

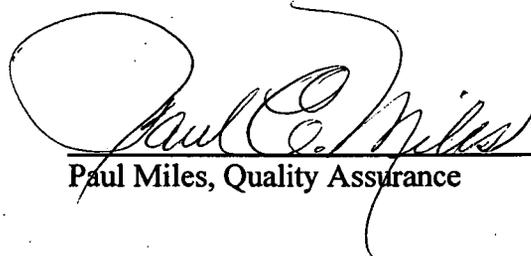
# RECONNAISSANCE LEVEL CHARACTERIZATION REPORT (RLCR)

## 442L CLOSURE PROJECT (Building 442L)

REVISION 0

September 24, 2001

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| A | Facility Location Map                            |
| B | Historical Site Assessment Report                |
| C | Radiological Characterization Package            |
| D | Chemical Characterization Package                |
| E | Radiological Data Summaries and Survey Maps      |
| F | Chemical Data Summaries and Sample Maps          |
| G | Decommissioning Waste Types And Volume Estimates |
| H | Data Quality Assessment (DQA) Detail             |

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## ABBREVIATIONS/ACRONYMS

|                     |   |
|---------------------|---|
| ACM                 | Asbestos containing material  |
| Be                  | Beryllium   |
| CDPHE               | Colorado Department of Public Health and the Environment                |
| DCGL <sub>EMC</sub> | Derived Concentration Guideline Level – elevated measurement comparison |
| DCGL <sub>W</sub>   | Derived Concentration Guideline Level – Wilcoxon Rank Sum Test          |
| D&D                 | Decontamination and Decommissioning                                     |
| DDCP                | Decontamination and Decommissioning Characterization Protocol           |
| DOE                 | U.S. Department of Energy   |
| DPP                 | Decommissioning Program Plan  |
| DQA                 | Data quality assessment   |
| DQOs                | Data quality objectives   |
| EPA                 | U.S. Environmental Protection Agency                                    |
| FDFPM               | Facility Disposition Program Manual                                     |
| HVAC                | Heating, ventilation, air conditioning                                  |
| HSAR                | Historical Site Assessment Report                                       |
| IHSS                | Individual Hazardous Substance Site                                     |
| IWCP                | Integrated Work Control Package   |
| K-H                 | Kaiser-Hill   |
| LBP                 | Lead-based paint  |
| LLW                 | Low-level waste   |
| MARSSIM             | Multi-Agency Radiation Survey and Site Investigation Manual             |
| MDA                 | Minimum detectable activity   |
| MDC                 | Minimum detectable concentration  |
| NORM                | Naturally occurring radioactive material                                |
| NRA                 | Non-Rad-Added Verification  |
| OSHA                | Occupational Safety and Health Administration                           |
| PARCC               | Precision, accuracy, representativeness, comparability and completeness |
| PCBs                | Polychlorinated Biphenyls   |
| PDS                 | Pre-demolition survey   |
| QC                  | Quality Control   |
| RCRA                | Resource Conservation and Recovery Act                                  |
| RFCA                | Rocky Flats Cleanup Agreement   |
| RFETS               | Rocky Flats Environmental Technology Site                               |
| RFFO                | Rocky Flats Field Office  |
| RLC                 | Reconnaissance Level Characterization                                   |
| RLCR                | Reconnaissance Level Characterization Report                            |
| RSP                 | Radiological Safety Practices   |
| SVOCs               | Semi-volatile organic compounds   |
| TCLP                | Toxicity Characteristic Leaching Procedure                              |
| TSA                 | Total surface activity  |
| VOCs                | Volatile organic compounds  |

## EXECUTIVE SUMMARY

A Reconnaissance Level Characterization (RLC) was performed to enable facility "Typing" per the DPP (10/8/98) and compliant disposition and waste management of 442L. Because this facility was anticipated to be a Type 1 facility, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). All facility surfaces were characterized in this RLC, including the interior and exterior surfaces of 442L (i.e., floors (slabs), walls, ceilings and roofs). Environmental media beneath and surrounding 442L was not within the scope of this RLC Report (RLCR) and will be addressed using the Soil Disturbance Permit process and in compliance with RFCA.

The RLC encompassed both radiological and chemical characterization to enable compliant disposition and waste management pursuant to the D&D Characterization Protocol (MAN-077-DDCP). The characterization built upon physical, chemical and radiological hazards identified in the 442L Historical Site Assessment Report.

Except for the floor slab, RLC sample results indicated no radiological or beryllium contamination exists in excess of the PSDP prescribed release limits. Fixed radiological contamination (i.e., uranium) and beryllium contamination were found in the floor drains of the 442L slab above the PSDP prescribed release limits. Since the contamination is confined to the floor drains and is structurally bound within the slab, the nature of the contamination should not be cause for elevating the building Type. However, during the demolition of 442L, the slab will be treated as radiologically and beryllium contaminated and appropriate controls will be required for slab handling and disposal.

Asbestos containing materials were identified in Building 442L in both friable and non-friable form. Fluorescent light ballasts may contain PCBs. PCB ballasts and asbestos containing materials will be removed and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations. Painted facility surfaces may contain PCBs and lead-based paints. All demolition debris will be managed in compliance with regulations governing PCBs (40 CFR 761), and Environmental Compliance Guidance #27, *Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal* as applicable.

Based upon this RLCR and subject to concurrence by the Colorado Department of Public Health and Environment (CDPHE), 442L is considered to be a Type 1 facility. During demolition the slab will be treated as radiologically and beryllium contaminated and appropriate controls will be required to characterize and dispose of the slab. To ensure that 442L remains free of contamination and that RLC data remain valid, isolation controls have been established, and the facility has been posted accordingly.

## **1 INTRODUCTION**

A Reconnaissance Level Characterization (RLC) was performed to enable compliant disposition and waste management of 442L. Because this facility was anticipated to be a Type 1 facility, a PDS characterization was performed. All facility surfaces were characterized in this RLC, including the interior and exterior surfaces of 442L (i.e., floors (slabs), walls, ceilings and roofs). Environmental media beneath and surrounding 442L was not within the scope of this RLC Report (RLCR) and will be addressed using the Soil Disturbance Permit process and in compliance with RFCA.

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous facilities will be removed. Among these is the 442L facility. The location of 442L is shown in Attachment A. This facility no longer supports the RFETS mission and needs to be removed to reduce Site infrastructure, risks and/or operating costs.

Before 442L can be removed, a Pre-Demolition Survey (PDS) must be conducted; this document presents the PDS results. The PDS was conducted pursuant to the Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The PDS built upon physical, chemical and radiological hazards identified in the 442L Historical Site Assessment Report.

### **1.1 Purpose**

The purpose of this report is to communicate and document the results of the RLC effort. PDSs are performed before building demolition to define the final radiological and chemical conditions of a facility. Final conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

### **1.2 Scope**

This report presents the final radiological and chemical conditions of the 442L facility. Environmental media beneath and surrounding 442L is not within the scope of this RLCR and will be addressed using the Soil Disturbance Permit process and in compliance with RFCA. Both the facility and environmental media will be dispositioned pursuant to the Rocky Flats Cleanup Agreement (RFCA).

### **1.3 Data Quality Objectives**

The Data Quality Objectives (DQOs) used in designing this RLC were the same DQOs identified in the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to section 2.0 of MAN-127-PDSP for these DQOs.

## 2 HISTORICAL SITE ASSESSMENT

A Facility-specific Historical Site Assessment (HSA) was conducted to understand facility history and related hazards. The assessment consisted of facility walkdowns, interviews, and document reviews, including a review of the Historical Release Report (refer to the D&D Characterization Protocol, MAN-077-DDCP). Results were used to identify data gaps and needs, and to develop radiological and chemical characterization packages. Results of the 442L HSA was documented in facility-specific Historical Site Assessment Report (HSAR). Refer to Attachment B, Historical Site Assessment Report, for a copy of the 442L HSAR. In summary, the HSAR identified some for potential radiological and chemical hazards.

## 3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

The 442L facility was characterized for radiological hazards per the PDSP. Section 3.1 describes the radiological characterization process that was performed, and Section 3.2 summarizes the radiological hazards that were identified.

### 3.1 Radiological Characterization

Radiological characterization was performed to define the nature and extent of radioactive materials that may be present on or in the facility. Measurements were performed to evaluate the contaminants of concern. Based on facility history, building walkdowns, and MARSSIM guidance, the facility was broken down into survey areas, survey units, and classifications. A Radiological Characterization Package (refer to Attachment C) was developed during the planning phases that describes how the facility was broken-down into survey units, the justification for the survey unit classifications, and the minimum measurement requirements per survey unit. Note: the Radiological Characterization Package in Attachment C also contains other facilities that have already been reported in the Group D RLCR.

Radiological survey unit packages were developed for each survey unit in accordance with Radiological Safety Practices (RSP) 16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure*. Total Surface Activity (TSA), removable and scan measurements were collected in accordance with RSP 16.02, *Radiological Surveys of Surfaces and Structures*. Radiological survey data were verified, validated and evaluated in accordance with RSP 16.04, *Radiological Survey/Sample Data Analysis*. Quality Control measures were implemented throughout the survey and sampling process in accordance with RSP 16.05, *Radiological Survey/Sample Quality Control*.

Radiological data, statistical analysis results, and survey locations are presented in Attachment E, Radiological Data Summaries and Survey Maps. Radiological survey packages are maintained in the 442L Characterization Project files.

### **3.2 Radiological Hazards Summary**

Radiological surveys were performed on all facility surfaces, including the walls, ceiling, roof and floor. Floor tiles were removed in various locations to expose the bare concrete slab surfaces, slab drains and portions of the two slab trenches. During the 1950s and 1960s, the trenches collected water from the washing machines used to launder the 444 Complex personnel protective clothing (PPE). The trench water was discharged to two adjacent slab drains. The 444 Complex PPE had the potential to be contaminated with uranium and beryllium contamination. After PPE laundry operations were terminated in the early 1970s, the trenches were filled in with concrete and the building was remodeled to facilitate other site operations. Surveys could not be performed in the trenches due to the concrete fill material making them inaccessible. However, all slab drains were surveyed for radiological and beryllium contamination. Three slab drains indicated elevated fixed uranium radioactivity. No transuranic radioactivity or removable uranium radioactivity was detected. Isotopic analysis of a small chunk of drain rust from the most elevated drain indicated only uranium contamination present. Isotopic analysis investigation data is presented in Attachment E, Radiological Data Summaries and Survey Maps, along with the other slab and drain survey data.

Other than the floor drains, no other areas within 442L had any radiological contamination above the PDSP transuranic or uranium DCGLs. During the demolition of 442L, the slab will be treated as radiologically contaminated and appropriate controls will be required for slab handling and disposal. Isolation control postings are displayed at all entrances to 442L to ensure no radioactive materials are introduced. Radiological data, statistical analysis results, and survey locations are presented in Attachment E, Radiological Data Summaries and Survey Maps.

## **4 CHEMICAL CHARACTERIZATION AND HAZARDS**

The 442L facility was characterized for chemical hazards per the PDSP. Section 4.1 describes the chemical characterization process that was performed, and Section 4.2 summarizes the chemical hazards that were identified.

### **4.1 Chemical Characterization**

Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present on or in 442L. Based upon a review of historical and process knowledge, visual inspections, and PDSP DQOs, additional sampling needs were determined. A Chemical Characterization Package (refer to Attachment D) was developed during the planning phases that describes sampling requirements and the justification for the sample locations and estimated sample numbers. Note: the Chemical Characterization Package in Attachment D also contains other facilities that have already been reported in the Group D RLCR. Contaminants of concern included asbestos, beryllium, RCRA/CERCLA constituents, and PCBs. Refer to Attachment F, Chemical Summary Data and Sample Maps, for details on sample results and sample locations.

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#### 4.1.1 Asbestos

Based on limited historical asbestos inspection data, an asbestos inspection and sampling of suspect asbestos containing material (ACM) was required for the PDS. A CDPHE-certified asbestos inspector conducted the inspection and sampling in accordance with PRO-563-ACPR *Asbestos Characterization Protocol*, Revision 1. Potential ACM was identified for sampling at the discretion of the inspector.

#### 4.1.2 Beryllium (Be)

Based on the HSAR, there was a record of beryllium operations in 442L. However, since the building was utilized as a laundry facility for laundering Building 444 PPE, there was a potential for beryllium contamination. Therefore, random and biased sampling was performed.

#### 4.1.3 RCRA/CERCLA Constituents [including metals and volatile organic compounds (VOCs)]

Based on the HSARs and facility walkdowns of 442L, there was no record of RCRA/CERCLA constituent operations, storage or spills, therefore RCRA/CERCLA constituent sampling was not performed in 442L.

Sampling for lead in paint in 442L was not required. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes, and additional analysis for characteristics of hazardous waste derived from LBP is not a requirement for disposal.

#### 4.1.4 Polychlorinated Biphenyls (PCBs)

Based on the HSAR and facility walkdowns of 442L, there was evidence of a potential PCB spill, therefore, PCB sampling was performed in this facility on the stream pump pad. 442L contains fluorescent light ballasts that may contain PCBs. Therefore, fluorescent light fixtures will be inspected to identify PCB ballasts during removal operations. PCB ballasts will be identified based on factors such as labeling (e.g., PCB-containing and non-PCB-containing), manufacturer, and date of manufacturing. All ballasts that do not indicate non-PCB-containing are assumed to be PCB-containing.

Historical data and process knowledge give no reason to suspect that any specialized paints or coatings containing PCBs were applied to any of the painted surfaces within 442L. However, 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 disposition are met. Except for the 442L slab, current plans are to dispose of demolition debris from 442L in an off-site, non-hazardous solid waste landfill as PCB Bulk Product Waste.

## 4.2 Chemical Hazards Summary

The following sections summarize the 442L chemical hazards identified during the PDS.

### 4.2.1 Asbestos

ACM is present in 442L, in both friable and non-friable form. Asbestos sample data and sample location maps are contained in Attachment F, Chemical Summary Data and Sample Maps. ACM will be removed and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations. Estimated quantities of ACM are presented in Attachment G, Decommissioning Waste Types and Volume Estimates.

442L had several different suspect ACM including drywall & joint compound, three (3) different types of floor tile and mastic, thermal systems insulation (TSI) on steam pipes & fittings, TSI labeled "Asbestos Free", brown baseboard with brown mastic, and roofing tars and flashing with silver paint. Analytical results of bulk samples indicate the following asbestos containing materials:

- 12" x 12" white-tan floor tiles with brown streaks                      7% Chrysotile
- TSI pipes & fittings    7% Chrysotile, 13% Amosite
- TSI labeled "Asbestos Free"    Trace Chrysotile
- Brown roofing tar, flashing, & silver paint                                      30% Chrysotile

All other analytical results of bulk samples indicate that no asbestos was detected.

### 4.2.2 Beryllium

Random and biased beryllium sample results of 442L were all less than  $0.1 \mu\text{g}/100\text{cm}^2$ , with the exception of sample 442L-8222001-315-103 which was  $0.455 \mu\text{g}/100\text{cm}^2$ . This sample was taken inside a floor drain located in Room 101 by the north wall beneath the windows. Since the building was utilized as a laundry facility for laundering B444 PPE, the washing machine water that was discharged to the floor drains is the likely source of the contamination. Radiological data of the floor drains also confirmed the washing machine water as the likely source term for contamination. Beryllium sample data and sample location maps are contained in Attachment F, Chemical Summary Data and Sample Maps.

### 4.2.3 RCRA/CERCLA Constituents

Based on the HSAR and facility walkdowns of 442L, there was no record of RCRA/CERCLA constituent operations, storage or spills. Therefore, there are no RCRA/CERCLA constituent hazards in 442L.

### 4.2.4 PCBs

Based on the HSAR and facility walkdowns of 442L, PCB core samples were taken in the 442L steam pump pad. There was evidence of a potential PCB oil spill from the oil-lubricated steam pump. Three real samples and one duplicate were taken on the steam pump pad and analyzed for PCBs. All sample results were less than the PCB regulatory limit. PCB sample data and sample location maps are contained in Attachment F, Chemical Summary Data and Sample Maps.

PCB ballasts may be found in 442L and will be removed and disposed of in accordance with site procedures prior to building demolition. It is not suspected that any specialized paints or coatings containing PCBs were applied to painted surfaces within 442L, however, except for the 442L slab, plans are to dispose of demolition debris in an off-site, non-hazardous solid waste landfill as PCB Bulk Product Waste.

## 5 PHYSICAL HAZARDS

Physical hazards associated with 442L are consist of those common to standard industrial environments and include hazards associated with energized systems, utilities, and trips and falls. There are no unique hazards associated with 442L. 442L has been relatively well maintained and is in good physical condition, and therefore, does not present hazards associated with building deterioration. Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

## 6 DATA QUALITY ASSESSMENT

Data used in making management decisions for decommissioning of 442L, and consequent waste management, are of adequate quality to support the decisions documented in this report. The data presented in this report (Attachments A–G) were verified and validated relative to DOE quality requirements, applicable EPA guidance, and original DQOs of the project.

