 | | P | 0.443 | 10.000 |
| | Molybdenum | 0.912 | +/-200.000 | U | P | 0.912 | 200.000 |
| | Nickel | 1.030 | +/-10.000 | U | P | 1.030 | 10.000 |
| | Potassium | 28.632 | +/-100.000 | B | P | 25.365 | 100.000 |
| | Selenium | 1.908 | +/-5.000 | U | P | 1.908 | 5.000 |
| | Silver | 0.888 | +/-10.000 | U | P | 0.888 | 10.000 |
| | Sodium | 72.959 | +/-100.000 | U | P | 72.959 | 100.000 |
| | Strontium | 0.119 | +/-10.000 | U | P | 0.119 | 10.000 |
| | Thallium | 5.635 | +/-10.000 | U | P | 5.635 | 10.000 |
| | Tin | 3.955 | +/-10.000 | U | P | 3.955 | 10.000 |
| | Uranium | 22.682 | +/-50.000 | U | P | 22.682 | 50.000 |
| | Vanadium | 0.468 | +/-10.000 | U | P | 0.468 | 10.000 |
| | Zinc | 0.656 | +/-20.000 | B | P | 0.465 | 20.000 |
| QC607279 | | | | | | | |
| | Aluminum | -20.540 | +/-50.000 | B | P | 7.402 | 50.000 |
| | Antimony | 1.873 | +/-10.000 | U | P | 1.873 | 10.000 |
| | Arsenic | 5.338 | +/-10.000 | B | P | 2.660 | 10.000 |
| | Barium | 0.150 | +/-10.000 | B | P | 0.120 | 10.000 |
| | Beryllium | 0.139 | +/-5.000 | U | P | 0.139 | 5.000 |
| | Cadmium | 0.339 | +/-5.000 | U | P | 0.339 | 5.000 |
| | Calcium | 14.630 | +/-100.000 | B | P | 7.780 | 100.000 |
| | Chromium | 0.510 | +/-10.000 | B | P | 0.421 | 10.000 |
| | Cobalt | -0.826 | +/-10.000 | B | P | 0.443 | 10.000 |
| | Copper | 0.740 | +/-10.000 | U | P | 0.740 | 10.000 |
| | Iron | 10.503 | +/-50.000 | B | P | 8.425 | 50.000 |
| | Lead | 1.286 | +/-5.000 | U | P | 1.286 | 5.000 |
| | Magnesium | 5.235 | +/-10.000 | U | P | 5.235 | 10.000 |



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# Form 7: Laboratory Control Sample Summary

SDG No.: 99A6333.002
Contract: KHCO00497 Lab Code: GEL Case No.: SAS No.:
Solid LCS Source:
Aqueous LCS Source:

