Attachment 1
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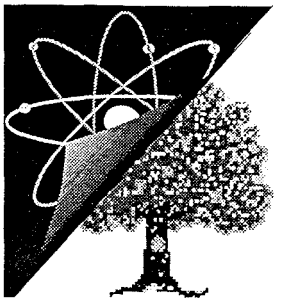

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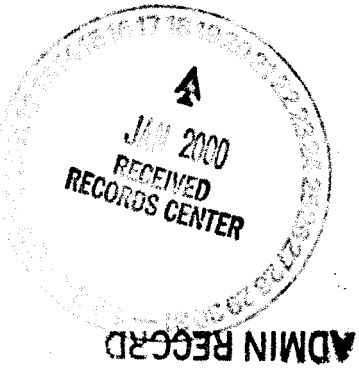
Closure Plan for Building 123 Components of RCRA Unit 40

U. S. Department of Energy

Rocky Flats Environmental Technology Site

REVISION 1



MARCH 25, 1998

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CLOSURE PLAN FOR BUILDING 123
COMPONENTS OF RCRA UNIT 40

REVISION 1

MARCH 25, 1998

This Closure Plan has been reviewed and approved by:

Vern Guthrie, Project Manager — 4/7/98 Date

Ted Hopkins, Environmental Compliance Manager — 4/7/98 Date

This Closure Plan was prepared by:

Ted A. Hopkins, Environmental Compliance Manager — 4/7/98 Date

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CLOSURE PLAN FOR BUILDING 123 COMPONENTS OF RCRA UNIT 40

1.0 INTRODUCTION

Partial closure of RCRA Unit 40 includes the closure of the RCRA regulated process waste lines, sumps, and pumping stations associated with Building 123 at the Rocky Flats Environmental Technology Site (RFETS). This system includes above ground process waste lines and ancilliary equipment (sumps, etc.) that are currently used in the building, as well as one active underground line. The Building 123 area encompasses overlapping Individual Hazardous Substance Sites (IHSS) 121 and 148. IHSS 121 includes the underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3. Figure 1-1 shows the location of Building 123 and IHSS 121 and 148. Leakage from old process waste lines and possible spills from operations may have resulted in contaminated soil beneath and adjacent to Building 123. This potentially contaminated soil has been designated IHSS 148. The OPWL is a network of tank and underground pipelines constructed to transport and temporarily store process waste from point of origin to on-site treatment and discharge points. Both the active and inactive systems include above and underground lines that transfer the process waste to valve vaults or holding tanks. All process waste lines inside the building are currently active. Closure will include deactivation, dismantlement, and remediation of all system components in Building 123, and decontamination, rinsing and sampling of the active underground pipeline that leaves the building and extends to Valve Vault 18.

Partial closure of RCRA Unit 40 is part of a larger project to decontaminate and decommission (D&D) Building 123 and surrounding area. This project will remove Buildings 123, 123S, 113, and 114 at RFETS; characterize portions of IHSS 148 and IHSS 121; and close a portion of RCRA Unit 40. The Building 123 slab and foundation will be cored as required to allow for sampling. Sample results will be used to evaluate the contamination beneath the building and modify the ER Ranking List, as results indicate. The overall project is being conducted as an accelerated action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) approved under the Building 123 Proposed Action Memorandum (PAM). The PAM is a decision document for the D&D of Building 123 and has been approved by the Colorado Department of Public Health and Environment (CDPHE). The Building 123 PAM references this unit closure plan. RCRA Unit 40 is currently under Interim status, and as a result, partial closure activities fall under Colorado Hazardous Waste Regulations: Part 265, Subpart G -"Closure and Post Closure".

1.1 APPLICABILITY

This RCRA Closure Plan applies to both the aboveground and subsurface Process Waste Tank System found in and beneath Building 123 as described:

- The aboveground waste process line in Building 123;
- The underground process waste line connecting Building 123 to Valve Vault 18 and from Valve Vault 18 to Tank 853 in Building 428; and
- All ancillary equipment (secondary containment, sumps, etc.) are the active part of RCRA Unit 40 associated with Building 123.

Note: Pipeline P-1 was modified in 1989. Part of the line (exterior to the building) was removed and replaced with new double walled piping. This line runs from the exterior of the building to Valve Vault 18. This new line is part of RCRA Unit 40 and will be closed in accordance with this plan.