In summary, the Verification and Validation (V&V) process corroborates that the following elements of the characterization process are adequate:

- ◆ the *number* of samples and surveys;
- ◆ the *types* of samples and surveys;
- ◆ the sampling/survey process as implemented “in the field”; and,
- ◆ the laboratory analytical process, relative to accuracy and precision considerations.

Details of the DQA are provided in Attachment H.

## **7 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES**

The demolition and disposal of 442L will generate a variety of wastes. Attachment G presents the estimated waste volumes and waste type. All wastes can be disposed of as sanitary waste, except asbestos containing material, PCB Bulk Product Waste and the slab, which shall be managed as radiologically and beryllium contaminated. There is no hazardous waste associated with 442L. Asbestos and PCB ballasts will be managed pursuant to Site asbestos and PCB abatement and waste management procedures.

## **8 FACILITY CLASSIFICATION AND CONCLUSIONS**

Based on the analysis of radiological, chemical and physical hazards, 442L is classified as a RFCA Type 1 facility pursuant to the RFETS Decommissioning Program Plan (DPP; K-H, 1999). The Type 1 classification is based on a review of historical and process knowledge, and newly acquired RLC data, and will be subject to concurrence by the Colorado Department of Public Health and the Environment (CDPHE).

The RLC of 442L was performed in accordance with the DDCP and PDSP; all PDSP DQOs were met, and all data satisfied the PDSP DQA criteria. This facility does not contain hazardous wastes. All demolition debris will be managed in compliance with regulations governing PCBs (40 CFR 761), as applicable, in accordance with the Decommissioning Program Plan, Section 3.3.5. PCB ballasts and asbestos containing material will be removed and disposed of in compliance with EPA and CDPHE regulations. The 442L slab shall be managed as radiologically and beryllium contaminated. Environmental media beneath and surrounding 442L will be addressed using the Soil Disturbance Permit process and in compliance with RFCA.

To ensure that 442L remains free of contamination and that RLC data remain valid, isolation controls have been established, and the facility is posted accordingly.

## 9 REFERENCES

- ANSI-N323A-1997, Radiation Protection Instrumentation Test and Calibration.
- DOE/RFFO, CDPHE, EPA, 1996. Rocky Flats Cleanup Agreement (RFCA), July 19, 1996.
- DOE Order 414.1A, "Quality Assurance."
- EPA, 1994. "The Data Quality Objective Process," EPA QA/G-4.
- K-H, 1997. "Kaiser-Hill Team Quality Assurance Program", Rev. 5, December, 1997.
- K-H, 1998. Facility Disposition Program Manual, MAN-076-FDPM, Rev. 1, September 1999.
- K-H, 1999. Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP, Rev. 1, June 19, 2000.
- K-H, 1999. Decommissioning Program Plan, June 21, 1999.
- K-H, 2000. Pre-Demolition Survey Plan, MAN-127-PDSP, Rev. 0, March 26, 2001.
- MARSSIM - Multi-Agency Radiation Survey and Site Investigation Manual, December 1997 (NUREG-1575, EPA 402-R-97-016).
- PRO-475-RSP-16.01, Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure, September 30, 1999.
- PRO-476-RSP-16.02, Radiological Surveys of Surfaces and Structures, September 30, 1999.
- PRO-477-RSP-16.03, Radiological Samples of Building Media, September 30, 1999.
- PRO-478-RSP-16.04, Radiological Survey/Sample Data Analysis, September 30, 1999.
- PRO-479-RSP-16.05, Radiological Survey/Sample Quality Control, September, 30, 1999
- RFETS, Environmental Waste Compliance Guidance #25, Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition.
- RFETS, Environmental Waste Compliance Guidance #27, Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal.
- RFETS, Historical Site Assessment Report for Building 442L.

# ATTACHMENT A

## Facility Location Map

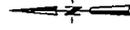
# 442L Overview

(As of August 28, 2001)

## EXPLANATION

-  Buildings & Tanks
- Standard Map Features**
-  Buildings and other structures
-  Solar Evaporation Ponds (SEPP)
-  Lakes and ponds
-  Streams, ditches, or other drainage features
-  Fences and other barriers
-  Paved roads
-  Dirt roads

ALL DIMENSIONS ARE IN METERS. THIS MAP IS A GENERALIZATION OF THE DATA PROVIDED AND DOES NOT REPRESENT THE ACTUAL SITUATION. THE USER SHALL BE RESPONSIBLE FOR OBTAINING THE NECESSARY DATA FOR ANY SPECIFIC APPLICATION.



Scale = 1 : 13240  
1 inch represents approximately 1112 feet



State Plane Coordinate Projection  
Colorado North Zone  
Datum: NAD83

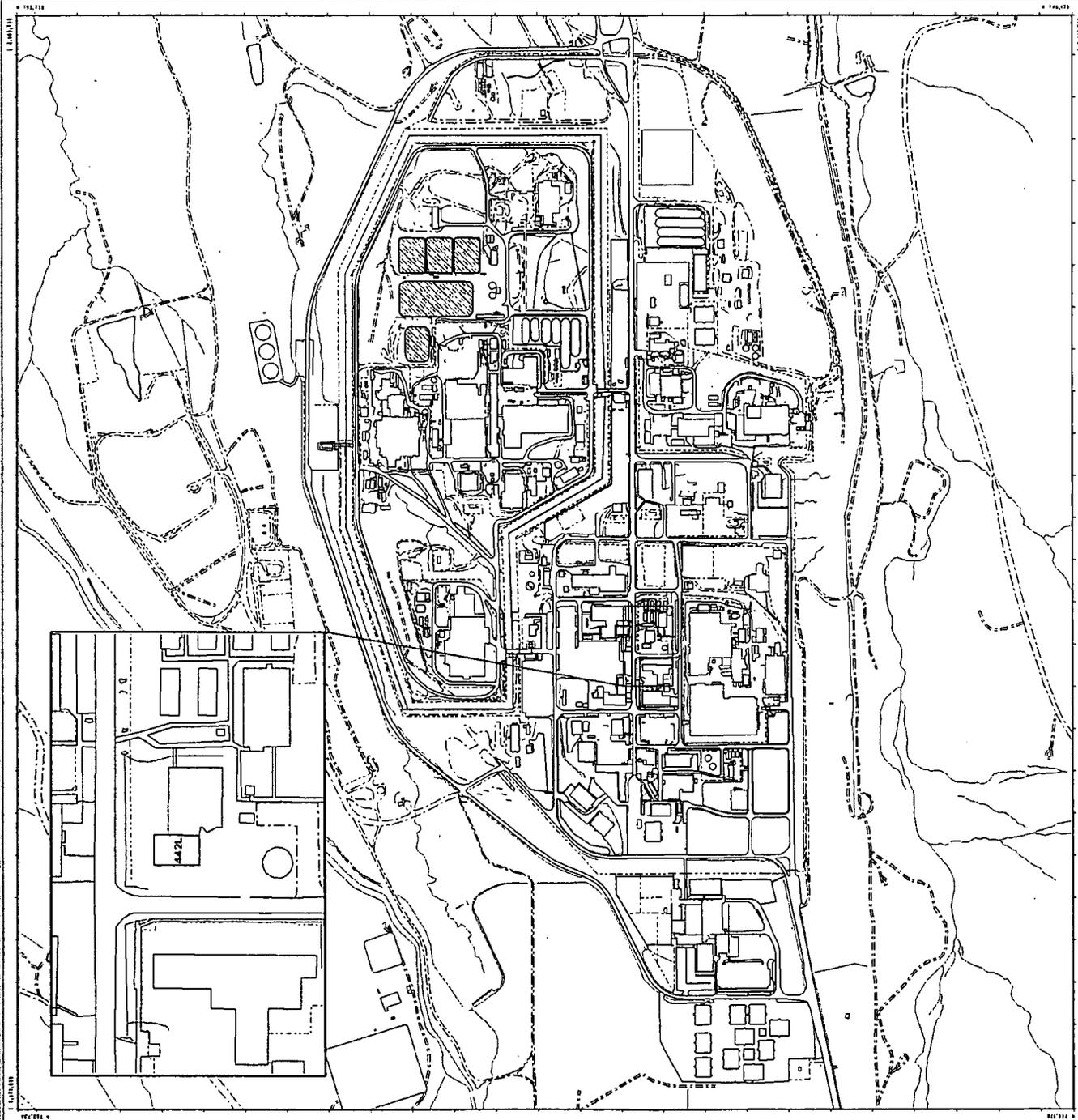
U.S. Department of Energy  
Rocky Flats Environmental Technology Site

Prepared by:  
**DynCorp**  
THE ART OF TECHNOLOGY

Prepared for:  
Kaiser Hill  
Rocky Flats  
Colorado, USA

MAP ID: 01-0888

August 28, 2001



NT\_Srv\_W:\projects\2001\01-0888\442L-overl.ram

# ATTACHMENT B

## Historical Site Assessment Report

## **HISTORICAL FACILITY OVERVIEW FOR BUILDING 442L, RAD OPS/GLOVEBOX CENTER**

Building 442L (first named Building 42, later named Building 442, now labeled Building 442L) was first constructed as a Plant Laundry Facility in approximately 1953. Building 442L is located south of Central Avenue at Fifth Street. Building 442L now has an attached facility on the east side, Building 442W. Building 442L is approximately 41' wide X 61' long X 15' high, above grade; the concrete walls and footings extend approximately 3' below grade. Building 442L accounts for approximately 2484 square feet of floor space. The building has an 8" poured steel reinforced concrete floor and roof/deck. The building's outer walls are 12" thick poured steel reinforced concrete construction. The partition walls of three rooms on the south side of the building are constructed from concrete block. The north half of the concrete floor, has two built-in drainage gutters approximately 2' deep X 4' wide X 8 feet long (these have been covered in the buildings present configuration). The floor on the east side of the building has a pit built into the floor, which is assumed to have been a maintenance and/or a plumbing access pit (the pit is covered in the buildings present configuration).

Utilities for Building 442L include electricity, steam heaters, refrigerated air conditioning, steam supply and condensate return lines, and a Plant Fire Sprinkler System. Building 442L has three power transformer and it is not known if they contain any PCBs. Lead-based paints, which may have contained PCBs, may have been used during the construction of this facility. Asbestos was used during the construction of Building 442L and all the overhead steam and condensate pipes are labeled as to whether or not they contain asbestos. A new Classroom and Training Center Room has recently been constructed that has a drop acoustical tile ceiling that has been insulated.

Building 442L was originally constructed as a Plant Laundry for Buildings 123, 441, and Building 444 which means clothing was washed that was contaminated with depleted uranium and/or beryllium. Building 442L was then striped of all its laundry equipment and a high efficiency particulate air (HEPA) filter test and filter certification facility was installed. Building 442L also had a bench area where washed personnel respirators were tested for leakage and filtration efficiency. Dioctylphthalate (DOP) chemical (a suspect carcinogen or cancer-causing substance) was used for HEPA filter and respirator filter testing. It is not known of other chemicals were used or stored in Building 442L. Building 442L, because of its historic contaminated clothing laundry operations, falls under building contamination concerns, UBC-442. The soils or land where Building 442L is constructed sits or IHSS/PACs 400-7 and 400-157.1. There is no information that indicates any radioactive materials were ever stored in Building 442L. After operating approximately 10 years as a HEPA and respirator test facility, all of the testing equipment was removed and glovebox, lab hood, supplied-air tent, and tank training operations were installed. Training for glovebox/hoods, tanks, tents, and classroom training is how Building 442L is presently configured and used.

## D&D RISS Facility Characterization Historical Site Assessment - Interview Checklist

**Facility ID: Building 442L**  
**Facility Type (1, 2, or 3): Type 2**

This facility specific Historical Site Assessment (HSA) – Interview Checklist has been conducted in accordance with:  
*D&D Characterization Protocol*, RFETS MAN-077-DDCP, latest version, and  
*Facility Disposition Program Manual*, RFETS MAN-076-FDPM, latest version

Personnel Interviewed (Name, Title, and Function)

Jan K. Fretthold, Senior Principal Engineer, X8239, P-212-5234, B130, Cubicle 225, K-H, in charge of testing and certification of HEPA filters in B442L.

What time frame did the interviewee work in the facility?

From 1994 until 2000 the interviewee worked as the Senior Principal Engineer in charge of testing/certification of HEPA filters in B442L. Interviewee revealed that B442L originally was built as a Plant laundry facility. The facility was then converted to HEPA testing/certification facility. Interviewee then stated B442W was constructed to become a warehouse for HEPA filters to be tested and certified. The warehouse also stored filters after testing/certification.

Has the building configuration changed since you worked in the building? Yes. If so, in what way? B442L was stripped of all Plant laundry equipment and HEPA filter testing and certification equipment was installed. The facility operated a number of years as the Plant's HEPA filter testing and certification facility. The HEPA filter testing/certification equipment was then stripped out and glovebox, tank, hood, and tent training equipment was then installed.

What types of equipment were in the building during the interviewee's time in the facility? The HEPA filter equipment described above.

Where was the equipment located? (specific rooms/areas) Rooms 101, 102, and Room 104.

Were any radioactive materials or equipment handled in the building? No, but radioactively contaminated clothing was laundered in the facility when it was the Plant Laundry Facility. If so, what types and where? Radioactively contaminated clothing was washed/processed throughout B442L  
 No known other radioactive materials were ever handled in 442L

Were any chemicals (e.g., Asbestos, Beryllium, Lead, RCRA/CERCLA Constituents, PCBs, etc.) handled in the building? If so, what types and where? Asbestos insulation materials were used during the construction of B442L. Beryllium and lead contaminated clothing was also washed in B442L. Power transformers in B442L may have contained PCBs. Lead-based paints may have been used during construction and maintenance of B442L. The paints may have contained PCBs as well.

Did any spills or uncontrolled release of radioactive materials or chemicals occur while you worked in the building? No, none. If so, what types and where?. N/A, none.

Were these spills/releases cleaned up? N/A If so, how were cleaned up? No known spills ever occurred in B442L during the HEPA filter testing/certification operations, but low level contamination (U, Be) may have happened during the Plant Laundry operating days.

Do you know of any additional issues, concerns, or process knowledge that could affect facility characterization? Yes, B442L falls under building contamination, UBC-442. Building 442L sits on IHSS/PACs 400-7 and 400-157.1.

Prepared By: Bob Sheets  
 Print Name

Bob Sheets  
 Signature

3/6/2001  
 Date

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# ATTACHMENT C

## Radiological Characterization Package



**Rocky Flats Environmental Technology Site**

**RADIOLOGICAL CHARACTERIZATION  
PACKAGE**

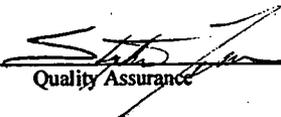
**GROUP 5 CLOSURE PROJECT**

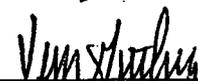
**REVISION 0**

**March 6, 2001**

**Prepared by:** Jay M. Britten /  3/5/01.  
Radiological Engineer

**Reviewed by:** Duane Parsons /  3/5/01.  
RISS Facility Characterization Coordinator

**Reviewed by:** Steve Luker /  3/5/01.  
Quality Assurance

**Approved by:** Vern Guthrie /  3/7/01.  
Closure Project Facility Manager

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**Radiological Characterization Package  
Group 5 (442W, 442L, T551A)**

|                  |               |                      |                     |                  |                      |
|------------------|---------------|----------------------|---------------------|------------------|----------------------|
| <b>Building:</b> | 442L&W, T551A | <b>Last Updated:</b> | <b>Date:</b> 3/5/01 | <b>Time:</b> 900 | <b>Initials:</b> JMB |
|------------------|---------------|----------------------|---------------------|------------------|----------------------|

\* This characterization package was prepared in accordance with MAN-077-DDCP, D&D Characterization Protocols (07/26/00), and MAN-127-PDSP, Pre-Demolition Survey Plan for D&D Facilities (02/14/01).

\* PDSP Data Quality Objectives were used to develop this characterization package.

**Instructions:**

1. Verify characterization activities are on the Plan-of-the-Day (POD).
2. Perform a Pre-Evolution Brief and/or Job Task Brief in accordance with the Site Conduct of Operations Manual.
3. Verify personnel have appropriate training for the applicable tasks they will be performing.
4. Comply with RWP requirements, if applicable.
5. Comply with JHA and facility PPE requirements, as applicable.
6. Inform the Facility Manager, or designee prior to starting characterization activities.
7. Follow applicable characterization and sampling procedures.
8. Notify Wackenhut Security (x2444) and the Shift Supervisor (x2914), and verify appropriate safety precautions/requirements are followed prior to accessing facility roofs.
9. Coordination with the Environmental Restoration Program organization will be required to further characterize underneath facility foundations and slabs prior to removal.
10. Collect and maintain all characterization paperwork in the Project File(s).
11. All radiological surveys shall be conducted in accordance with the sampling and instruction forms included in Group 5 Package Identification numbers 01-0009, 01-0010, 01-0012, 01-0013, 01-0014, and 01-0015. Sample locations are denoted on scaled maps attached to each survey package.