Instrument ID: TJA61 Trace2 ICPAES

| Sample ID | Analyte | Units | True Value | Result | C | % Recovery | Acceptance Limits %R | M |
|---|---|---|---|---|---|---|---|---|
| QC607280 | | | | | | | | |
| | Aluminum | µg/L | 5000.0 | 5071.3 | | 101.4 | 80.0 - 120.0 | P |
| | Antimony | µg/L | 2000.0 | 2023.8 | | 101.2 | 80.0 - 120.0 | P |
| | Arsenic | µg/L | 5000.0 | 4985.8 | | 99.7 | 80.0 - 120.0 | P |
| | Barium | µg/L | 10000.0 | 9663.0 | | 96.6 | 80.0 - 120.0 | P |
| | Beryllium | µg/L | 2000.0 | 1995.4 | | 99.8 | 80.0 - 120.0 | P |
| | Cadmium | µg/L | 1000.0 | 1017.7 | | 101.8 | 80.0 - 120.0 | P |
| | Calcium | µg/L | 5000.0 | 5204.7 | | 104.1 | 80.0 - 120.0 | P |
| | Chromium | µg/L | 5000.0 | 4999.1 | | 100.0 | 80.0 - 120.0 | P |
| | Cobalt | µg/L | 2000.0 | 2016.5 | | 100.8 | 80.0 - 120.0 | P |
| | Copper | µg/L | 2000.0 | 2012.3 | | 100.6 | 80.0 - 120.0 | P |
| | Iron | µg/L | 2000.0 | 2034.2 | | 101.7 | 80.0 - 120.0 | P |
| | Lead | µg/L | 5000.0 | 5124.2 | | 102.5 | 80.0 - 120.0 | P |
| | Magnesium | µg/L | 2000.0 | 2022.5 | | 101.1 | 80.0 - 120.0 | P |
| | Manganese | µg/L | 2000.0 | 2023.8 | | 101.2 | 80.0 - 120.0 | P |
| | Molybdenum | µg/L | 2000.0 | 2030.5 | | 101.5 | 90.0 - 110.0 | P |
| | Nickel | µg/L | 2000.0 | 2022.3 | | 101.1 | 80.0 - 120.0 | P |
| | Potassium | µg/L | 5000.0 | 4835.0 | | 96.7 | 80.0 - 120.0 | P |
| | Selenium | µg/L | 1000.0 | 939.9 | | 94.0 | 80.0 - 120.0 | P |
| | Silver | µg/L | 500.0 | 505.7 | | 101.1 | 80.0 - 120.0 | P |
| | Sodium | | | | | | | |
| | Strontium | µg/L | 1000.0 | 998.9 | | 99.9 | 80.0 - 120.0 | P |
| | Thallium | µg/L | 2000.0 | 2019.3 | | 101.0 | 100.0 - 100.0 | P |
| | Tin | µg/L | 2000.0 | 2013.9 | | 100.7 | 80.0 - 120.0 | P |
| | Uranium | µg/L | 1000.0 | 984.7 | | 98.5 | 77.3 - 122.7 | P |
| | Vanadium | µg/L | 2000.0 | 2006.2 | | 100.3 | 80.0 - 120.0 | P |
| | Zinc | µg/L | 2000.0 | 1967.6 | | 98.4 | 80.0 - 120.0 | P |
| QC607302 | | | | | | | | |
| | Mercury | µg/L | 20.0 | 20.0 | B | 99.9 | 80.0 - 120.0 | AV |
| QC608661 | | | | | | | | |
| | Lithium | µg/L | 1000.0 | 1124.0 | | 112.4 | 80.0 - 120.0 | P |



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# Form 3b: Preparation Blank Summary

SDG No.: 99A6333.002
Contract: KHCC00497 Lab Code: GEL Case No.: SAS No.:

Preparation Blank Matrix: TCLP

| Sample ID | Analyte | Result (µg/L) | Acceptance Window | Conc Qual | M | IDL | CRDL |
|---|---|---|---|---|---|---|---|
| QC607279 | | | | | | | |
| | Manganese | 1.868 | +/-10.000 | B | P | 0.443 | 10.000 |
| | Molybdenum | -2.628 | +/-200.000 | B | P | 0.912 | 200.000 |
| | Nickel | 1.951 | +/-10.000 | B | P | 1.030 | 10.000 |
| | Potassium | 77.055 | +/-100.000 | B | P | 25.365 | 100.000 |
| | Selenium | 6.287 | +/-5.000 | | P | 1.908 | 5.000 |
| | Silver | 0.888 | +/-10.000 | U | P | 0.888 | 10.000 |
| | Sodium | 38,538.770 | +/-10000.000 | | P | 295.940 | 10000.000 |
| | Strontium | 0.287 | +/-10.000 | B | P | 0.119 | 10.000 |
| | Thallium | -5.739 | +/-10.000 | B | P | 5.635 | 10.000 |
| | Tin | 3.955 | +/-10.000 | U | P | 3.955 | 10.000 |
| | Uranium | 22.682 | +/-50.000 | U | P | 22.682 | 50.000 |
| | Vanadium | 0.468 | +/-10.000 | U | P | 0.468 | 10.000 |
| | Zinc | 1.023 | +/-20.000 | B | P | 0.465 | 20.000 |
| QC607301 | | | | | | | |
| | Mercury | 1.158 | +/-200.000 | U | AV | 1.158 | 200.000 |
| QC607664 | | | | | | | |
| | Mercury | 1.158 | +/-200.000 | U | AV | 1.158 | 200.000 |
| QC608658 | | | | | | | |
| | Lithium | 0.846 | +/-25.000 | B | P | 0.239 | 25.000 |
| QC608659 | | | | | | | |
| | Lithium | 1.298 | +/-25.000 | B | P | 0.239 | 25.000 |
| QC608660 | | | | | | | |
| | Lithium | 0.953 | +/-25.000 | B | P | 0.239 | 25.000 |