This Closure Plan will identify the options available for the management, and the removal and/or remediation of this system. This Closure Plan does not apply to:

- The inactive portion of the P-1 Pipeline;
- to Pipelines P-2 or P-3;
- nor to any soil contamination found under this building; and
- Tank 853 in Building 428.

Note: Building operations prior to 1985 that generated mixed waste were not regulated under RCRA, and, therefore, these pipelines are not part of RCRA Unit 40. Non-regulated underground pipelines that were abandoned prior to RCRA regulation include: pipelines P-2 and P-3. (Blue and red on attached First Floor Plan) In 1974, Pipelines P-2 and P-3 were grouted in place. The Building 123 PAM and IHSS 148 and 121 Sampling and Analysis Plan (SAP) address the investigation and characterization of any soil contamination created by the lines. The implementation of the RCRA Closure Plan is a component of the facility decommissioning plan.

The following is a summary of the decommissioning plan for the process waste piping system in Building 123.

The Decommissioning of Building 123 has been divided into four main phases:

I. Strip-Out and Utility Isolation
II. Asbestos Abatement
III. Demolition
IV. Characterization of IHSS 121 and 148.

During Phase I, the above grade section of the process waste line (shown in pink on Attachment 1, First Floor Plan) will be removed under either Option 1, 2 or 3 as described in Section 7.0 of this Closure Plan. The piping will be plugged where it goes below ground in Rooms 156, 157 and 158. After removal, all the above ground piping will be packaged as either Low Level Waste or Mixed Waste depending the results of rinsate sampling. The piping will be removed to prepare the building for demolition in Phase III.

The underground process waste lines will be managed during Phase IV. The underground process waste lines refer to the inactive section of P1 (yellow on the attached sketch), P2 (blue), P3 (orange), and the active underground section of piping which goes to Valve Vault 18 (green). During Phase IV, the soil and the concrete slab will be sampled (drilled) for characterization. Closure activities for the inactive underground process waste lines, the building slab and surrounding soil will be determined by ER based upon the results of the characterization study. Soil remediation is not considered as part of the work scope of either the B123 Pam or this Closure Plan. Final disposition of the underground portion of the active process waste line (green) will depend on sample analysis of the rinsate. If the rinsate sample of the underground portion of the active waste line is below RFCA Tier 2 standards then the line will have been successfully "Clean Closed". But if the rinsate sample does not meet RFCA Tier 2 standard then the pipeline will be deferred to ER.

2.0 FACILITY CONTACT

The RFETS contact for closure activities is:

Manager, Rocky Flats Field Office
U. S. Department of Energy
P. O. Box 928
Golden, Colorado 80402-0928

Phone: (303) 966-2025

3.0 UNIT CLOSURE NOTIFICATION, CERTIFICATION AND SCHEDULE

The closure of the Building 123 above ground process waste system, sumps, and underground pipelines will be conducted as a partial closure of Unit 40. Notification will be submitted to the Director of the Colorado Department of Public Health and Environment (CDPHE) of the intent to close the process waste system 45 days prior to the planned start of closure activities.

If the total time necessary for closure is expected to exceed 180 days, the facility will notify the Director within 30 days of such a determination (Part 265.113(b)) and at least 30 days prior to the expiration of the 180 day closure period (Part 265.113(c)).

Within 60 days after completion of closure activities, the facility will notify CDPHE through submittal of proper certification that the unit has been closed in accordance with the approved closure plan. The certification package will be signed by the owner or operator and by an independent, Colorado-registered Professional Engineer.

4.0 REGULATORY REQUIREMENTS

A plan for closure of RCRA hazardous waste treatment and storage units at RFETS is required pursuant to 6 CCR 1007-3, Part 265 of the Colorado Hazardous Waste Regulations: Part 265, Subpart G - "Closure and Post Closure", Sections 265.110 through 265.120. No demonstration of financial responsibility is required because compliance with 6 CCR 1007-3, Part 266, Subpart A - "Financial Requirements", is not required for government owned facilities.

5.0 UNIT DESCRIPTION

RCRA Unit 40

RCRA Unit 40 is the site-wide network of tanks, pipelines, and sumps constructed to transport and temporarily store process waste from the point of origin to on-site treatment and discharge points. Operation of the process waste system in Building 123 began in 1952 in the east and central wings. An extension to the east wing was added in 1968, and the west wing was added in 1972. The process waste system for Building 123 was modified with each of the expansions to the building.