**Class 1 Areas**

| Survey Area           | Survey Unit | Class | Description | Total m <sup>2</sup> | Floor m <sup>2</sup> | Scan m <sup>2</sup> | TSA | Smears | Media | Class Justification   |
|-----------------------|-------------|-------|-------------|----------------------|----------------------|---------------------|-----|--------|-------|---|
| N/A                   | N/A         | N/A   | N/A         | N/A                  | N/A                  | N/A                 | N/A | N/A    | N/A   | No Class 1 Areas identified in this characterization unit. Historical Site Assessment and process knowledge indicate no need for this classification. |
| <b>Class 1 Totals</b> |             |       |             | 0                    | 0                    | 0                   | 0   | 0      | 0     |   |

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**Radiological Characterization Package  
Group 5 (442W, 442L, T551A)**

| Class 2 Areas         |             |       |             |                      |                      |                     |     |        |       |   |
|-----------------------|-------------|-------|-------------|----------------------|----------------------|---------------------|-----|--------|-------|---|
| Survey Area           | Survey Unit | Class | Description | Total m <sup>2</sup> | Floor m <sup>2</sup> | Scan m <sup>2</sup> | TSA | Smears | Media | Class Justification   |
| N/A                   | N/A         | N/A   | N/A         | N/A                  | N/A                  | N/A                 | N/A | N/A    | N/A   | No Class 2 Areas identified in this characterization unit. Historical Site Assessment and process knowledge indicate no need for this classification. |
| <b>Class 2 Totals</b> |             |       |             | 0                    | 0                    | 0                   | 0   | 0      | 0     | 0   |

**Radiological Characterization Package  
Group 5 (442W, 442L, T551A)**

| Class 3 Areas |             |       |   |                         |                         |                        |                        |                        |       |   |
|---------------|-------------|-------|---|-------------------------|-------------------------|------------------------|------------------------|------------------------|-------|---|
| Survey Area   | Survey Unit | Class | Description                                   | Total (m <sup>2</sup> ) | Floor (m <sup>2</sup> ) | Scan (m <sup>2</sup> ) | TSA                    | Spreads                | Media | Class Justification   |
| A             | 442-A-001   | 3     | Interior of B442L (floor, walls, and ceiling) | 948                     | 259                     | 95                     | 15-random<br>15-biased | 15-random<br>15-biased | 0     | Areas are not expected to contain, or have ever contained, any residual radioactivity greater than the DCG <sub>LW</sub> . Historical Site Assessment and process knowledge of this unit provide a high degree of confidence that no individual measurement will exceed the DCG <sub>LW</sub> . A 10% scan will be biased towards areas of greater potential for contamination (e.g., floors and lower walls). Also, two biased TSA and removable sample locations will be collected. |
| B             | 442-B-002   | 3     | Exterior of 442L (walls and roof)             | 447                     | 0                       | 45                     | 15-random              | 15-random              | 0     | Areas are not expected to contain, or have ever contained, any residual radioactivity greater than the DCG <sub>LW</sub> . Historical Site Assessment and process knowledge of this unit provide a high degree of confidence that no individual measurement will exceed the DCG <sub>LW</sub> . A 10% scan will be biased towards areas of greater potential for contamination.   |
| A             | 442-A-003   | 3     | Interior of 442W (floor, walls, and ceiling)  | 1875                    | 571                     | 188                    | 15-random<br>2-biased  | 15-random<br>2-biased  | 0     | Areas are not expected to contain, or have ever contained, any residual radioactivity greater than the DCG <sub>LW</sub> . Historical Site Assessment and process knowledge of this unit provide a high degree of confidence that no individual measurement will exceed the DCG <sub>LW</sub> . A 10% scan will be biased towards areas of greater potential for contamination (e.g., floors and lower walls). Also, two biased TSA and removable sample locations will be collected. |
| B             | 442-B-004   | 3     | Exterior of 442W (walls and roof)             | 1066                    | 0                       | 107                    | 15-random              | 15-random              | 0     | Areas are not expected to contain, or have ever contained, any residual radioactivity greater than the DCG <sub>LW</sub> . Historical Site Assessment and process knowledge of this unit provide a high degree of confidence that no individual measurement will exceed the DCG <sub>LW</sub> . A 10% scan will be biased towards areas of greater potential for contamination.   |

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**Radiological Characterization Package**

**Group 5 (442W, 442L, T551A)**

**Class 3 Areas**

| Survey Area            | Survey Unit | Class | Description                                   | Total<br>m <sup>2</sup> | Floor<br>m <sup>2</sup> | Scan<br>m  | TSA                   | Smears                | Media    | Class Justification   |
|------------------------|-------------|-------|---|-------------------------|-------------------------|------------|-----------------------|-----------------------|----------|---|
| C                      | 551-C-005   | 3     | Interior of T551A (floor, walls, and ceiling) | 1124                    | 295                     | 113        | 15-random<br>2-biased | 15-random<br>2-biased | 0        | Areas are not expected to contain, or have ever contained, any residual radioactivity greater than the DCGL <sub>w</sub> . Historical Site Assessment and process knowledge of this unit provide a high degree of confidence that no individual measurement will exceed the DCGL <sub>w</sub> . A 10% scan will be biased towards areas of greater potential for contamination (e.g., floors and lower walls). Also, two biased TSA and removable sample locations will be collected. |
| D                      | 551-D-006   | 3     | Exterior of T551A (walls and roof)            | 586                     | 12                      | 59         | 15-random             | 15-random             | 0        | Areas are not expected to contain, or have ever contained, any residual radioactivity greater than the DCGL <sub>w</sub> . Historical Site Assessment and process knowledge of this unit provide a high degree of confidence that no individual measurement will exceed the DCGL <sub>w</sub> . A 10% scan will be biased towards areas of greater potential for contamination.   |
| <b>Class 3 Totals</b>  |             |       |   | <b>6046</b>             | <b>1137</b>             | <b>607</b> | <b>96</b>             | <b>96</b>             | <b>0</b> |   |
| <b>All Class Areas</b> |             |       |   | <b>6046</b>             | <b>1137</b>             | <b>607</b> | <b>96</b>             | <b>96</b>             | <b>0</b> |   |

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**Radiological Characterization Package  
Group 5 (442W, 442L, T551A)**

| Non-Impacted Areas         |             |     |             |                      |                      |          |          |          |          |  |
|----------------------------|-------------|-----|-------------|----------------------|----------------------|----------|----------|----------|----------|--|
| Survey Area                | Survey Unit | GIS | Description | Total m <sup>2</sup> | Floor m <sup>2</sup> | Scanning | ISA      | Smears   | Media    | Class. Justification   |
| N/A                        | N/A         | N/A | N/A         | N/A                  | N/A                  | N/A      | N/A      | N/A      | N/A      | No Non-Impacted Areas Identified in this characterization unit. Historical Site Assessment and process knowledge indicate no need for this classification. |
| <b>Non-Impacted Totals</b> |             |     |             | <b>0</b>             | <b>0</b>             | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b>   |

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# ATTACHMENT D

## Chemical Characterization Package

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**Rocky Flats Environmental Technology Site**  
**CHEMICAL CHARACTERIZATION PACKAGE**

*DMP 2/26/01*  
**400/500/900 BUILDING CLUSTER CLOSURE PROJECT**

**REVISION 1**

**FEBRUARY 20, 2001**

Prepared by: *[Signature]*  
Industrial Hygiene

Prepared by: *[Signature]*  
Environmental Compliance

Reviewed by: *[Signature]*  
Quality Assurance

Reviewed by: *[Signature]* 2/21/01  
RISS Facility Characterization Coordinator

Approved by: *F. E. Hille* 2-26-01  
Closure Project Facility Manager

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## CHEMICAL CHARACTERIZATION PACKAGE

*DMP 2/26/01*

**BUILDING(s):** 400/500/900 CLUSTER – (T551A, 442W, 442L, ~~T900D~~)

- \* This characterization package was prepared in accordance with MAN-077-DDCP, D&D Characterization Protocols, and MAN-127-PDSP, Pre-Demolition Survey Plan for D&D Facilities.
- \* PDSP Data Quality Objectives were used to develop this characterization package.

**Instructions:**

1. Verify characterization activities are on the Plan-of-the-Day (POD).
2. Perform a Pre-Evolution Brief and/or Job Task Brief in accordance with the Site Conduct of Operations Manual.
3. Verify personnel have appropriate training for the applicable tasks they will be performing.
4. Comply with RWP requirements, if applicable.
5. Comply with JHA and facility PPE requirements, as applicable.
6. Inform the Facility Manager, or designee prior to starting characterization activities.
7. Follow applicable characterization and sampling procedures.
8. Notify Wackenhut Security (x2444) and the Shift Supervisor (x2914), and verify appropriate safety precautions/requirements are followed prior to accessing facility roofs.
9. Coordination with the Environmental Restoration Program organization will be required to further characterize underneath facility foundations and slabs prior to removal.
10. Collect and maintain all characterization paperwork in the Project File(s), and all electronic data in the appropriate D&D RISS subdirectory.

| ASBESTOS              |                             |   |
|-----------------------|-----------------------------|---|
| Sample Location       | Estimated Number of Samples | Sample location and justification/rational  |
| 442 L&W               | 37                          | Asbestos inspection has not been performed. As a result, a comprehensive invasive inspection must be performed in accordance with PRO-563-ACPR, Asbestos Characterization Procedure   |
| <del>T900D</del>      | <del>1</del>                | <del>Asbestos inspection has not been performed. As a result a comprehensive invasive inspection must be performed in accordance with PRO-563-ACPR, Asbestos Characterization Procedure.</del>  |
| T551A                 | 20                          | Asbestos inspection has not been performed. As a result a comprehensive invasive inspection must be performed in accordance with PRO-563-ACPR, Asbestos Characterization Procedure.   |
| <b>Total Samples:</b> | <b>64</b>                   | The exact sample numbers and locations will not be determined until a comprehensive, invasive inspection is performed in accordance with 40 CFR Part 763, Subpart E. Sample locations will be specified on sample maps during characterization efforts. Samples will be obtained in accordance with PRO-653-ACPR, Asbestos Characterization Procedure and 40 CFR 763. |

*P. moved  
2/26/01*

*27*

| <b>BERYLLIUM</b>       |  |   |
|------------------------|--|---|
| <b>Sample Location</b> | <b>Number of Samples (Smears)</b>            | <b>Sample location and justification/rational</b>   |
| 442 L&W                | Room 101 –<br>15 random,<br>2 biased         | Process history indicates B442W, Rooms 101 and 105 may have been used as a beryllium storage areas, no documented supporting data or process history proves otherwise. Therefore, random and biased sampling will be performed in Rooms 101 and 105. Room 101 and 105 are approximately 1900 sq. ft, and 5400 sq. ft respectively.<br><br>There is no documented supporting data or process history that proves beryllium was not used or stored in the remaining portions of B442 L&W. Therefore, two biased samples per building will be obtained in areas other than B442W, Rooms 101 and 105. |
|                        | Room 105 –<br>36 random,<br>4 biased         |   |
|                        | All other<br>Facility<br>areas<br>5 – biased |   |
| T551A                  | 5 – biased                                   | No historical association with Beryllium. Sample locations will be biased and will be determined at the time of sampling.   |
| <del>T900D</del>       | <del>5 – biased</del>                        | <del>No historical association with Beryllium. Sample locations will be biased and will be determined at the time of sampling.</del>  |
| <b>Total Samples:</b>  | 72   | Samples will be obtained at locations specified on sample map(s) in accordance with PRO-536-BCPR, Beryllium Characterization Procedure. Biased sample locations will correspond with the most probable areas of dust accumulation (including beryllium dust), assuming airborne deposition.   |

| <b>LEAD</b>   |                          |  |
|---|--------------------------|--|
| <b>Sample Location</b>  | <b>Number of Samples</b> | <b>Sample location and justification/rational</b>  |
| 400; 500, 900 Cluster,<br>all locations <sup>part 2/26/01</sup> | 0                        | Lead sampling is not required in the 400, 500, 900 Cluster. All paint will remain a part of the infrastructure during demolition and therefore does not require sampling per Environmental Waste Compliance Guidance No. 27, Lead Based Paint (LBP) and LBP Debris Disposal. Sampling for lead for IH requirements will be at the discretion of the demolition contractor. |
| <b>Total Samples:</b>   | 0                        |  |

| <b>RCRA/CERCLA CONSTITUENTS</b> |                          |  |
|---------------------------------|--------------------------|--|
| <b>Sample Location</b>          | <b>Number of Samples</b> | <b>Sample location and justification/rational</b>  |
| 442L & 442W                     | 0                        | A walk-down of the building, review of building historical documents and conversations with personnel assigned to the building, with historical knowledge of the processes in the building, indicate that no major spills of concern occurred within the building. Dioctyl phthalate was used in the building in vacuum pumps, and while some material was probably dripped on the floor during the course of operations, it was in small quantities that were immediately cleaned up. The only incident that appears to have occurred at the building involved a spill of oil in the soil outside the building. It was remediated at the time of the spill, and turned out to be regular oil, not dioctyl phthalate, as suspected, therefore no sampling is required. |
| T551A                           | 0                        | Process knowledge and a walk-down of this building indicates that no RCRA/CERCLA constituents of concern or historical spills exist in the trailer, therefore no sampling is required.   |

removed  
2/26/01

28

Removed  
D.M.  
2/26/01

|                       |   |   |
|-----------------------|---|---|
| <del>T900D</del>      | 0 | <del>Process knowledge and a walk-down of this building indicates that no RCRA/CERCLA constituents of concern or historical spills exist in the trailer, therefore no sampling is required.</del> |
| <b>Total Samples:</b> | 0 |   |

| PCBs                  |                   |   |
|-----------------------|-------------------|---|
| Sample Location       | Number of Samples | Sample location and justification/rational  |
| 442L, steam pump      | 4 (3 + duplicate) | There is visible staining on the concrete pad surrounding the steam pump from oil used to lubricate the pump (approximately 25 sqft). This oil could have been contained PCBs at one time. Core sampling (2" diameter, 2" depth) in the number indicated should be conducted to determine the presence or absence of PCBs. (Deeper samples will be taken in the unlikely event that contamination appears to have migrated farther than 2" into the slab.) Disposal of the entire slab as PCB bulk remediation waste would likely be more expensive, and would require soil sampling to determine any migration under the slab. |
| T551A                 | 0                 | Process knowledge and a walk-down of this building indicates no potential for PCB contamination, therefore no sampling is required.   |
| <del>T900D</del>      | 0                 | <del>Process knowledge and a walk-down of this building indicates no potential for PCB contamination, therefore no sampling is required.</del>  |
| <b>Total Samples:</b> | 4                 |   |

Removed  
D.M.  
2/26/01

\* PCB ballasts, fluorescent light bulbs, potential mercury switches in thermostats, and mercury vapor light bulbs shall be removed prior to demolition.