# Form 1: Inorganic Analyses Data Sheet

SDG No.: 99A6333.002A

Method Type: Total Metals

Sample ID: 9904873-04

Client ID: 99A6333-014.002

Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 40.2 | µg/L | B | | P | 7.4 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-36-0 | Antimony | 1.9 | µg/L | U | | P | 1.9 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-38-2 | Arsenic | 2.7 | µg/L | U | | P | 2.7 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-39-3 | Barium | 0.92 | µg/L | B | | P | 0.12 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-41-7 | Beryllium | 0.40 | µg/L | B | | P | 0.14 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-43-9 | Cadmium | 0.67 | µg/L | B | | P | 0.34 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-70-2 | Calcium | 541 | µg/L | B | | P | 7.8 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-47-3 | Chromium | 1.4 | µg/L | B | | P | 0.42 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-48-4 | Cobalt | 0.44 | µg/L | U | | P | 0.44 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-50-8 | Copper | 5.0 | µg/L | B | | P | 0.74 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-89-6 | Iron | 41.6 | µg/L | B | | P | 8.4 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-92-1 | Lead | 1.3 | µg/L | U | | P | 1.3 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-93-2 | Lithium | 0.24 | µg/L | U | | P | 0.24 | HP ICPMS | may1199.09 |
| 7439-95-4 | Magnesium | 39.7 | µg/L | B | | P | 5.2 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-96-5 | Manganese | 1.5 | µg/L | B | | P | 0.44 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-97-6 | Mercury | 0.12 | µg/L | U | | AV | 0.12 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 0.91 | µg/L | U | | P | 0.91 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-02-0 | Nickel | 1.0 | µg/L | U | | P | 1.0 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-09-7 | Potassium | 113 | µg/L | B | | P | 25.4 | TJA61 Trace2 ICPAES | 990505-1 |
| 7782-49-2 | Selenium | 1.9 | µg/L | U | | P | 1.9 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-22-4 | Silver | 0.89 | µg/L | U | | P | 0.89 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-23-5 | Sodium | 437 | µg/L | B | | P | 73.0 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-24-6 | Strontium | 1.1 | µg/L | B | | P | 0.12 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-28-0 | Thallium | 5.6 | µg/L | U | | P | 5.6 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-31-5 | Tin | 4.0 | µg/L | U | | P | 4.0 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-61-1 | Uranium | 22.7 | µg/L | U | | P | 22.7 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-62-2 | Vanadium | 0.47 | µg/L | U | | P | 0.47 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-66-6 | Zinc | 33.9 | µg/L | | | P | 0.46 | TJA61 Trace2 ICPAES | 990505-1 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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# Form 1: Inorganic Analyses Data Sheet

SDG No.: 99A6333.002A

Method Type: Total Metals

Sample ID: 9904873-12

Client ID: [redacted]

Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 4/28/99 Level: LOW

% Solids: 0.00

| CAS No. | Analyte | Concentration | Units | C | Qual | M | DL | Instrument ID | Analytical Run |
|---|---|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 21.2 | µg/L | B | | P | 7.4 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-36-0 | Antimony | 2.0 | µg/L | B | | P | 1.9 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-38-2 | Arsenic | 2.7 | µg/L | U | | P | 2.7 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-39-3 | Barium | 0.35 | µg/L | B | | P | 0.12 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-41-7 | Beryllium | 0.14 | µg/L | U | | P | 0.14 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-43-9 | Cadmium | 0.59 | µg/L | B | | P | 0.34 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-70-2 | Calcium | 135 | µg/L | B | | P | 7.8 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-47-3 | Chromium | 0.42 | µg/L | U | | P | 0.42 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-48-4 | Cobalt | 0.44 | µg/L | U | | P | 0.44 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-50-8 | Copper | 4.6 | µg/L | B | | P | 0.74 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-89-6 | Iron | 50.8 | µg/L | B | | P | 8.4 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-92-1 | Lead | 1.3 | µg/L | U | | P | 1.3 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-93-2 | Lithium | 0.24 | µg/L | U | | P | 0.24 | HP ICPMS | may1199.09 |
| 7439-95-4 | Magnesium | 16.5 | µg/L | B | | P | 5.2 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-96-5 | Manganese | 0.59 | µg/L | B | | P | 0.44 | TJA61 Trace2 ICPAES | 990505-1 |
| 7439-97-6 | Mercury | 0.12 | µg/L | U | | AV | 0.12 | PE CVAA | 990503wp- |
| 7439-98-7 | Molybdenum | 0.91 | µg/L | U | | P | 0.91 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-02-0 | Nickel | 1.4 | µg/L | B | | P | 1.0 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-09-7 | Potassium | 105 | µg/L | B | | P | 25.4 | TJA61 Trace2 ICPAES | 990505-1 |
| 7782-49-2 | Selenium | 1.9 | µg/L | U | | P | 1.9 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-22-4 | Silver | 0.89 | µg/L | U | | P | 0.89 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-23-5 | Sodium | 413 | µg/L | B | | P | 73.0 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-24-6 | Strontium | 0.42 | µg/L | B | | P | 0.12 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-28-0 | Thallium | 5.6 | µg/L | U | | P | 5.6 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-31-5 | Tin | 4.0 | µg/L | U | | P | 4.0 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-61-1 | Uranium | 22.7 | µg/L | U | | P | 22.7 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-62-2 | Vanadium | 0.47 | µg/L | U | | P | 0.47 | TJA61 Trace2 ICPAES | 990505-1 |
| 7440-66-6 | Zinc | 6.7 | µg/L | B | | P | 0.46 | TJA61 Trace2 ICPAES | 990505-1 |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:



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General Engineering Laboratories

## Form 3b: Preparation Blank Summary

SDG No.: 99A6333.002A

Contract: KHC000497 Lab Code: GEL Case No.: SAS No.:

Preparation Blank Matrix: WATER

| Sample ID | Analyte | Result (µg/L) | Acceptance Window | Conc Qual | M | IDL | CRDL |
|---|---|---|---|---|---|---|---|
| QC606634 | | | | | | | |
| | Aluminum | 15.681 | +/-36.000 | B | P | 7.402 | 36.000 |
| | Antimony | 1.873 | +/-93.000 | U | P | 1.873 | 93.000 |
| | Arsenic | 2.660 | +/-99.000 | U | P | 2.660 | 99.000 |
| | Barium | 0.120 | +/-40.000 | U | P | 0.120 | 40.000 |
| | Beryllium | 0.139 | +/-38.000 | U | P | 0.139 | 38.000 |
| | Cadmium | 0.339 | +/-20.000 | U | P | 0.339 | 20.000 |
| | Calcium | 9.732 | +/-172.000 | B | P | 7.780 | 172.000 |
| | Chromium | 0.421 | +/-26.000 | U | P | 0.421 | 26.000 |
| | Cobalt | 0.443 | +/-37.000 | U | P | 0.443 | 37.000 |
| | Copper | 10.758 | +/-35.000 | B | P | 0.740 | 35.000 |
| | Iron | 8.425 | +/-44.000 | U | P | 8.425 | 44.000 |
| | Lead | 1.286 | +/-30.000 | U | P | 1.286 | 30.000 |
| | Magnesium | 5.235 | +/-52.000 | U | P | 5.235 | 52.000 |
| | Manganese | 0.443 | +/-31.000 | U | P | 0.443 | 31.000 |
| | Molybdenum | 0.912 | +/-3.000 | U | P | 0.912 | 3.000 |
| | Nickel | 1.030 | +/-42.000 | U | P | 1.030 | 42.000 |
| | Potassium | 25.365 | +/-569.000 | U | P | 25.365 | 569.000 |
| | Selenium | 1.908 | +/-175.000 | U | P | 1.908 | 175.000 |
| | Silver | 0.888 | +/-32.000 | U | P | 0.888 | 32.000 |
| | Sodium | 72.959 | +/-319.000 | U | P | 72.959 | 319.000 |
| | Strontium | 0.119 | +/-200.000 | U | P | 0.119 | 200.000 |
| | Thallium | 5.635 | +/-418.000 | U | P | 5.635 | 418.000 |
| | Tin | 3.955 | +/-200.000 | U | P | 3.955 | 200.000 |
| | Uranium | 22.682 | +/-200.000 | U | P | 22.682 | 200.000 |
| | Vanadium | 0.468 | +/-30.000 | U | P | 0.468 | 30.000 |
| | Zinc | 8.055 | +/-37.000 | B | P | 0.465 | 37.000 |
| QC606830 | | | | | | | |
| | Lithium | 0.239 | +/-100.000 | U | P | 0.239 | 100.000 |
| QC607202 | | | | | | | |
| | Mercury | -0.132 | +/-20.000 | B | AV | 0.116 | 20.000 |