The process waste system incorporated into RCRA Unit 40 includes the system components in Rooms 103, 103A, 105, 111, 112, 113B, 121, 123, 123A, 124, 125, 126C, 127, 155, 155B, 156, 157, and 158 in the building, and the active underground line that connects to Valve Vault 18. A drawing of the building and the process waste piping is included in Appendix A. The history of the Building process waste system is described below.

Building 123 Ancillary Equipment: Four concrete sumps that were used for emergency secondary containment are considered ancillary equipment to RCRA Unit 40 and by their construction an integral part of the buildings floor structure. These sumps are described as follows:

- Sump 125, located in Room 125, a small concrete sump with epoxy paint surface, dimensions: 1'8" long by 1'10" wide by 1'11" deep;
- Sump 156, located in Room 156, a concrete sump with a gray epoxy painted surface; dimensions: 4' long by 4' wide by 4'2" deep. Entry into this sump requires a confined space entry permit;

- Sump 157, located in Room 157, a concrete sump with a gray epoxy painted surface; dimensions: 4' long by 5' wide by 4'2" deep. Entry into this sump requires a confined space entry permit; and

- Sump 158, located in Room 158, concrete sump with a gray epoxy painted surface; dimensions: 4' long by 4' wide by 5'2" deep. Entry into this sump requires a confined space entry permit.

Underground Section: The original process waste lines (P2) were installed below grade in 1952. The southern portion of this system in the east wing was modified in 1968 when the east wing addition was constructed. The process waste line installed in 1968 is referred to as the P3 line.

In 1972, an additional underground process waste piping system was installed which serviced the construction of the west wing (P1). Construction of the west wing included three large interconnected concrete sump pits in Rooms 156, 157, and 158.

In 1974 an above grade process piping system (see below) was installed to replace the old P2 and P3 lines. When this new above-grade system was installed, the P2 and P3 lines were filled with grout.

In 1989, the below grade process waste piping system was upgraded. The sections of P1 that lie outside of Building 123 were removed. A new below grade piping system was installed in 1989 that went from the south west corner of Building 123 to Valve Vault 18. The 1989 section of the underground process waste piping was used until 1997.

Above Ground Section: In 1974 a process waste piping system was installed above-grade in Building 123. This above grade system tied into the P1 below grade system, and later was tied into the 1989 below-grade piping system. In 1995, approximately 40% of the above-grade piping were modified and upgraded. The above grade piping system was used until 1997.