# ATTACHMENT E

## Radiological Data Summaries and Survey Maps

**SURVEY UNIT DATA SUMMARY: 442-A-001**

Survey Unit Description:

Interior of 442L

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## Survey Unit 442-A-001 Data Summary

| <u>Total Surface Activity Measurements</u> |                 |                         | <u>Removable Activity Measurements</u> |      |                         |
|--|-----------------|-------------------------|--|------|-------------------------|
|  | 48              |                         | 48                                     |      |                         |
|  | Number Required |                         | Number Obtained                        |      |                         |
| MIN  | -15.5           | dpm/100 cm <sup>2</sup> | MIN                                    | -1.2 | dpm/100 cm <sup>2</sup> |
| MAX  | 61.1            | dpm/100 cm <sup>2</sup> | MAX                                    | 8.2  | dpm/100 cm <sup>2</sup> |
| MEAN                                       | 1.8             | dpm/100 cm <sup>2</sup> | MEAN                                   | 1.0  | dpm/100 cm <sup>2</sup> |
| STD DEV                                    | 15.1            | dpm/100 cm <sup>2</sup> | STD DEV                                | 2.2  | dpm/100 cm <sup>2</sup> |
| TRANSURANIC<br>DCGL <sub>w</sub>           | 100             | dpm/100 cm <sup>2</sup> | TRANSURANIC<br>DCGL <sub>w</sub>       | 20   | dpm/100 cm <sup>2</sup> |

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**Survey Unit 442-A-001 Total Surface Activity Results**

| Manufacturer:                 | NE Electra |
|-------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Model:                        | DP-6       |
| Instrument ID#:               | 7          | 8          | 9          | 11         | 12         | 22         | 23         | 24         | 31         | 32         |
| Serial #:                     | 1513       | 1665       | 1136       | 1513       | 1513       | 3114       | 1665       | 3114       | 3114       | 3114       |
| Cal Due Date:                 | 9/29/01    | 8/26/01    | 8/13/01    | 9/29/01    | 9/29/01    | 11/1/01    | 8/21/01    | 11/1/01    | 11/1/01    | 11/1/01    |
| Analysis Date:                | 6/14/01    | 6/14/01    | 6/18/01    | 6/18/01    | 6/19/01    | 8/9/01     | 8/9/01     | 8/13/01    | 8/21/01    | 8/22/01    |
| Alpha Eff. (c/d):             | 0.212      | 0.212      | 0.208      | 0.2107     | 0.2107     | 0.220      | 0.212      | 0.220      | 0.22       | 0.22       |
| Alpha Bkgd (cpm)              | 1.3        | 1.3        | 2.0        | 2.0        | 0.7        | 0.7        | 1.3        | 0.7        | 1.3        | 2.0        |
| Sample Time (min)             | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        |
| LAB Time (min)                | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        |
| MDC (dpm/100cm <sup>2</sup> ) | 29.9       | 29.9       | 35.4       | 35.0       | 24.6       | 23.5       | 29.9       | 23.5       | 28.8       | 33.5       |

| Sample Location Number | Instrument ID#: | Sample Gross Counts (cpm) | LAB Gross Counts (cpm) | Sample Net Activity (dpm/100cm <sup>2</sup> ) |
|------------------------|-----------------|---------------------------|------------------------|---|
| 1                      | 11              | 0.7                       | 3.3                    | -12.2   |
| 2                      | 11              | 0.0                       | 4.0                    | -15.5   |
| 3                      | 7               | 2.7                       | 2.7                    | -2.7  |
| 4                      | 9               | 1.3                       | 2.7                    | -9.4  |
| 5                      | 8               | 2.0                       | 2.7                    | -6.0  |
| 6                      | 8               | 2.0                       | 5.3                    | -6.0  |
| 7                      | 7               | 3.3                       | 2.0                    | 0.2   |
| 8                      | 11              | 1.3                       | 2.0                    | -9.3  |
| 9                      | 7               | 4.0                       | 2.7                    | 3.5   |
| 10                     | 9               | 3.3                       | 2.7                    | 0.2   |
| 11                     | 9               | 0.7                       | 5.3                    | -12.3   |
| 12                     | 8               | 2.0                       | 4.0                    | -6.0  |
| 13                     | 8               | 2.7                       | 2.0                    | -2.7  |
| 14                     | 9               | 5.3                       | 3.3                    | 9.8   |
| 15                     | 11              | 4.7                       | 2.7                    | 6.8   |
| 16                     | 8               | 2.0                       | 4.0                    | -6.0  |
| 17                     | 11              | 5.3                       | 4.7                    | 9.7   |
| 18                     | 7               | 2.0                       | 2.7                    | -6.0  |
| 19                     | 9               | 4.7                       | 5.3                    | 6.9   |
| 20                     | 11              | 2.0                       | 4.0                    | -6.0  |
| 21                     | 9               | 4.0                       | 4.7                    | 3.5   |
| 22                     | 9               | 3.3                       | 2.7                    | 0.2   |
| 23                     | 9               | 4.0                       | 3.3                    | 3.5   |
| 24                     | 7               | 2.3                       | 5.3                    | -4.5  |
| 25                     | 8               | 1.3                       | 6.0                    | -9.3  |
| 26                     | 8               | 8.0                       | 4.0                    | 22.3  |
| 27                     | 8               | 2.0                       | 6.0                    | -6.0  |
| 28                     | 7               | 4.0                       | 4.0                    | 3.5   |
| 29                     | 8               | 2.0                       | 4.7                    | -6.0  |
| 30                     | 7               | 4.7                       | 6.7                    | 6.8   |

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**Survey Unit 442-A-001 Total Surface Activity Results**

|                               |            |            |            |            |            |            |            |            |            |            |
|-------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Manufacturer:                 | NE Electra |
| Model:                        | DP-6       |
| Instrument ID#:               | 7          | 8          | 9          | 11         | 12         | 22         | 23         | 24         | 31         | 32         |
| Serial #:                     | 1513       | 1665       | 1136       | 1513       | 1513       | 3114       | 1665       | 3114       | 3114       | 3114       |
| Cal Due Date:                 | 9/29/01    | 8/26/01    | 8/13/01    | 9/29/01    | 9/29/01    | 11/1/01    | 8/21/01    | 11/1/01    | 11/1/01    | 11/1/01    |
| Analysis Date:                | 6/14/01    | 6/14/01    | 6/18/01    | 6/18/01    | 6/19/01    | 8/9/01     | 8/9/01     | 8/13/01    | 8/21/01    | 8/22/01    |
| Alpha Eff. (e/d):             | 0.212      | 0.212      | 0.208      | 0.2107     | 0.2107     | 0.220      | 0.212      | 0.220      | 0.22       | 0.22       |
| Alpha Bkgd (cpm)              | 1.3        | 1.3        | 2.0        | 2.0        | 0.7        | 0.7        | 1.3        | 0.7        | 1.3        | 2.0        |
| Sample Time (min)             | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        |
| LAB Time (min)                | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        |
| MDC (dpm/100cm <sup>2</sup> ) | 29.9       | 29.9       | 35.4       | 35.0       | 24.6       | 23.5       | 29.9       | 23.5       | 28.8       | 33.5       |

| Sample Location Number | Instrument ID#: | Sample Gross Counts (cpm)     | LAB Gross Counts (cpm) | Sample Net Activity (dpm/100cm <sup>2</sup> ) |
|------------------------|-----------------|-------------------------------|------------------------|---|
| *31                    | 32              | 6.0                           | 2.7                    | 12.4  |
| *32                    | 22              | 2.7                           | 0.7                    | -2.6  |
| 33                     | 22              | 0.0                           | 1.3                    | -14.8   |
| 34                     | 22              | 2.7                           | 1.3                    | -2.6  |
| *35                    | 32              | 4.7                           | 2.3                    | 6.5   |
| 36                     | 23              | 2.0                           | 0.0                    | -6.0  |
| 37                     | 23              | 2.7                           | 2.7                    | -2.7  |
| 38                     | 22              | 16.7                          | 4.0                    | 61.1  |
| 39                     | 22              | 16.7                          | 2.0                    | 61.1  |
| 40                     | 24              | 0.0                           | 4.7                    | -14.8   |
| 41                     | 24              | 2.7                           | 2.7                    | -2.6  |
| 42                     | 24              | 4.0                           | 3.3                    | 3.4   |
| 43                     | 31              | 7.3                           | 2.7                    | 18.4  |
| 44                     | 22              | 2.0                           | 2.7                    | -5.7  |
| 45                     | 22              | 4.7                           | 3.3                    | 6.5   |
| 46                     | 22              | 2.7                           | 2.7                    | -2.6  |
| 47                     | 31              | 4.0                           | 0.7                    | 3.4   |
| 48                     | 31              | 6.7                           | 1.3                    | 15.6  |
|                        |                 | Average LAB                   |                        | 3.3   |
|                        |                 | MIN                           |                        | -15.5   |
|                        |                 | MAX                           |                        | 61.1  |
|                        |                 | MEAN                          |                        | 1.8   |
|                        |                 | SD                            |                        | 15.1  |
|                        |                 | Transuranic DCGL <sub>w</sub> |                        | 100   |

|       |    |                               |     |       |
|-------|----|-------------------------------|-----|-------|
| 16 QC | 9  | 0.0                           | 2.0 | -11.9 |
| 12 QC | 9  | 3.3                           | 2.7 | 4.0   |
| 17 QC | 31 | 1.3                           | 2.7 | -5.3  |
|       |    | Average LAB                   |     | 2.5   |
|       |    | MIN                           |     | -11.9 |
|       |    | MAX                           |     | 4.0   |
|       |    | MEAN                          |     | -4.4  |
|       |    | SD                            |     | 8.0   |
|       |    | Transuranic DCGL <sub>w</sub> |     | 100   |

\*Elevated beta activity was discovered at these sample locations (floor drains located inside B442L).

Gamma Spectroscopy isotopic analysis of rust chips inside these drains attributed the indicated activity to uranium.

No Pu or other DOE Rad-Added isotopes were identified. Copies of the gamma spectroscopy results are included in this data summary & the 442L Characterization Project Files.

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### Survey Unit 442-A-001 Smear Results

| Manufacturer:                 | Eberline |
|-------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Model:                        | SAC-4    | SAC-4    | SAC-4    | SAC-4    | SAC-4    | SAC-5    | SAC-6    | SAC-7    | SAC-7    |
| Instrument ID#:               | 1        | 2        | 3        | 4        | 5        | 6        | 13       | 14       | 15       |
| Serial #:                     | 830      | 833      | 767      | 770      | 966      | 770      | 767      | 851      | 905      |
| Cal Due Date:                 | 8/12/01  | 7/23/01  | 11/9/01  | 7/18/01  | 11/8/01  | 1/19/02  | 11/9/01  | 11/8/01  | 7/26/02  |
| Analysis Date:                | 6/18/01  | 6/18/01  | 6/18/01  | 6/18/01  | 8/22/01  | 8/22/01  | 8/22/01  | 8/22/01  | 8/22/01  |
| Alpha Eff. (c/d):             | 0.33     | 0.33     | 0.33     | 0.33     | 0.33     | 0.33     | 0.33     | 0.33     | 0.33     |
| Alpha Bkgd (cpm)              | 0.2      | 0.1      | 0.2      | 0.0      | 0.3      | 0.4      | 0.0      | 0.2      | 0.1      |
| Sample Time (min)             | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        |
| Bkgd Time (min)               | 10       | 10       | 10       | 10       | 10       | 10       | 10       | 10       | 10       |
| MDC (dpm/100cm <sup>2</sup> ) | 8.0      | 7.0      | 8.0      | 4.5      | 8.8      | 9.4      | 4.5      | 8.0      | 7.0      |

| Sample Location Number | Instrument ID# | Gross Counts (cpm)            | Net Activity (dpm/100 cm <sup>2</sup> ) |
|------------------------|----------------|-------------------------------|---|
| 1                      | 3              | 1                             | 2.4                                     |
| 2                      | 1              | 1                             | 2.4                                     |
| 3                      | 3              | 0                             | -0.6                                    |
| 4                      | 4              | 0                             | 0.0                                     |
| 5                      | 4              | 1                             | 3.0                                     |
| 6                      | 1              | 1                             | 2.4                                     |
| 7                      | 1              | 0                             | -0.6                                    |
| 8                      | 1              | 0                             | -0.6                                    |
| 9                      | 2              | 0                             | -0.3                                    |
| 10                     | 3              | 1                             | 2.4                                     |
| 11                     | 4              | 0                             | 0.0                                     |
| 12                     | 2              | 0                             | -0.3                                    |
| 13                     | 1              | 1                             | 2.4                                     |
| 14                     | 2              | 0                             | -0.3                                    |
| 15                     | 2              | 0                             | -0.3                                    |
| 16                     | 4              | 1                             | 3.0                                     |
| 17                     | 2              | 1                             | 2.7                                     |
| 18                     | 3              | 1                             | 2.4                                     |
| 19                     | 2              | 0                             | -0.3                                    |
| 20                     | 1              | 0                             | -0.6                                    |
| 21                     | 3              | 0                             | -0.6                                    |
| 22                     | 1              | 0                             | -0.6                                    |
| 23                     | 4              | 0                             | 0.0                                     |
| 24                     | 4              | 0                             | 0.0                                     |
| 25                     | 4              | 0                             | 0.0                                     |
| 26                     | 2              | 0                             | -0.3                                    |
| 27                     | 1              | 1                             | 2.4                                     |
| 28                     | 2              | 0                             | -0.3                                    |
| 29                     | 2              | 0                             | -0.3                                    |
| 30                     | 3              | 0                             | -0.6                                    |
| 31                     | 13             | 0                             | 0.0                                     |
| 32                     | 5              | 1                             | 2.1                                     |
| 33                     | 14             | 0                             | -0.6                                    |
| 34                     | 5              | 3                             | 8.2                                     |
| 35                     | 6              | 1                             | 1.8                                     |
| 36                     | 6              | 0                             | -1.2                                    |
| 37                     | 13             | 1                             | 3.0                                     |
| 38                     | 5              | 3                             | 8.2                                     |
| 39                     | 14             | 2                             | 5.5                                     |
| 40                     | 5              | 1                             | 2.1                                     |
| 41                     | 6              | 0                             | -1.2                                    |
| 42                     | 14             | 0                             | -0.6                                    |
| 43                     | 14             | 1                             | 2.4                                     |
| 44                     | 13             | 0                             | 0.0                                     |
| 45                     | 5              | 1                             | 2.1                                     |
| 46                     | 6              | 0                             | -1.2                                    |
| 47                     | 6              | 0                             | -1.2                                    |
| 48                     | 13             | 0                             | 0.0                                     |
|                        |                | MIN                           | -1.2                                    |
|                        |                | MAX                           | 8.2                                     |
|                        |                | MEAN                          | 1.0                                     |
|                        |                | SD                            | 2.2                                     |
|                        |                | Transuranic DCGL <sub>w</sub> | 20                                      |

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**GAMMA SPECTROSCOPY**  
**ANALYTICAL RESULTS**

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QA Background Count Performed?  YES  NO

If No, Explanation:

**QA Criteria:**

Upper and lower boundaries have been established for peak centroid warning and control limits for selected energy lines. Upper and lower boundary limits for peak centroids are set as absolutes from the calibration centroids. FWHM and activity parameters are controlled at 2 and 3 sigma limits for selected energies that cover the full range of energies in the spectrum. The limits for the QA parameters are derived from a running mean of the QA data collected since the initial calibration of the detector for the N-sigma parameters.

**Nonconformance & Operational Variances:**

None.

**Discussion:**

The activity reported for Th-234 is the recommended activity for U-238.

MDA Calculation - Currie Method as specified in the Genie 2000 Customized Tools Manual, Appendix B; Basic Algorithms.

**Canberra Project Manager/Manager's Designee Comments:**

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature."

*"I certify that this electronic image, and all hardcopies produced from this image, accurately represents the data and is in compliance with the RFETS specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager or the Manager's designee."*

Larry Umbaugh  
Signature

Laboratory Director  
Title

8/28/01  
Date

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Analysis Results Header

8/28/2001 7:45:50 AM

Page 1

\*\*\*\*\*  
 \*\*\*\*\* GAMMA SPECTRUM ANALYSIS \*\*\*\*\*  
 \*\* Canberra Mobile Laboratory Services \*\*  
 \*\*\*\*\*

Report Generated On : 8/28/2001 7:45:50 AM

KIN Number : 01D1345  
 Analytical Batch ID : 0108274453  
 Line Item Code : RC10B019

Filename: A:\OBJ00180.CNF

Sample Number : 01D1345-001.001  
 Lab Sample Number : CMLS-572  
 Sample Receipt Date : 8/27/2001  
 Sample Volume Received : 6.24E+001 GRAMS

Result Identifier : N/A

Peak Locate Threshold : 2.00  
 Peak Locate Range (in channels) : 100 - 8192  
 Peak Area Range (in channels) : 100 - 8192  
 Identification Energy Tolerance : 1.500 keV

Sample (Final Aliquot Size) : 6.240E+001 GRAMS  
 Sample Quantity Error : 0.000E+000  
 Systematic Error Applied : 0.000E+000

Sample Taken On : 8/24/2001 9:30:00 AM  
 Acquisition Started : 8/27/2001 12:40:21 PM

Count Time : 3600.0 seconds  
 Real Time : 3600.4 seconds  
 Dead Time : 0.01 %

Energy Calibration Used Done On : 7/10/01  
 Energy = 0.441 + 0.250\*ch + 6.37E-008\*ch^2 + -1.05E-011\*ch^3

Corrections Applied:  
 None

Efficiency Calibration Used Done On : 8/27/01  
 Efficiency Geometry ID : 01D1345

Analyzed By: Shari Chambers Date: 8/28/01

Reviewed By: Larry Umbaugh Date: 8/28/01

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Sample and QC Sample Results Summary 8/28/01 7:45:50 AM Page 2

\*\*\*\*\*  
 \*\*\*\*\* Sample and QC Sample Results Summary \*\*\*\*\*  
 \*\*\*\*\*

Site Sample ID : 01D1345-001.001

Analytical Batch ID : 0108274453

Sample Type (Result Identifier): OBJ

Lab Sample Number : CMLS-572

Geometry ID : 01D1345

Filename: A:\OBJ00180.CNF

Detector Name: BEGE

MDA = Curie method as specified in Genie-2000 Customization Tools Manual Appendix B; Basic Algorithms.