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# Form 7: Laboratory Control Sample Summary

**SDG No.:** 99A6333.002A

**Contract:** KHCO00497 **Lab Code:** GEL **Case No.:** **SAS No.:**

**Solid LCS Source:**

**Aqueous LCS Source:**

Instrument ID: TJA61 Trace2 ICPAES

| Sample ID | Analyte | Units | True Value | Result | C | % Recovery | Acceptance Limits %R | M |
|---|---|---|---|---|---|---|---|---|
| QC606635 | | | | | | | | |
| | Aluminum | µg/L | 1000.0 | 1063.1 | | 106.3 | 89.5 - 115.6 | P |
| | Antimony | µg/L | 1000.0 | 1064.1 | | 106.4 | 89.8 - 111.4 | P |
| | Arsenic | µg/L | 1000.0 | 1066.2 | | 106.6 | 89.5 - 111.6 | P |
| | Barium | µg/L | 1000.0 | 1034.6 | | 103.5 | 90.7 - 110.8 | P |
| | Beryllium | µg/L | 1000.0 | 1050.5 | | 105.1 | 90.2 - 113.0 | P |
| | Cadmium | µg/L | 1000.0 | 1057.9 | | 105.8 | 90.7 - 114.6 | P |
| | Calcium | µg/L | 5000.0 | 5291.5 | | 105.8 | 89.7 - 115.4 | P |
| | Chromium | µg/L | 1000.0 | 1056.8 | | 105.7 | 90.0 - 111.7 | P |
| | Cobalt | µg/L | 1000.0 | 1063.6 | | 106.4 | 91.1 - 113.4 | P |
| | Copper | µg/L | 1000.0 | 1065.9 | | 106.6 | 88.2 - 114.6 | P |
| | Iron | µg/L | 1000.0 | 1063.7 | | 106.4 | 91.8 - 113.7 | P |
| | Lead | µg/L | 1000.0 | 1068.4 | | 106.8 | 89.3 - 113.6 | P |
| | Magnesium | µg/L | 1000.0 | 1035.5 | B | 103.6 | 86.6 - 112.8 | P |
| | Manganese | µg/L | 1000.0 | 1060.8 | | 106.1 | 87.9 - 111.5 | P |
| | Molybdenum | µg/L | 1000.0 | 1041.7 | | 104.2 | 80.0 - 120.0 | P |
| | Nickel | µg/L | 1000.0 | 1086.7 | | 108.7 | 91.3 - 115.3 | P |
| | Potassium | µg/L | 5000.0 | 5158.3 | | 103.2 | 85.3 - 114.2 | P |
| | Selenium | µg/L | 1000.0 | 1022.1 | | 102.2 | 87.2 - 109.4 | P |
| | Silver | µg/L | 1000.0 | 1071.2 | | 107.1 | 90.9 - 116.1 | P |
| | Sodium | µg/L | 8130.0 | 8749.2 | | 107.6 | 91.5 - 117.7 | P |
| | Strontium | µg/L | 1000.0 | 1032.3 | | 103.2 | 80.0 - 120.0 | P |
| | Thallium | µg/L | 1000.0 | 1078.0 | | 107.8 | 90.4 - 112.9 | P |
| | Tin | µg/L | 1000.0 | 1051.5 | | 105.1 | 80.0 - 120.0 | P |
| | Uranium | µg/L | 1000.0 | 1052.2 | | 105.2 | 80.0 - 120.0 | P |
| | Vanadium | µg/L | 1000.0 | 1027.0 | | 102.7 | 89.8 - 113.0 | P |
| | Zinc | µg/L | 1000.0 | 1033.8 | | 103.4 | 92.4 - 112.9 | P |
| QC606834 | | | | | | | | |
| | Lithium | µg/L | 2000.0 | 2115.0 | | 105.8 | 80.0 - 120.0 | P |
| QC607203 | | | | | | | | |
| | Mercury | µg/L | 2.0 | 1.9 | B | 96.1 | 80.0 - 120.0 | AV |

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