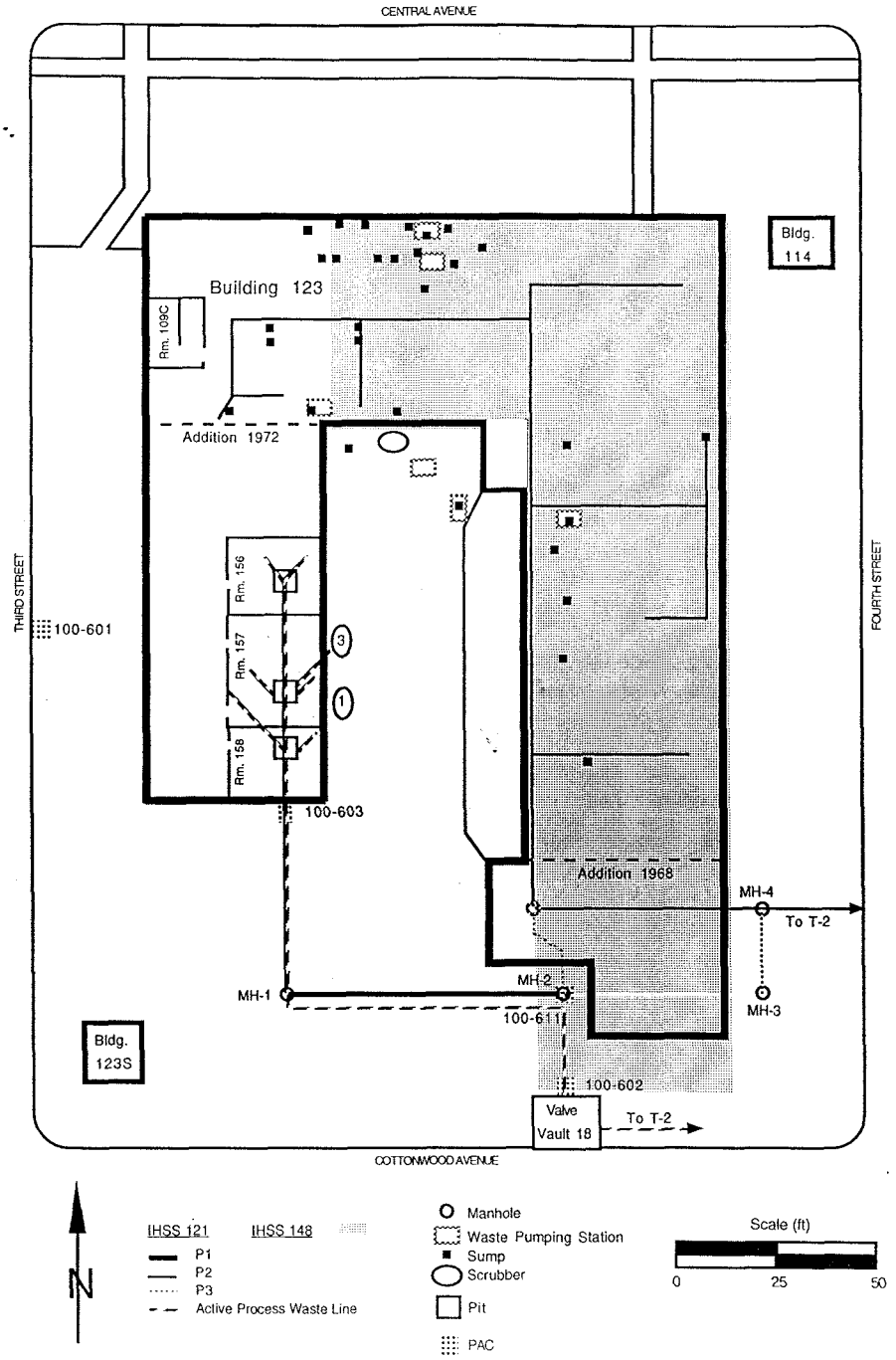


Figure 1-1 Location of Building 123 and Associated IHSS 121 and 148

6.0 CHARACTERIZATION

6.1 EPA WASTE CODES ASSOCIATED WITH THIS UNIT AND SAMPLING PARAMETERS

The following EPA Waste Codes were listed in the Part A application for RCRA Unit 40: D001, D002, D004-D011, D018, D019, D028, D029, D035, D040, F001, F002, F003, F005, F007, F008, and F009. However, not all of the above referenced waste streams have been identified as being disposed of in RCRA Unit 40 in Building 123. The WSRIC identifies the following process wastes as being disposed of in the process waste system:

- From 1987 to 1997, organic compounds such as Dibutyl-n-diethyl carbamoyl phosphate; (DDCP) and toluene were used in very small quantities for Americium separation in Building 123;
- Acids: nitric acid, hydrofluoric acid, sulfuric acid, hydrochloric acid, acetic acid, formic acid, oxalic acid, and perchloric acid;
- Bases: ammonium hydroxide and sodium hydroxide;
- Radionuclides: various isotopes of plutonium, americium, uranium, and curium;
- Metals: Calcium, Magnesium, and Iron effluents, beryllium (trace amounts);
- Ammonium nitrate, ammonium thiocyanate, ammonium chloride, ammonium oxalate, ammonium hydroxylamine, ethylene glycol, Diethylenetriaminepentaacetate (DTPA) potassium permanganate, potassium permanganate, sodium nitrate, and sodium carbonate.

After treatment, using either Option 1 or Option 3, a representative sample of the final rinse water will be taken in Building 428 near Tank #853 where a sampling tap is located. All liquid wastes from Building 123 flow into this tank. This sample will be tested for:

- The Target Analyte List for Metals (Table 6-1);
- Volatile Organics (as identified in Table 6-2); and
- Fingerprinting (pH, flash point, TSS, turbidity, etc.)

These sample parameters will account for all of the EPA Waste codes associated with RCRA Unit 40 except for F007, F008, F009 . These listed waste codes are for cyanide wastes from electroplating operations. No electroplating operations utilizing cyanide were conducted in Building 123 and are therefore omitted from testing. Tables 6-1 and 6- 2 list the contaminants to be analyzed for, and their associated EPA Waste Codes.