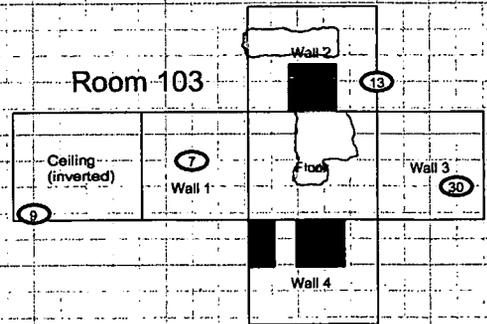
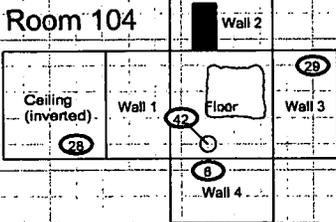
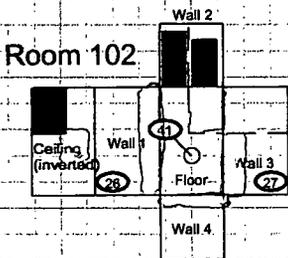
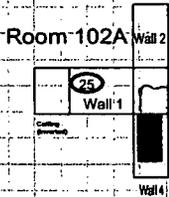
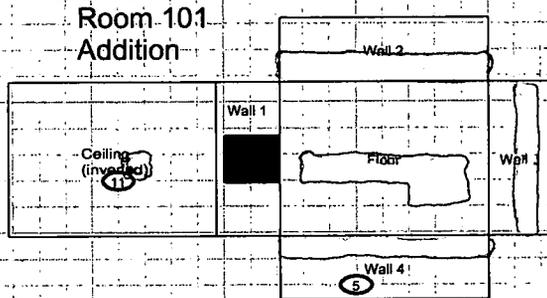
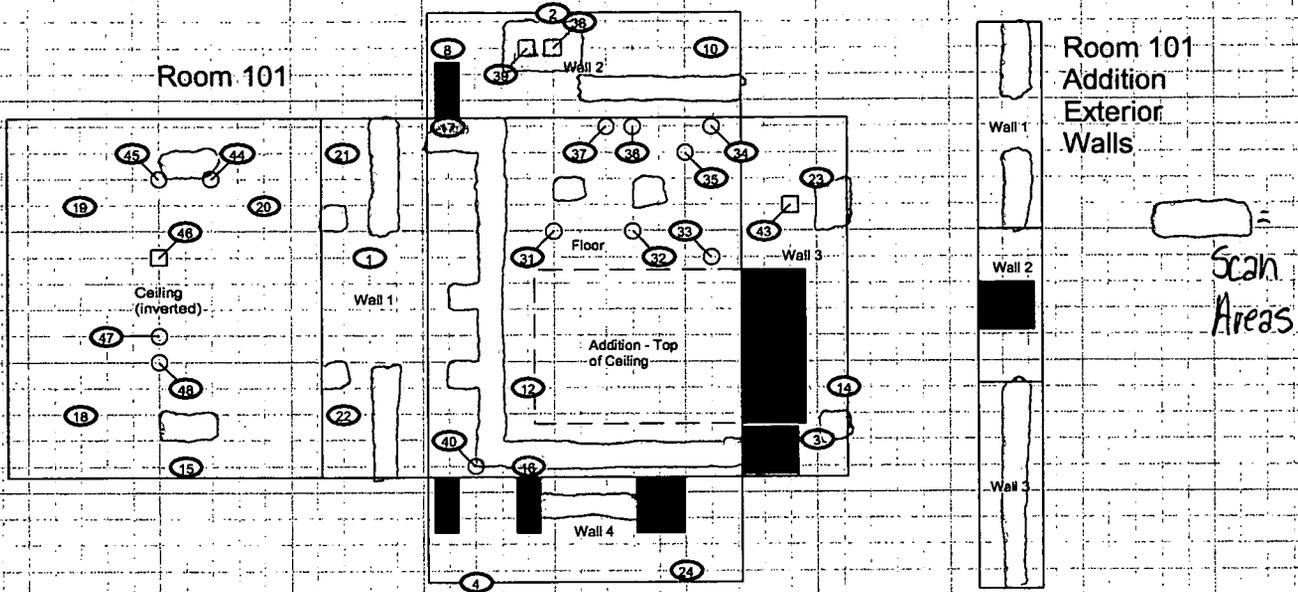
| Analyte | Activity<br>(pCi/GRAMS ) | 2-Sigma Uncertainty<br>(pCi/GRAMS ) | MDA<br>(pCi/GRAMS ) |
|---------|--------------------------|-------------------------------------|---------------------|
| K-40    | 0.00E+000                | 0.00E+000                           | 2.04E+000           |
| Tl-208  | 0.00E+000                | 0.00E+000                           | 1.29E-001           |
| Po-210  | 0.00E+000                | 0.00E+000                           | 1.13E+004           |
| Pb-212  | 0.00E+000                | 0.00E+000                           | 1.22E+000           |
| Pb-212  | 0.00E+000                | 0.00E+000                           | 1.65E-001           |
| Bi-214  | 0.00E+000                | 0.00E+000                           | 3.27E-001           |
| Pb-214  | 1.74E-001                | 1.04E-001                           | 1.40E-001           |
| Ra-226  | 0.00E+000                | 0.00E+000                           | 1.35E+000           |
| Ac-228  | 0.00E+000                | 0.00E+000                           | 3.77E-001           |
| Th-230  | 0.00E+000                | 0.00E+000                           | 2.06E+001           |
| Th-231  | 0.00E+000                | 0.00E+000                           | 1.02E+000           |
| Pa-234  | 0.00E+000                | 0.00E+000                           | 2.34E-001           |
| Pa-234M | 0.00E+000                | 0.00E+000                           | 2.19E+001           |
| Tl-234  | 3.21E+001                | 1.60E+001                           | 1.16E+000           |
| U-235   | 6.35E-001                | 2.67E-001                           | 8.35E-002           |
| Am-241  | 1.08E-001                | 8.20E-002                           | 2.31E-001           |

The activity reported for Th-234 is the recommended activity for U-238, RISS Rad.  
 Engineering concurs that the indicated activity is due to uranium isotopes. JB9/2/01

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**PRE-DEMOLITION SURVEY FOR GROUP 5 CLUSTER**

Survey Area: A      Survey Unit: 442-A-001      Classification: 3  
 Building: 442L  
 Survey Unit Description: Interior of B442L  
 Total Area: 948 sq. m.      Total Floor Area: 259 sq. m.



|   |   |   |   |   |
|---|---|---|---|---|
| <p><b>SURVEY MAP LEGEND</b></p> <ul style="list-style-type: none"> <li>⊕ Smear &amp; TSA Location</li> <li>⊕ Smear, TSA &amp; Sample Location</li> <li>■ Open/Inaccessible Area</li> <li>□ Area in Another Survey Unit</li> </ul> | <p>Neither the United States Government nor Kiewit Hill Co., nor DynCorp I&amp;ET, nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.</p> | <p>Scan Survey Information<br/>                 Survey Instrument ID #(s): 9, 10, 12, 23<br/>                 RCT ID #(s): 1, 2, 3, 5</p> | <p>0 FEET 30<br/>                 0 METERS 10<br/>                 1 inch = 24 feet 1 grid sq. = 1 sq. m.</p> | <p>U.S. Department of Energy<br/>                 Rocky Flats Environmental Technology Site<br/>                 Prepared by: GIS Dept. 303-668-7703 Prepared for:<br/> <b>DynCorp</b><br/>                 THE ART OF TECHNOLOGY<br/>                 MAP ID: FV2001/01-0303      September 13, 2001</p> |
|---|---|---|---|---|

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**SURVEY UNIT DATA SUMMARY: 442-B-002**

Survey Unit Description:

Exterior of 442L

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## Survey Unit 442-B-002 Data Summary

| <u>Total Surface Activity Measurements</u> |                 |                         | <u>Removable Activity Measurements</u> |      |                         |
|--|-----------------|-------------------------|--|------|-------------------------|
|  | 15              |                         | 15                                     |      |                         |
|  | Number Required |                         | Number Obtained                        |      |                         |
| MIN  | 7.0             | dpm/100 cm <sup>2</sup> | MIN                                    | -0.9 | dpm/100 cm <sup>2</sup> |
| MAX  | 49.3            | dpm/100 cm <sup>2</sup> | MAX                                    | 2.4  | dpm/100 cm <sup>2</sup> |
| MEAN                                       | 21.6            | dpm/100 cm <sup>2</sup> | MEAN                                   | 0.2  | dpm/100 cm <sup>2</sup> |
| STD DEV                                    | 13.5            | dpm/100 cm <sup>2</sup> | STD DEV                                | 1.4  | dpm/100 cm <sup>2</sup> |
| TRANSURANIC<br>DCGL <sub>w</sub>           | 100             | dpm/100 cm <sup>2</sup> | TRANSURANIC<br>DCGL <sub>w</sub>       | 20   | dpm/100 cm <sup>2</sup> |

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## Survey Unit 442-B-002 Total Surface Activity Results

|                                    |            |            |            |            |            |
|------------------------------------|------------|------------|------------|------------|------------|
| <b>Manufacturer:</b>               | NE Electra |
| <b>Model:</b>                      | DP-6       | DP-6       | DP-6       | DP-6       | DP-6       |
| <b>Instrument ID#:</b>             | 7          | 8          | 9          | 10         | 11         |
| <b>Serial #:</b>                   | 1136       | 1420       | 1665       | 1665       | 1136       |
| <b>Cal Due Date:</b>               | 8/13/01    | 8/28/01    | 8/26/01    | 8/26/01    | 8/13/01    |
| <b>Analysis Date:</b>              | 6/19/01    | 6/19/01    | 6/20/01    | 6/21/01    | 6/21/01    |
| <b>Alpha Eff. (c/d):</b>           | 0.2077     | 0.2195     | 0.2116     | 0.2116     | 0.2077     |
| <b>Alpha Bkgd (cpm)</b>            | 0.7        | 2.7        | 2.0        | 1.3        | 1.0        |
| <b>Sample Time (min)</b>           | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        |
| <b>LAB Time (min)</b>              | 1.5        | 1.5        | 1.5        | 1.5        | 1.5        |
| <b>MDC (dpm/100cm<sup>2</sup>)</b> | 24.9       | 37.6       | 34.8       | 29.9       | 27.9       |

| Sample Location Number              | Instrument ID#: | Sample Gross Counts (cpm) | LAB Gross Counts (cpm) | Sample Net Activity (dpm/100cm <sup>2</sup> ) |
|-------------------------------------|-----------------|---------------------------|------------------------|---|
| 1                                   | 8               | 10.7                      | 4.0                    | 37.5  |
| 2                                   | 7               | 4.0                       | 0.7                    | 7.4   |
| 3                                   | 7               | 8.7                       | 3.3                    | 30.0  |
| 4                                   | 8               | 4.0                       | 0.7                    | 7.0   |
| 5                                   | 7               | 12.0                      | 3.3                    | 45.9  |
| 6                                   | 7               | 7.3                       | 2.0                    | 23.3  |
| 7                                   | 7               | 12.7                      | 2.0                    | 49.3  |
| 8                                   | 8               | 6.0                       | 1.3                    | 16.1  |
| 9                                   | 8               | 5.3                       | 5.3                    | 12.9  |
| 10                                  | 7               | 5.3                       | 4.0                    | 13.6  |
| 11                                  | 7               | 4.0                       | 3.3                    | 7.4   |
| 12                                  | 8               | 7.3                       | 2.0                    | 22.0  |
| 13                                  | 8               | 6.7                       | 2.7                    | 19.3  |
| 14                                  | 7               | 5.3                       | 0.0                    | 13.6  |
| 15                                  | 8               | 6.7                       | 2.4                    | 19.3  |
| <b>Average LAB</b>                  |                 |                           |                        | <b>2.5</b>                                    |
| <b>MIN</b>                          |                 |                           |                        | <b>7.0</b>                                    |
| <b>MAX</b>                          |                 |                           |                        | <b>49.3</b>                                   |
| <b>MEAN</b>                         |                 |                           |                        | <b>21.6</b>                                   |
| <b>SD</b>                           |                 |                           |                        | <b>13.5</b>                                   |
| <b>Transuranic DCGL<sub>w</sub></b> |                 |                           |                        | <b>100</b>                                    |

|                                     |   |     |     |             |
|-------------------------------------|---|-----|-----|-------------|
| 2 QC                                | 8 | 4.0 | 4.0 | -3.0        |
| 4 QC                                | 7 | 6.7 | 5.3 | 9.9         |
| <b>Average LAB</b>                  |   |     |     | <b>4.7</b>  |
| <b>MIN</b>                          |   |     |     | <b>-3.0</b> |
| <b>MAX</b>                          |   |     |     | <b>9.9</b>  |
| <b>MEAN</b>                         |   |     |     | <b>3.5</b>  |
| <b>SD</b>                           |   |     |     | <b>9.1</b>  |
| <b>Transuranic DCGL<sub>w</sub></b> |   |     |     | <b>100</b>  |

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## Survey Unit 442-B-002 Smear Results

|                                    |          |          |          |          |
|------------------------------------|----------|----------|----------|----------|
| <b>Manufacturer:</b>               | Eberline | Eberline | Eberline | Eberline |
| <b>Model:</b>                      | SAC-4    | SAC-4    | SAC-4    | SAC-4    |
| <b>Instrument ID#:</b>             | 1        | 2        | 3        | 4        |
| <b>Serial #:</b>                   | 830      | 833      | 767      | 770      |
| <b>Cal Due Date:</b>               | 8/12/01  | 7/23/01  | 8/27/01  | 7/18/01  |
| <b>Analysis Date:</b>              | 6/19/01  | 6/19/01  | 6/19/01  | 6/19/01  |
| <b>Alpha Eff. (c/d):</b>           | 0.33     | 0.33     | 0.33     | 0.33     |
| <b>Alpha Bkgd (cpm)</b>            | 0.2      | 0.3      | 0.1      | 0.2      |
| <b>Sample Time (min)</b>           | 2        | 2        | 2        | 2        |
| <b>Bkgd Time (min)</b>             | 10       | 10       | 10       | 10       |
| <b>MDC (dpm/100cm<sup>2</sup>)</b> | 8.0      | 8.8      | 7.0      | 8.0      |

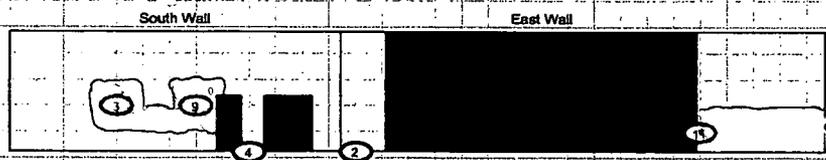
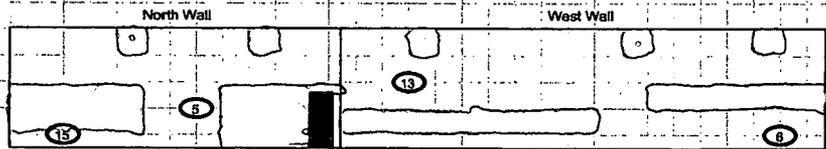
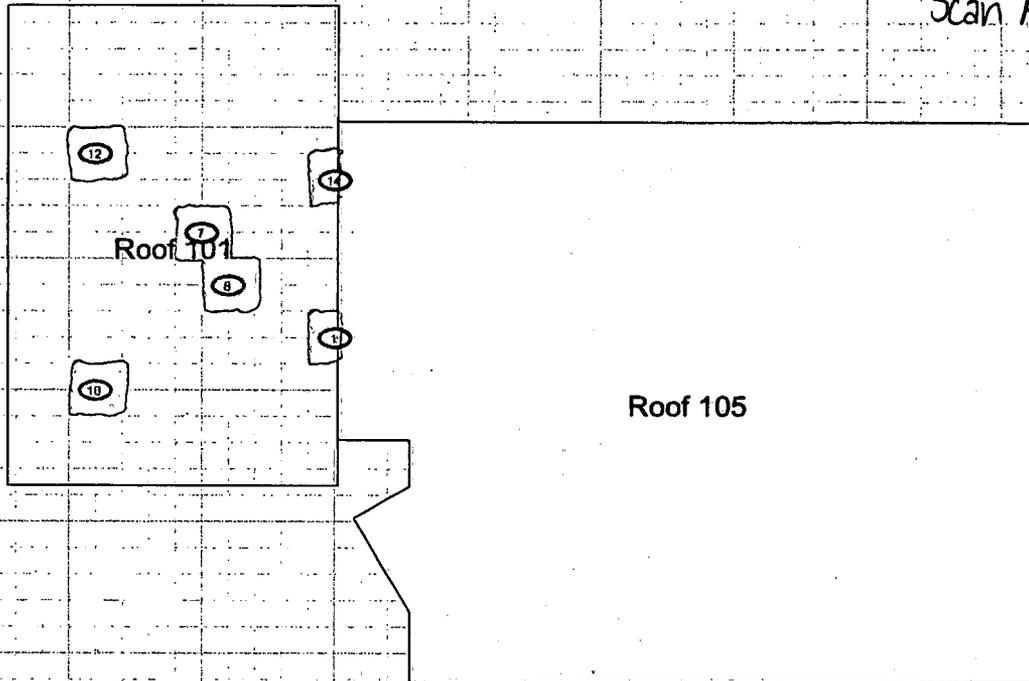
| Sample Location Number | Instrument ID# | Gross Counts (cpm)            | Net Activity (dpm/100 cm <sup>2</sup> ) |
|------------------------|----------------|-------------------------------|---|
| 1                      | 1              | 0                             | -0.6                                    |
| 2                      | 3              | 0                             | -0.3                                    |
| 3                      | 2              | 0                             | -0.9                                    |
| 4                      | 3              | 0                             | -0.3                                    |
| 5                      | 4              | 1                             | 2.4                                     |
| 6                      | 1              | 1                             | 2.4                                     |
| 7                      | 4              | 1                             | 2.4                                     |
| 8                      | 1              | 1                             | 2.4                                     |
| 9                      | 4              | 0                             | -0.6                                    |
| 10                     | 2              | 0                             | -0.9                                    |
| 11                     | 1              | 0                             | -0.6                                    |
| 12                     | 3              | 0                             | -0.3                                    |
| 13                     | 2              | 0                             | -0.9                                    |
| 14                     | 2              | 0                             | -0.9                                    |
| 15                     | 3              | 0                             | -0.3                                    |
|                        |                | MIN                           | -0.9                                    |
|                        |                | MAX                           | 2.4                                     |
|                        |                | MEAN                          | 0.2                                     |
|                        |                | SD                            | 1.4                                     |
|                        |                | Transuranic DCGL <sub>w</sub> | 20                                      |

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**PRE-DEMOLITION SURVEY FOR GROUP 5 CLUSTER**

Survey Area: B      Survey Unit: 442-B-002      Classification: 3  
 Building: 442L  
 Survey Unit Description: Exterior of B442L  
 Total Area: 447 sq. m.      Total Floor Area: 0 sq. m.