Based upon process knowledge and application of the Contained-In Policy, materials from this unit (pipelines, pumps, sumps, etc.) must be managed as RCRA mixed waste and analyzed for characteristics unless Options 1 and 3, Rinsate or Debris Treatment standards, identified in this document are met.

TABLE 6-1 MODIFIED TARGET ANALYTE LIST METALS AND ASSOCIATED EPA WASTE CODES

Aluminum, Al	Antimony, Sb	Arsenic, As D004
Barium, Ba D005	Beryllium, Be	Cadmium, Cd D006
Cesium, Cs	Chromium, Cr D007	Cobalt, Co
Copper, Cu	Iron, Fe	Lead, Pb D008
Lithium, Li	Magnesium, Mg	Manganese, Mn
Mercury, Hg * D009	Molybdenum, Mo	Nickel, Ni
Potassium, K	Selenium, Se D010	Silicon, Si
Silver, Ag D011	Sodium, Na	Strontium, Sr
Thallium, Tl	Tin, Sn	Vanadium, V
Zinc, zn		

Mercury is not part of the TAL metal list but was added because of its common usage in laboratories.

TABLE 6-2 MODIFIED TARGET COMPOUND LIST OF VOLATILE ORGANIC COMPOUNDS AND ASSOCIATED EPA WASTE CODES

1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane F002	1,2-Dichloroethene (total)
1,2-Dichloropropane	1-1-1-Trichoethane F001/F002	1-1-Dichloroethane
1,1-Dichloroethylene D029	1-2-Dichloroethane D028	2-Hexanone
Bromoform	Bromomethane	Carbon disulfide F005
Carbon tetrachloride D019/F001	Chloroethane	Chlorobenzene D021/F002
Chloroform D022	Chloromethane	cis-1,3-Dichloropropene
Dibromochloromethane	Ethylbenzene F003	Methyl ethyl ketone (butanone)..... D035/F005
Methylene chloride F001/F002	Pyridine F005	Styrene
Tetrachloroethylene D039/F001/F002	Toluene F005	trans-1,3-Dichloropropene
Trichloroethylene D040/F001/F002	Vinyl Chloride D043	Xylenes (total) F003
Acetone F003	4-Methyl-2-pentanone	Benzene D018/F005

6.1.1 Above Ground Portion of RCRA Unit 40 in Building 123

Building 123 has always housed laboratory operations. Laboratories routinely generate organic compounds most of which (prior to 1987) were disposed of in the process waste system. Some of these chemicals would today be characterized as listed wastes. In 1987, administrative controls were established that prohibited the disposal of listed hazardous waste to the waste process system. In addition, satellite accumulation areas were established to manage all listed hazardous wastes generated in Building 123. Beginning in 1989, this system was used predominately as an elementary neutralization unit for D002 corrosive waste streams and was in use until the building ceased operations in 1997. The above ground pipeline system was upgraded in 1995 when approximately 40% of this system was replaced.

6.2 SOIL CHARACTERIZATION

Soil characterization of the Building 123 area will be conducted as part of the activities outlined in the Building 123 Proposed Action Memorandum. Soil characterization will include sampling and analysis of the soil beneath and surrounding Building 123. Following removal of the building superstructure, samples will be collected through the slab. The IHSS 121 and 148 SAP has been written to guide characterization activities in these areas. The SAP incorporates a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol. The RFETS Statistical Applications Group will be used to ensure that statistically valid and representative samples of each waste stream are taken. Current planning indicates a need for approximately forty-six (46) soil samples beneath the slab of Building 123 and from areas surrounding underground, abandoned OPWLs. Samples will be collected from one to six feet in depths and are designed to locate contaminants that may have leaked from the lines. Samples will be analyzed for Volatile Organic Compounds (VOCs), Target Analyte List (TAL) Metals, radionuclides, and nitrates. Data quality requirements supporting the analysis effort will conform to criteria established in "Guidance for the Data Quality Objective Process", EPA QA/G-4 (EPA 1994). The Data Quality Objectives are listed in the "Building 123 and IHSS 121 SAP". (See RF/RMRS-97-023)

7.0 CLOSURE PERFORMANCE STANDARD

The closure performance standard specifies that hazardous waste facilities are to be closed in such a way as to (1) minimize the need for further maintenance at the facility, and (2) protect human health and the environment by controlling, minimizing, or eliminating potential releases of hazardous waste to the environment (6 CCR 1007-3, Section 265.111).

For ease in achieving RCRA Closure Performance Standards, that portion of RCRA Unit 40 associated with Building 123 will be divided into three components: above ground piping; associated ancilliary equipment (concrete sumps) and below ground piping. These units will be treated independently. RCRA Closure will not be completed until these components either:

- Achieve the RCRA Closure Performance Standards, and are certified closed by an independent Colorado Registered Professional Engineer; or
- Are deferred to ER after failing to meet standards.

Any of the three closure options described below may be used to achieve "RCRA Clean Closure." For example, the above ground piping may be closed using the Decontamination Option while the below ground might be closed using Debris Treatment.

To achieve "RCRA Clean Closure" of this unit, a selection of one of the following options will be made by DOE/Kaiser-Hill based on characterization data.

7.1 OPTION 1: DECONTAMINATION OF RCRA UNIT 40 ASSOCIATED WITH BUILDING 123

If this option is selected for either the above ground and/or the below ground portions of this unit , closure will consist of decontaminating the pipe and any associated ancilliary equipment with a solution capable of removing the contaminants of concern and testing the final rinsate to verify treatment standards. This decontamination will be conducted in accordance with the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, Section C, Clean Closure by Decontamination.

7.1.1 Closure Performance Standards for Above Ground Piping, Ancillary Equipment (e.g., Concrete Sumps) and Below Ground Piping Associated with RCRA Unit 40

Closure Performance Standards for decontamination identified in this section include, but are not limited to:

- The selection of an appropriate solution for decontamination. Selection of the decontamination solution was based on the types of wastes previously managed in the unit and the contaminants that are present. Water containing sodium carbonate and trisodium phosphate will be used as the decontamination solution;
- Flushing the system with a decontamination solution to remove any remaining trace amounts of acids or bases;
- The final rinsate closure performance standards for internal surfaces of tanks (as described in RFCA Permit, Part X Closures) will be used to evaluate the effectiveness of the decontamination; and
- The final rinsate volume will not exceed 5% of the capacity of the piping system.

The above ground and/or below ground and the ancillary equipment (e.g., concrete sumps) will be considered decontaminated and meet RCRA Clean Closure Performance Standards if:

- All visible waste residuals have been removed and;
- The final rinsate contains concentrations of priority pollutants (identified as being managed in the unit) and heavy metals (268.48 UHC listing) below the Tier 2 action levels as defined in Attachment 5 of the Rocky Flats Compliance Agreement (RFCA) and;
- The pH of the rinsate is between 6 and 9.

7.1.2 Rinsate Performance Standards

Above Ground Piping System and Removable Ancilliary Equipment

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, all above ground portion of this unit will be removed and managed as LLW. This LLW will be stored on-site until it can be disposed in an approved facility (e.g., Nevada Test Site, Envirocare),

Non-removable Ancillary Equipment (e.g., Concrete Sumps)

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, the concrete sumps meeting standards will be considered closed and no further work will be required. The floor slab will remain in place and will be evaluated by ER as to whether it will be removed or not.

Below Ground Piping System

Two options exist for the below ground portion of the process waste system:

1. The rinsate sample from the piping meet Tier 2 standards and performance standards are certified by an independent engineer. Clean Closure of this unit will require no further activities; or

2. The rinsate sample does not meet Tier 2 standards and therefore the unit can not be Clean Closed. The unit will be deferred to ER for evaluation as part of the site-wide ROD.

Once the building is removed, the soil sampling program as described in the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites 121 and 148 at Building 123* (SAP) will be initiated. The purpose of the SAP is to identify any hazardous constituents present in the soil as a result of releases from either the waste process lines (active or inactive) or Building 123.

Any soil contaminants identified during sampling operations will be evaluated by Environmental Restoration Projects and will be used to update the ER Ranking List. This list will be used to determine whether or not soil remediation is required.