Scan Areas



|   |   |  |  |
|---|---|--|--|
| <p><b>SURVEY MAP LEGEND</b></p> <ul style="list-style-type: none"> <li> Smear &amp; TSA Location</li> <li> Smear, TSA &amp; Sample Location</li> <li> Open/inaccessible Area</li> <li> Area in Another Survey Unit</li> </ul> | <p>Neither the United States Government nor Kaiser Hill Co., nor DynCorp I&amp;ET, nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.</p> <p><b>Scan Survey Information</b><br/>                 Survey Instrument ID #(s): 7, 8, 10, 11<br/>                 RCT ID #(s): 1, 2, 3, 4</p> | <p>0      FEET      30</p> <p>0      METERS      10</p> <p>1 inch = 24 feet    1 grid sq. = 1 sq. m.</p> | <p>U.S. Department of Energy<br/>                 Rocky Flats Environmental Technology Site</p> <p>Prepared by: GHS Dept. 303-868-770 Prepared for:<br/> <b>DynCorp</b><br/>                 THE ART OF TECHNOLOGY</p> <p>MAP ID: h2991/01-0393      March 6, 2001</p> |
|---|---|--|--|

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# ATTACHMENT F

## Chemical Data Summaries and Sample Maps

**Asbestos Data Summary**

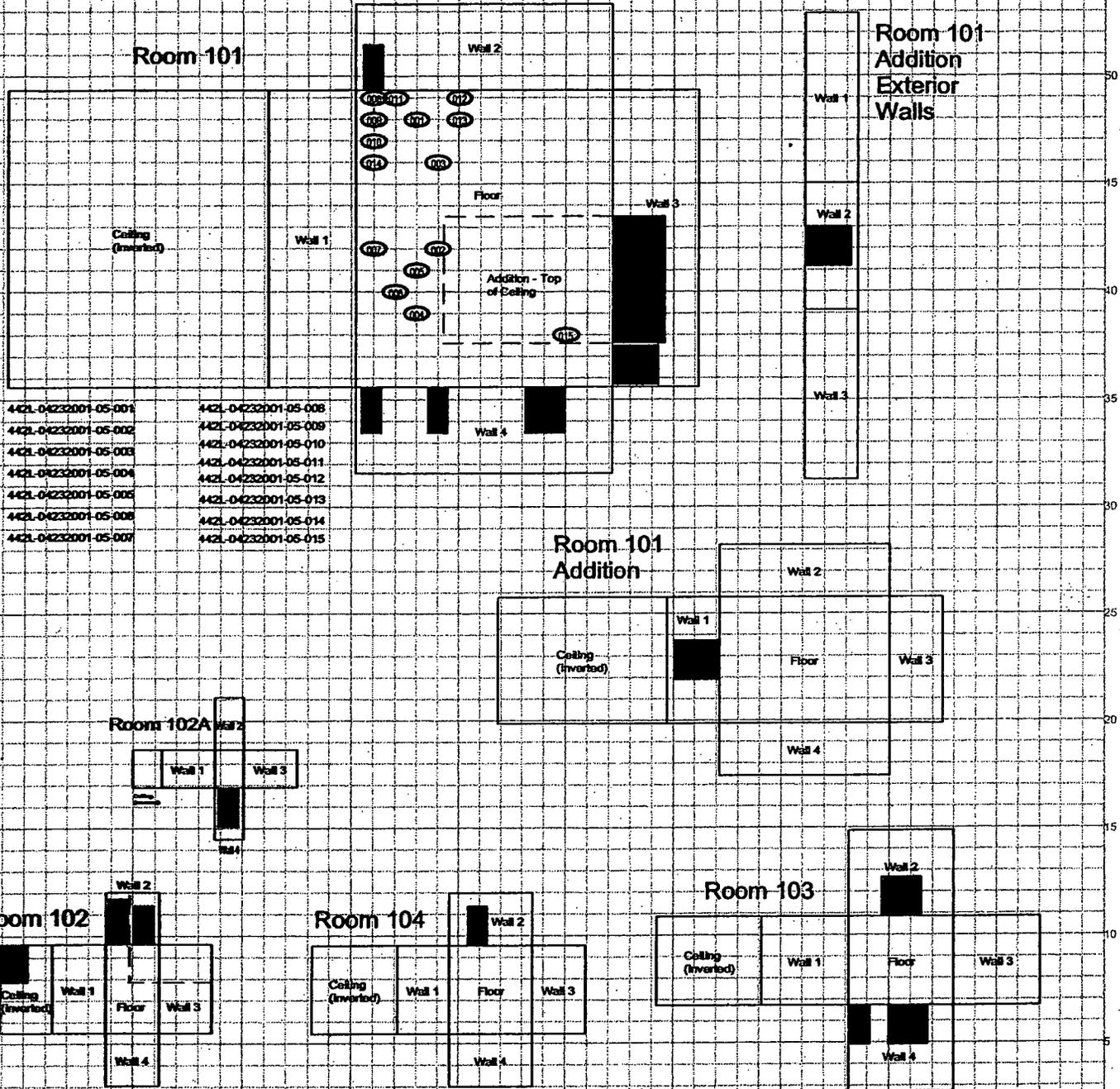
| Sample Number        | Material Sampled & Location  | Analytical Results   |
|----------------------|--|--|
| 442L-04232001-05-001 | 442L, Room 101 – [A] Yellow Mastic   | None Detected  |
|                      | [B] 12" x 12" white/tan floor tile w/ brown streak   | Chrysotile 7%  |
| 442L-04232001-05-002 | 442L, Room 101 – [A] Yellow Mastic   | None Detected  |
|                      | [B] 12" x 12" white/tan floor tile w/brown streak  | Chrysotile 7%  |
| 442L-04232001-05-003 | 442L, Room 101 – 12" x 12" white/gray floor tile with gray streak, gray plaster and yellow mastic  | None Detected  |
| 442L-04232001-05-004 | 442L, Room 101 – 12" x 12" white/gray floor tile with gray streak, gray plaster, and yellow mastic | None Detected  |
| 442L-04232001-05-005 | 442L, Room 101 – 12" x 12" white floor tile with light green olive streak, and yellow mastic       | None Detected  |
| 442L-04232001-05-006 | 442L, Room 101 – 12" x 12" white floor tile with light green olive streak, and yellow mastic       | None Detected  |
| 442L-04232001-05-007 | 442L, Room 101 – TSI white elbow from condensate steam by pump                                     | None Detected  |
|                      | [A] White fibrous woven material   | None Detected  |
|                      | [B] White fibrous woven material w/white & gray paint & clear resin                                | None Detected  |
| 442L-04232001-05-008 | [C] White fibrous plaster  | Chrysotile Trace<br>Point count Trace<br>Amosite 2%<br>Point count Trace |
|                      | 442L, Room 101 – TSI white on straight section on pump steam line, labeled asbestos                | None Detected  |
|                      | [A] White fibrous woven material w/white paint   | None Detected  |
| 442L-04232001-05-009 | [B] White fibrous plaster  | Chrysotile 7%<br>Amosite 13%   |
|                      | 442L, Room 101 – TSI white, straight section on 125 steam, labeled asbestos                        | None Detected  |
| 442L-04232001-05-010 | [A] White fibrous woven material w/white paint   | Chrysotile 7%<br>Amosite 13%   |
|                      | [B] White fibrous plaster  | Chrysotile 7%<br>Amosite 13%   |

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| Sample Number        | Material Sampled & Location   | Analytical Results                    |
|----------------------|---|---------------------------------------|
| 442L-04232001-05-011 | 442L, Room 101 – TSI gray elbow from condensate steam line, labeled asbestos free<br>[A] White fibrous woven material w/white paint       | Chrysotile Trace<br>Point Count Trace |
|                      | [B] Gray fibrous plaster  | None Detected                         |
| 442L-04232001-05-012 | 442L, Room 101 -- TSI gray elbow from HVAC unit, labeled asbestos free. White fibrous woven material w/white paint & gray fibrous plaster | None Detected                         |
| 442L-04232001-05-013 | 442L, Room 101 -- TSI gray elbow from HVAC unit, labeled asbestos free<br>[A] White fibrous woven material w/white paint                  | Chrysotile Trace<br>Point Count Trace |
|                      | [B] Gray fibrous plaster  | None Detected                         |
| 442L-04232001-05-014 | 442L, Room 101 – Brown Cove Base with brown mastic  | None Detected                         |
| 442L-04232001-05-015 | 442L, Room 101 Addition – White/tan drywall w/white tape, mud, and paint  | None Detected                         |
| 442L-04232001-05-016 | 442L, Roof, east end – Brown fibrous tar w/black tar & silver paint   | Chrysotile 30%                        |
| 442L-04232001-05-017 | 442L, Roof, center – (Core sample) Yellow fibrous material & black fibrous tar  | None Detected                         |
| 442L-04232001-05-018 | 442L, Roof, NW center – (Core sample) Yellow fibrous material & black fibrous tar   | None Detected                         |
| 442L-04232001-05-019 | 442L, Roof flashing near tall vent, center – Brown fibrous tar w/black tar & silver paint   | Chrysotile 30%                        |

**PRE-DEMOLITION SURVEY FOR GROUP 5 CLUSTER**

Survey Area: A      Survey Unit: 442-A-001      Classification: N/A  
 Building: 442L  
 Survey Unit Description: Interior of B442L



**SURVEY MAP LEGEND**

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

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N ↑

0      FEET      30

0      METERS      10

1 inch = 24 feet    1 grid sq. = 1 sq. m.

U.S. Department of Energy  
 Rocky Flats Environmental Technology Site

Prepared by: G23 Dept. 393-006-770/Prepared for:  
**DynCorp**  
 THE ART OF TECHNOLOGY

MAP ID: G230101-5302      March 8, 2001

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**Beryllium Data Summary**

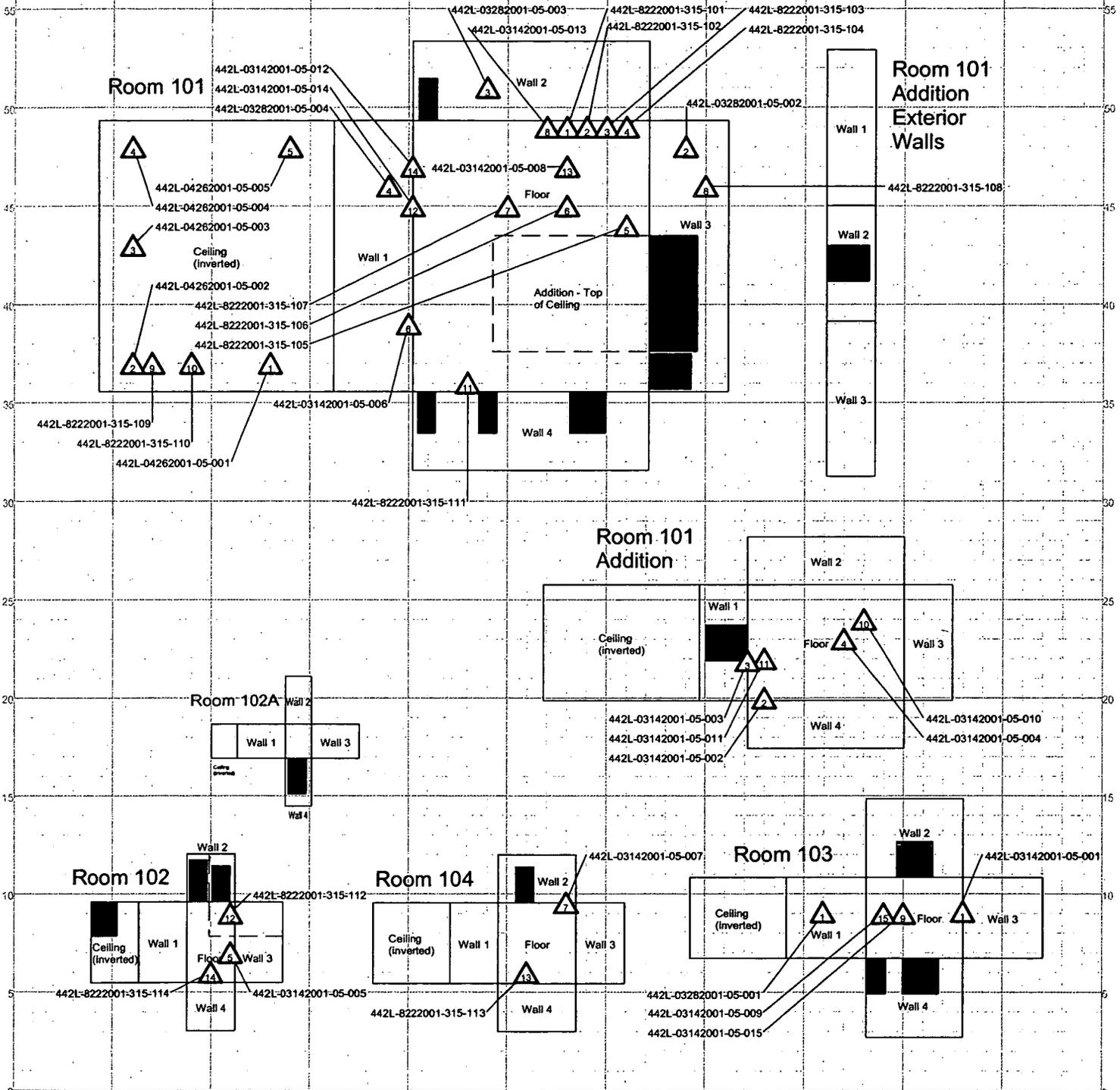
| Sample Number        | Sample Location  | Result<br>(ug/100 cm <sup>2</sup> ) |
|----------------------|--|-------------------------------------|
| 442L-03282001-05-001 | 442L, Room 103, west wall, >6' high                                  | < 0.1                               |
| 442L-03282001-05-002 | 442L, Room 101, window sill at east end, >4' high                    | < 0.1                               |
| 442L-03282001-05-003 | 442L, Room 101, window sill at NW corner, >4' high                   | < 0.1                               |
| 442L-03282001-05-004 | 442L, Room 101, window sill at WN corner, >4' high                   | < 0.1                               |
| 442L-04262001-05-001 | 442L, Room 101, on top of light fixture, >8' high                    | < 0.1                               |
| 442L-04262001-05-002 | 442L, Room 101, on top of light fixture, >8' high                    | < 0.1                               |
| 442L-04262001-05-003 | 442L, Room 101, on top of light fixture, >8' high                    | < 0.1                               |
| 442L-04262001-05-004 | 442L, Room 101, on top of light fixture, >8' high                    | < 0.1                               |
| 442L-04262001-05-005 | 442L, Room 101, on top of light fixture, >8' high                    | < 0.1                               |
| 442L-03142001-05-001 | 442L, Room 103, juncture of wall & floor, 6'1" s. of Wall 2          | < 0.1                               |
| 442L-03142001-05-002 | 442L, Room 101 addition, juncture of wall & floor, 2'9" e. of Wall 1 | < 0.1                               |
| 442L-03142001-05-003 | 442L, Room 101 addition, floor 7' n. of Wall 4                       | < 0.1                               |
| 442L-03142001-05-004 | 442L, Room 101 addition, floor 9'1" s. of Wall 2 & 9'11" w. of #3    | < 0.1                               |
| 442L-03142001-05-005 | 442L, Room 102, floor 9" w. of Wall 3 & 2'9" s. of Wall 2            | < 0.1                               |
| 442L-03142001-05-006 | 442L, Room 101, juncture of floor & Wall 1, 11'3" n. of #4           | < 0.1                               |
| 442L-03142001-05-007 | 442L, Room 104, juncture of floor & Wall 2, 1'8" w. of #3            | < 0.1                               |
| 442L-03142001-05-008 | 442L, Room 101, floor, 1'1" s. of #2 & 16'10" w. of #3               | < 0.1                               |
| 442L-03142001-05-009 | 442L, Room 103, floor, 6'1" e. of #1 & 6'1" s. of #2                 | < 0.1                               |
| 442L-03142001-05-010 | 442L, Room 101 addition, floor, 5'9" s. of #2 & 6'8" w. of #3        | < 0.1                               |
| 442L-03142001-05-011 | 442L, Room 101 addition, floor 7' n. of Wall 4                       | < 0.1                               |
| 442L-03142001-05-012 | 442L, Room 101, juncture of floor & wall 1, 14'3" s. of #2           | < 0.1                               |
| 442L-03142001-05-013 | 442L, Room 101, floor, 7'8" s. of #2 & 13'7" w. of #3                | < 0.1                               |
| 442L-03142001-05-014 | 442L, Room 101, juncture of floor & wall 1, 7'8" s. of #2            | < 0.1                               |
| 442L-03142001-05-015 | 442L, Room 103, floor, 2'10" e. of #1 & 6'1" s. of #2                | < 0.1                               |
|                      |  |                                     |
| 442L-8222001-315-101 | Room 101, Interior surface of floor drain                            | < 0.1                               |
| 442L-8222001-315-102 | Room 101, Interior surface of floor drain                            | < 0.1                               |
| 442L-8222001-315-103 | Room 101, Interior surface of floor drain                            | 0.455                               |
| 442L-8222001-315-104 | Room 101, Interior surface of floor drain                            | < 0.1                               |

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| Sample Number        | Sample Location   | Result (ug/100 cm <sup>3</sup> ) |
|----------------------|---|----------------------------------|
| 442L-8222001-315-105 | Room 101, Interior surface of floor drain                               | < 0.1                            |
| 442L-8222001-315-106 | Room 101, Interior surface of floor drain                               | < 0.1                            |
| 442L-8222001-315-107 | Room 101, Interior surface of floor drain                               | < 0.1                            |
| 442L-8222001-315-108 | Room 101, Interior of exhaust duct, west window, 9' high                | < 0.1                            |
| 442L-8222001-315-109 | Room 101 Addition, interior of exhaust duct, ceiling, 15' high          | < 0.1                            |
| 442L-8222001-315-110 | Room 101 Addition, interior of exhaust duct, ceiling, 15' high          | < 0.1                            |
| 442L-8222001-315-111 | Room 101, Interior surface of floor drain                               | < 0.1                            |
| 442L-8222001-315-112 | Room 102, Women's Bathroom shower drain, exterior                       | < 0.1                            |
| 442L-8222001-315-113 | Room 104, Interior surface of floor drain                               | < 0.1                            |
| 442L-8222001-315-114 | Room 102, Women's bathroom, interior surface of floor drain by commode. | < 0.1                            |

**PRE-DEMOLITION SURVEY FOR GROUP 5 CLUSTER**

Survey Area: A      Survey Unit: 442-A-001      Classification: N/A  
 Building: 442L  
 Survey Unit Description: Interior of B442L



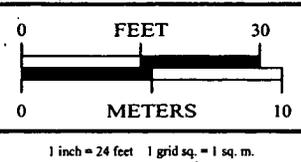
**SURVEY MAP LEGEND**

|  |                             |
|--|-----------------------------|
|  | Asbestos Sample Location    |
|  | Beryllium Sample Location   |
|  | Lead Sample Location        |
|  | RCRA/CERCLA Sample Location |
|  | PCB Sample Location         |

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Open/Inaccessible Area

Area in Another Survey Unit



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MAP ID: R/2001/01-0303      September 12, 2001

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### PCB Data Summary

| Sample Number   | Sample Location   | Results* (ppm) |
|-----------------|---|----------------|
| 01S0051-001.002 | 442L, Concrete pad, west side Room 101, near steam pump | NON-DETECT     |
| 01S0051-002.002 | 442L, Concrete pad, west side Room 101, near steam pump | NON-DETECT     |
| 01S0051-003.002 | 442L, Concrete pad, west side Room 101, near steam pump | NON-DETECT     |
| 01S0051-004.002 | 42L, Duplicate of 01S0051-002.002                       | NON-DETECT     |

\* All results are well below the regulatory limit for PCB remediation waste (50 ppm), and below the level for cleanup requirements (25 ppm) as outlined in the *Final Proposed Action Memorandum Remediation of Polychlorinated Biphenyls*, RFETS, May 1995.

\*\* The highest detection limit is for Aroclor 1221 at 0.067 ppm. The other Aroclors have a detection limit of 0.033 ppm.

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**SURVEY MAP LEGEND**

- PCB Sample Location
- ROBAMERCA Sample Location
- Lead Sample Location
- Boytium Sample Location
- Arsenic Sample Location

Indicate the United States Government and Rocky Flats Co. are not responsible for the accuracy of the information contained in this map. The user of this map is advised that the user should not rely on this map for any purpose other than that for which it was prepared.

Open/Accessible Area

Area in Another Survey Unit

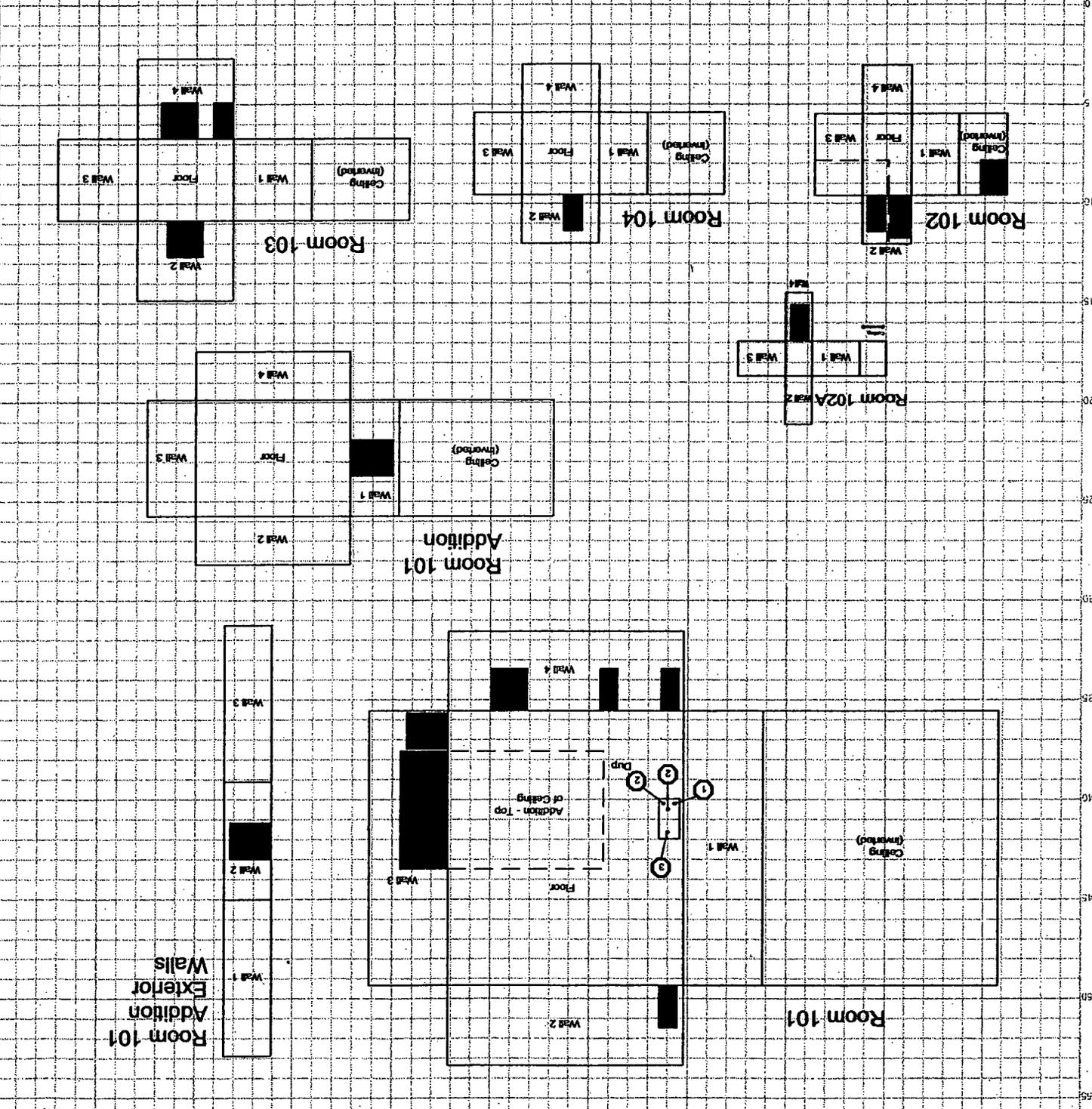
Scale: 1 inch = 24 feet 1 grid sq. = 1 sq. m.

0 10 30 METERS

0 10 30 FEET

N ↓

U.S. Department of Energy  
Rocky Flats Environmental Technology Site  
Prepared by: GSA Dept. 303-088-7707/Prepared By:  
THE ART OF TECHNOLOGY  
March 8, 2001  
MAP ID: RFE00181-0003



**PRE-DEMOLITION SURVEY FOR GROUP 5 CLUSTER**

Survey Area: A  
 Building: 442L  
 Survey Unit Description: Interior of B442L  
 Classification: N/A  
 Survey Unit 442-A-001

## ATTACHMENT G

# Decommissioning Waste Types and Volume Estimates

**Attachment G – Decommissioning Waste Types and Volumes Estimates**

| Facility | Concrete <sup>1,2</sup><br>(cu ft) | Wood <sup>1</sup><br>(cu ft) | Metal <sup>1</sup><br>(cu ft) | Corrugated/<br>Sheet Metal <sup>1</sup><br>(cu ft) | Wall Board <sup>1</sup><br>(cu ft) | ACM<br>(cu ft)                     | Other Waste<br>(cu ft)   |
|----------|------------------------------------|------------------------------|-------------------------------|--|------------------------------------|------------------------------------|--|
| 442L     | 9,712                              | 500                          | 585                           | 260  | 300                                | 297 (non-friable)<br>189 (friable) | Glass 45 cu ft<br>Insulation 500 cu ft<br>carpet 60 cu ft<br>Ceiling tile 90 cu ft |

(1) Materials are assumed to be PCB Bulk Product Waste.

(2) The 442L floor slab is radiologically and beryllium contaminated.

# ATTACHMENT H

## Data Quality Assessment (DQA) Detail

## DATA QUALITY ASSESSMENT (DQA) – 442L RLCR

### INTRODUCTION

Data used in making management decisions for decommissioning and waste management must be of adequate quality to support the decisions. Adequate data quality for decision-making is required by the Kaiser-Hill Team Quality Assurance Program (K-H, 1997, §7.1.4 and 7.2.2), as well as by the customer (DOE, RFFO; Order O 414.1A, Quality Assurance, §4.b.(2)(b)). Regulators and the public also expect decisions and data that are technically and legally defensible. Verification and validation of the data ensure that data used in decisions resulting from the Pre-Demolition Survey (PDS) are usable and defensible.

Verification and validation (V&V) of this RLCR are the primary components of the DQA. V&V constitutes the cornerstone of the DQA, because statistical tests and material background determinations relative to decision-making for radiological survey units were not implemented nor required. Instead, measurement results were compared, on a one-to-one basis, with release criteria given in DOE Order 5400.5. The RLC results could, theoretically, be used to conduct Sign Tests for decisions, but because all individual measurements were less than the DCGL<sub>w</sub>, the survey units meet release criteria without further data reduction. This DQA supports conclusions in the report through implementation of the guidelines taken from the following MARSSIM sections:

- §4.9, Quality Control
- §8.2, Data Quality Assessment
- §9.0, Quality Assurance & Quality Control
- Appendix E, Assessment Phase of the Data Life Cycle
- Appendix N, Data Validation using Data Descriptors

DQA was performed on measurement and sample results obtained from the Survey Units listed Table H-1. These Survey Units are traceable to specific building locations.

### VERIFICATION OF RESULTS

Verification ensures that data produced and used by the project are documented and traceable, per quality requirements. Verification consisted of reviewing the project's data relative to the following subsets, for each unique Survey Unit:

- Radiological
  - scans (total surface contamination)
  - surveys (TSA and removable)
- Chemical
  - asbestos

- beryllium
- PCBs

Consistent with similar RLC reports at the RFETS, verification confirms the following:

- Chain-of-Custody was intact from initial sampling through transport and final analysis;
- Preservation and hold-times were within tolerance; and
- Format and content of the data are clearly presented relative to goals of the project (i.e., to determine, with at least 95% confidence, that the survey units of interest are adequate for unrestricted radiological release, and no chemical hazards, or contamination, exist).

Verification of the RLC data also addresses quality records representing implementation of the following quality controls:

- Instrument calibrations, for accuracy;
- Laboratory control samples, for accuracy;
- Blanks, for accuracy;
- Duplicate measurements (surveys), for precision;
- Minimum Detectable Activity (MDA), Minimum Detection Limits (MDLs);
- Sample Analysis and Preparation methods.
- Count times, for sensitivity; and
- Sample preparations, for accuracy and representativeness.

All radiological data are organized into Survey Packages, which correlate to unique (MARSSIM) Survey Units. Each Survey Package is systematically reviewed by the responsible Radiological Engineer, a peer reviewer, and finally, Radiological Engineering Management. Chemical data are organized by sample number and corresponding sample location.

All relevant Quality records are managed in the Project File, and will be submitted to the CERCLA Administrative Record for permanent storage within 30 days of the approval of this RLC by the Regulators.

## **VALIDATION OF RESULTS**

Validation consists of a technical review of all data that directly support the RLC decisions, so that any limitations of the data relative to project goals are delineated, and the associated data are qualified accordingly. Data were validated relative to the following:

- The DQOs as defined in the *Pre-Demolition Survey Plan for D&D Facilities* (K-H, 3/22/2001; i.e., did the final data achieve the initial DQOs of the project, particularly with respect to decisions), and
- Quality Assurance criteria (consistent with the various applicable sections in the MARSSIM, expressed in terms of the PARCCS parameters given in the subsections below).

MARSSIM criteria for the broad topic of "data quality assessment" used in final status surveys generally falls within the generic categories of quality assurance, quality control, data validation, and data assessment (including verification and validation).

All of the significant MARSSIM criteria listed in Table H-2 – H-5 are summarily addressed within the "PARCC Parameters" discussion presented in the tables. PARCCS parameters are congruent with "data descriptors" in the MARSSIM parlance and address characteristics of the data that must be defined for scientific integrity and defensibility. The discussion of the PARCC parameters -- Precision, Accuracy, Representativeness, Comparability, and Completeness, also include discussion of bias and sensitivity, two more data descriptors emphasized in MARSSIM.

## DQO DECISIONS

DQO decisions are summarized in Table H-1.

## PARCCS PARAMETERS

### Precision

#### *Radiological Surveys*

Duplicate measurements were acquired at the required frequency ( $\geq 5\%$  frequency of real surveys) on the MARSSIM survey grids. All duplicate measurements were within tolerance based on repeatability of results below the DCGL<sub>w</sub>.

#### *Chemical Results*

Repeatability of beryllium results was not evaluated through field duplicates, based on the removable nature of the sampling process; this is consistent with radiological survey methodology, where repeatability is only evaluated relative to TSA measurements (fixed activity), and not removable activity. Overall repeatability within the sample set was evident based on all 37 of 38 sample results less than the detection limit ( $0.1 \mu\text{g}/100\text{cm}^2$ ).

Repeatability of asbestos results was not evaluated through field duplicates. Overall repeatability within the sample set was evident based on positive test results for the majority of the 19 samples.

Repeatability of results for PCBs, was adequate: all results for real samples and field duplicates were well below associated action levels.

## **Accuracy (and Bias)**

### ***Radiological Results (Surveys)***

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 tolerance during daily operations. Calibration and calibration check results were within the RFETS and industry-standard requirement of  $\pm 20\%$  of the applicable reference standard values. Full-scale multi-point calibrations provide accuracies of  $\pm 10\%$  prior to implementation of survey instruments in the field, consistent with guidelines put forth in ANSI-N323.d

No biases were noted in the instrumentation, based on daily performance checks.

Distance measurements recorded on maps are within 3% of actual distances based on the laser technology used for distance measurements associated with the surveys.

### ***Chemical Results***

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  $\sim 1\%$  at low concentrations (i.e., presence or absence of the mineral of interest). Accuracy for the analysis is adequate, as the contrast between 0% and 1% is a clear distinction for the decision of "ACM" vs. "No ACM".

Accuracy of all analytical results was adequate based on acceptable percent recoveries of LCS performed on a laboratory-batching basis. Initial and continuing calibrations were also satisfactory relative to performance within specifications and the frequencies at which they were performed.

## **Representativeness**

Samples and surveys are representative based on the following criteria:

- Familiarity with facilities -- multiple walk-downs and collaborations by management and technical staff;
- Implementation of industry-standard Chain-of-Custody protocols;
- Compliance with sample preservation and hold times; and
- Documented and (site) approved methods, particularly RSPs for scans/surveys, and SOPs for asbestos sampling and beryllium swiping.
- Chemical Characterization Package, 442L Closure Project, Revision 1, Feb. 20, 2001
- Radiological Survey Packages:
  - 01-0009, Survey Unit 442-A-001
  - 01-0010, Survey Unit 442-B-002

Surveys were also representative of the facilities based on a combination of random and biased measurement locations. Random survey measurements, 48 per Survey Unit, provided statistical confidence in radiological decisions, while biased locations provided additional confidence, as the locations were biased toward those areas with the greatest potential for radiological contamination (dust accumulation areas relative to airborne particulates, and high foot-traffic areas). All chemical sample locations are biased toward materials or locations with the highest potential for contamination.

No beta/gamma survey designs were implemented for 442L based on the conservatism of the transuranic limits used as DCGLs in the unrestricted release decision process. Stated differently, based on the well-established suite of actinides historically used at the RFETS, all of these actinides would emit alpha radiation in exceedance of the applicable transuranic DCGLs before other DCGLs would be exceeded for their respective Uranium species – Technical Basis Document 00162, Rev. 0, *Technical Justification for Types of Surveys Performed During Reconnaissance Level Characterization Surveys and Pre-Demolition Surveys in RISS Facilities*, corroborates the use of this conservative approach.

Consistent with EPA's G-4 DQO process, the radiological survey design was optimized by checking actual measurement results (acquired during RLC) against model output with original estimates. Use of actual sample/survey (result) variances in the MARSSIM DQO model confirms that an adequate number of samples/surveys were acquired.

### Completeness

#### ***Radiological Results***

The two Survey Packages were peer reviewed and approved by radiological engineering management. All radiological results are complete, valid without qualification, and form data sets with adequate quantities and quality of data for release decisions. Completeness of data for the project is summarized on table H-1.

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**Table H-1. Data Completeness Summary for the 442L**

| ANALYTE  | # Samples Required<br>(incl. Media; Real &<br>QC Samples)   | # Taken<br>(Real & QC<br>Samples) <sup>B</sup>  | Project Decisions<br>(Conclusions) &<br>Uncertainty  | Comments<br>(RIN, Analytical Method, Qualifications, etc.)  |
|--|---|---|--|---|
| Asbestos <sup>A</sup><br>• 442L  | 19 (biased/reals)   | 15 (int) 4 (ext)  | ACM – See Section<br>4.2.1   | 40 CFR 763.86<br>5 CCR 1001-10<br>EPA 600/R-93/116<br>Project # 01D0712   |
| Beryllium (swipes)<br>• 442L   | 39 (total, biased, reals)   | 38 reals, 1 blanks<br>10 internal laboratory<br>QC samples  | Contamination at floor<br>drain room 101 sample #<br>442L-82220001-315-103   | RIN 01D1373<br>RIN 01D0752<br>RIN 01D0632<br>RIN 01D0654<br>OSHA ID-125G<br>One positive result above action level (0.2µg/100cm <sup>2</sup> ) and<br>investigative level (0.1 µg/100cm <sup>2</sup> ). |
| PCBs<br>• 442L   | 3 reals, 1 duplicate  | 3 reals, 1 duplicate  | No contamination<br>identified   | RIN 01S0051   |
| Radiological<br>• Survey Unit:<br>442-A-001<br><br>• Survey Unit:<br>442-B-002 | 15 random & 33 biased<br>2 QC TSA<br>10% Scan<br><br>15 random & 0 biased<br>2 QC TSA<br>10% Scan | 15 random & 33 biased<br>2 QC TSA<br>10% Scan<br><br>15 random & 0 biased<br>2 QC TSA<br>10% Scan | No Alpha contamination<br>at any location above the<br>action levels. Elevated<br>Beta at 3 drains 31, 32,<br>and 35 | No results above DCGL <sub>w</sub> or DCGL <sub>EMC</sub> action level (20<br>dpm/100cm <sup>2</sup> removable, 100 dpm/100cm <sup>2</sup> average, and 300<br>dpm/100cm <sup>2</sup> maximum.          |

<sup>A</sup> # of samples required is estimate only, based on miscellaneous material types; final # of samples at discretion of IH

<sup>B</sup> int – building interior, ext – building exterior

### Comparability

All results presented are comparable with radiological survey and analytical data on a site and DOE-complex wide basis. This comparability is based on:

- Use of standardized engineering units in the reporting of measurement results;
- Consistent sensitivities of measurements at  $\leq 50\%$  DCGL<sub>W</sub> ( $\leq 75\%$  DCGL<sub>EMC</sub> for scans);
- Use of site-approved procedures (RSPs, TBDs, and SOPs);
- Systematic quality controls; and
- Thorough documentation of the planning, sampling/analysis process, and data reduction into formats designed for making decisions posed from the project's original data quality objectives.

### Sensitivity

Adequate sensitivities, in units of dpm/100<sup>2</sup> cm, were attained for all surveys implemented based on MDAs at 50% of the transuranic DCGL<sub>W</sub> ( $\leq 75\%$  DCGL<sub>EMC</sub> for scans). Derivations of MDAs, for all instruments used, are given in each respective Radiological Survey Package. Nominal MDAs for each survey method are summarized as follows:

- Surveys (Eberline SAC-4) - removable contamination: 10 dpm/100cm<sup>2</sup>
- Surveys (NE Electra) - total surface contamination (TSA): 50 dpm/100cm<sup>2</sup>
- Surveys (NE Electra) - scans:  $<225$  dpm/100 cm<sup>2</sup>

Sensitivities were adequate for all chemical analyses. Detection limits for beryllium were less than 0.1 ug/100cm<sup>2</sup>; asbestos was not detected at sensitivities to  $<1\%$  volume.

### Summary

In summary, the data presented in this report have been verified and validated relative to the project decisions as stated in the original DQOs. Media surveyed and sampled yielded results more than their associated action levels for ACM and radiological. ACM is present in both friable and non-friable form. Three slab drains (31, 32, and 35) indicated elevated fixed uranium radioactivity. Other than the floor drains, no other areas within 442L had any radiological contamination above the PDSP transuranic or uranium DCGLs.

ACM will be removed and disposed in compliance with EPA and CDPHE regulations. During the demolition of 442L, the slab will be treated as radiologically contaminated and appropriate controls will be required for slab handling and disposal. Asbestos sample data and sample location maps are contained in Attachment F, Chemical Summary Data and Sample Maps. Isotopic analysis investigation data is presented in Attachment E, Radiological Data Summaries and Survey Maps, along with the other slab and drain survey data.

Isolation control postings are displayed at all entrances to 442L to ensure no radioactive materials are introduced.

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**Table H-2 V&V of Radiological Surveys for 442L**

| V&V CRITERIA, RADIOLGICAL SURVEYS |   | K-H RSP 16.00 Series<br>MARSSIM (NUREG-1575)<br>for exterior units; RLCP and<br>RSP 7.02 for interior |   | COMMENTS     |   |
|-----------------------------------|---|---|---|--------------|---|
| QUALITY REQUIREMENTS              |   |   |   |              |   |
|                                   | Parameters  |   | Measure   | frequency    |   |
| ACCURACY                          | initial calibrations                                |   | 90%<x<110%  | ≥1           | multi-point calibration through the measurement range encountered in the field  |
|                                   | daily source checks                                 |   | 80%<x<120%  | ≥1           | none  |
|                                   | local area background                               | Field   | <MDL  | ≥1           | all local area backgrounds were within expected ranges (i.e., none anomalously high)  |
| PRECISION                         | field duplicate measurements for TSA                |   | all results ≤ MDA   | ≥5% of reals | none  |
| REPRESENTATIVENESS                | MARSSIM gridding methodology                        |   | statistical and biased  | NA           | random w/ statistical confidence  |
|                                   | Survey Maps   |   | Class 3 <1000m <sup>2</sup>   | NA           | random and biased measurement locations documented to ±0.2ft  |
|                                   | Controlling Documents (Characterization Pkg; RSPs)  |   | qualitative   | NA           | see original Characterization Package (planning document) for field/sampling procedures; thorough documentation of the planning, sampling/analysis process, and data reduction into formats |
| COMPARABILITY                     | units of measure                                    |   | dpm/100cm <sup>2</sup>  | NA           | Use of standardized engineering units in the reporting of measurement results   |
| COMPLETENESS                      | Plan vs. Actual surveys usable results vs. unusable |   | >95%<br>>95%  | NA           | none  |
| SENSITIVITY                       | detection limits                                    |   | MDC(TSA):<br>≤50<br>dpm/100cm <sup>2</sup><br>MDC(RA):<br>≤10<br>dpm/100cm <sup>2</sup> | all measures | MDAs ≤ ½ DCGLw per MARSSIM guidelines   |

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**Table H-3 V&V of Chemical Results - Asbestos for 442L**

| V&V CRITERIA, CHEMICAL ANALYSES |  | DATA PACKAGE                 |                               | COMMENTS  |
|---------------------------------|--|------------------------------|-------------------------------|---|
| ASBESTOS                        | METHOD: EPA 600/R-93/116                               | LAB ---->                    | Reservoirs Environmental, Inc |   |
| QUALITY REQUIREMENT             |  | RIN ---->                    | 01D0713                       |   |
|                                 |  | Measure                      | Frequency                     |   |
| ACCURACY                        |  | below detectable amounts     | ≥1                            | Semi-quantitative, per (microscopic) visual estimation  |
| PRECISION                       |  | all below detectable amounts | ≥19 samples                   | Semi-quantitative, per (microscopic) visual estimation  |
| REPRESENTATIVENESS              | COC  | Qualitative                  | NA                            | Chain-of-Custody intact; completed paperwork, containers w/ custody seals   |
|                                 | Hold times/preservation                                | Qualitative                  | NA                            | Not applicable  |
|                                 | Sample Maps  | Quantitative                 | per area                      | none  |
|                                 | Controlling Documents (Plans, Procedures, etc.)        | Qualitative                  | NA                            | See Table H-1 for analytical methods; original Characterization Package (planning document) for field/sampling procedures; thorough documentation of the planning, sampling/analysis process, and data reduction into formats |
| COMPARABILITY                   |  | % by bulk volume             | NA                            | Use of standardized engineering units in the reporting of measurement results   |
| COMPLETENESS                    | Plan vs. Actual samples<br>Usable results vs. unusable | Qualitative                  | NA                            | none  |
| SENSITIVITY                     | Detection limits                                       | <1% by volume                | all measures                  |   |

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**Table H-4 V&V of Chemical Results - Beryllium for 442L**

| V&V CRITERIA, CHEMICAL ANALYSES |   | DATA PACKAGE |  |          |  |
|---------------------------------|---|--------------|--|----------|--|
| BERYLLIUM                       | Prep: NMAM 7300<br>Method: OSHA ID-125G         | LAB →        | Johns Manville, Littleton, CO.           |          |  |
| QUALITY REQUIREMENTS            |   | RIN ---->    | 01D1373<br>01D0752<br>01D0632<br>01D0654 |          |  |
|                                 |   | measure      | frequency                                | COMMENTS |  |
| ACCURACY                        | calibrations                                    | initial      | r <sup>2</sup> >0.99                     | ≥1       | calibration range not verified   |
|                                 |   | continuing   | 80%<%R<120%                              | ≥1       | none   |
|                                 | LCS   |              | 80%<%R<120%                              | ≥1       | Accuracy of beryllium results was adequate based on acceptable percent recoveries of LCS performed on a laboratory-batching basis (spike @ 25 ug).   |
|                                 | blanks  | lab & field  | <MDL                                     | ≥1/batch | Field blank was consistent with the yields identified for field samples. all lab blanks yielded results <RDL   |
|                                 | interference check std (ICP)                    |              |  | NA       | not necessary, in absence of analysis for other metals   |
| PRECISION                       | LCSD  |              | 80%<%R<120%<br>(RPD<20%)                 | ≥1       | Intra-laboratory precision was adequate based on acceptable percent recoveries of LCSD performed on a laboratory batching basis (%R ± 20% @ 25 ug)   |
|                                 | field duplicate                                 |              | all results < RL                         | ≥1       | Repeatability of beryllium results was not evaluated through field duplicates, based on the removable nature of the sampling process; this is consistent with radiological survey methodology, where repeatability is only evaluated relative to TSA measurements (fixed activity), and not removable activity. Overall repeatability within the sample set is indeterminate at this time. |
| REPRESENTATIVENESS              | COC   |              | qualitative                              | NA       | Chain-of-Custody intact: completed paperwork, containers w/ custody seals  |
|                                 | hold times/preservation                         |              | qualitative                              | NA       | not applicable   |
|                                 | maps  |              |  |          | none   |
|                                 | Controlling Documents (Plans, Procedures, etc.) |              | qualitative                              | NA       | standardized analytical method; original Characterization Package (planning document) refers to field/sampling procedures; thorough documentation of the planning, sampling/analysis process; data reduction into clear and usable formats   |

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| V&V CRITERIA, CHEMICAL ANALYSES |  | DATA PACKAGE  |   | COMMENTS   |
|---------------------------------|--|---|---|--|
| BERYLLIUM                       | Prep: NMAM 7300<br>Method: OSHA ID-125G                              | LAB →<br>Johns<br>Manville,<br>Littleton,<br>CO.    | frequency                                 |  |
| <b>QUALITY REQUIREMENTS</b>     |  |   |   |  |
| <b>COMPARABILITY</b>            | measurement units  | RIN →→→<br>01D1373<br>01D0752<br>01D0632<br>01D0654 | measure<br>ug/100cm <sup>2</sup>          | Use of standardized engineering units in the reporting of measurement results; |
| <b>COMPLETENESS</b>             | Plan vs. Actual samples usable results vs. unusable detection limits |   | >95%<br>>95%                              | none   |
| <b>SENSITIVITY</b>              |  |   | 0.05ug/100cm <sup>2</sup><br>all measures | The method detection limit (MDL) for beryllium is cited.                       |

**Table H-5 V&V of Chemical Results – PCBs for 442L**

| V&V CRITERIA, CHEMICAL ANALYSES |   | DATA PACKAGE |                                       |                          |  |
|---------------------------------|---|--------------|---------------------------------------|--------------------------|--|
| PCBs                            | METHOD: OLM3.1 CLP                                    |              | LAB ---->                             | Paragon Analytics, Inc., |  |
|                                 |   |              | RIN ---->                             | 01S0051                  |  |
| QUALITY REQUIREMENT             |   |              |                                       | COMMENTS                 |  |
|                                 |   |              | measure                               | frequency                |  |
| ACCURACY                        | calibrations, retention times                         | initial      | various                               | ≥1/batch                 | All initial and continuing calibrations were met except for the following exceptions; 1660 032001-1 CCV-decachlorobiphenyl was out low on both columns and 1660 032001-2 CCV-decachlorobiphenyl was out low on column 2. |
|                                 |   | continuing   | 80%<%R<120%                           | ≥1/batch                 |  |
|                                 | MS  |              | 75%<%R<125%                           | ≥1/batch                 | All matrix spike and matrix spike duplicate recoveries and RPDs were within acceptance criteria  |
|                                 | surrogates  |              | various                               | ≥1/batch                 | All surrogates recoveries were within acceptance criteria.   |
|                                 | blanks  | lab          | <MDL                                  | ≥1/batch                 | The method blank was below the limit for all analytes.   |
| PRECISION                       | MSD   |              | 75%<%R<125%                           | ≥1/batch                 | none   |
|                                 | field duplicate                                       |              | all results < regulatory limit or RPD | ≥5% of reals             | none   |
| REPRESENTATIVENESS              | COC   |              | qualitative                           | NA                       | Chain-of-Custody intact; data packages complete; containers w/ custody seals   |
|                                 | hold times/preservation                               |              | ≤30 days extract<br>≤45 days analysis | NA                       | none   |
|                                 | Controlling Documents (Plans, Procedures, maps, etc.) |              | qualitative                           | NA                       | none   |
| COMPARABILITY                   |   |              | ug/kg                                 | NA                       | Use of standardized engineering units in the reporting of measurement results;   |
| COMPLETENESS                    | Plan vs. Actual samples usable results vs. unusable   |              | >95%<br>>95%                          | NA                       | none   |
| SENSITIVITY                     | detection limits                                      |              | various                               | all analytes             | All reporting limits were less than one order of magnitude of the associated action level.   |

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