7.2 OPTION 2: MANAGED AS HAZARDOUS WASTE WITH NO ONSITE TREATMENT

7.2.1 Manage Piping/Ancilliary Equipment that can be Removed as Hazardous Waste

If this option is selected, all removable process waste system components will be managed as RCRA mixed waste with the EPA Waste Codes of F001/F002/ F005. The piping and removable ancilliary equipment will be size reduced and placed into storage on-site at a TSDFs until shipment to an offsite TSDF for final disposition. All hazardous waste and/or mixed wastes generated from this project will be managed in accordance with all applicable state and federal regulations. Further description of waste management activities can be found in Section 10.

In accordance with 40 CFR 268, a representative sample will be taken of these waste streams (e.g., PVC piping, steel piping, etc.) to determine whether the waste stream meets LDR standards or not. In the event that the TCLP sample meets the MCL Tier 2 standards for organics (which contain all the listed wastes identified for this unit), the operator will consider the waste to "No Longer Contain Listed Waste." This will allow any piping meeting this standard to be managed as non-hazardous waste provided the piping is not also characteristically hazardous.

7.3 OPTION 3: DEBRIS TREATMENT OF THE ABOVE AND BELOW GROUND PORTIONS OF RCRA UNIT 40

If this option is selected for either the above ground and/or below ground portions of RCRA Unit 40, the process waste system will be managed as RCRA Hazardous Debris in accordance with 40 CFR 268.45. It is anticipated that this option would be selected only for the above ground portion of this unit.

7.3.1 Debris Treatment Closure Performance Standards

Hazardous debris will be considered decontaminated if the process meets the performance standards identified in the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, Section D, Debris Rule Decontamination. Requirements identified in this section include, but are not limited to:

- Material must meet the definition of debris found in 40 CFR 268.45;

- Selection of a specified technology as identified in 40 CFR 268.45. Extraction or destruction technologies should be selected over immobilization technologies whenever possible. For decontaminating hazardous debris piping, tanks and associated ancillary equipment in Building 123 , chemical extraction using water washing and spraying will be selected. Water washing and spraying is defined as application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers. Water containing sodium carbonate and trisodium phosphate will be used as decontamination solution;

- A volume of approximately three times the piping/tanks volume of this unit will be used to decontaminate the piping and ensure adequate residence time; and

- Clean surface debris standards as specified in 40 CFR 268.45 must be met.

All treatment residuals generated from extraction and/or destruction technologies used in the Closure of Building 123 (including rinsates) will be characterized in accordance with 40 CFR 262.11 and managed accordingly. Treatment residuals do not meet the definition of debris.

In the event that closure performance standards for debris are not met, the piping will be removed and handled as RCRA mixed waste.

8.0 SPECIFIC CLOSURE ACTIVITIES

Closure activities will be performed to achieve the objectives of the closure performance standard. (See RCRA Permit, Part 10 Closure, Section C-6, "Closure Performance Standards"). The activities will be conducted with decontamination and decommissioning activities covered by the Building 123 PAM, which includes remediation of the remainder of the building and abandoned OPWLs under the building. Closure activities will be implemented to ensure the protection of human health and the environment, and waste minimization.

The following sections outline the procedures necessary to close active process waste lines in Building 123, and the active underground line between Building 123 and Valve Vault 18.

8.1 PREPARATION OF ENGINEERING PACKAGES AND WORK PACKAGES

Engineering and work packages will be used to govern the deactivation and decommissioning activities. Engineering designs will be developed for removal and decommissioning activities. The engineering package will define the sequence of activities and methods of size reducing, dismantling, and packaging of the building materials. The packages are being prepared for the Building 123 project in three phases:

1) Deactivation of the building;

2) Demolition of the building; and

3) Characterization of underground contamination.

8.2 HEALTH AND SAFETY

The RFETS Health and Safety Practices Manual defines general health and safety measures to be followed at the Site. All closure activities will be conducted in accordance with the manual. In addition, a specific Health and Safety Plan has been written for Building 123 D&D activities, which specifically addresses D&D and RCRA Unit 40 closure activities. As Low As Reasonably Achievable (ALARA) principles will be followed regarding personnel radiation dosage and exposures to hazardous materials. Radiation Control Technicians will survey all rooms in the building for radiation, and the pipelines and sumps will be monitored for radiological contamination.

In accordance with Site Procedure 1-74000-IWCP, September 4, 1996, *Integrated Work Control Program* (IWCP) work packages will be prepared to direct and control all work. The packages will be organized similarly to the engineering packages. Each work package will contain a Job Safety Analysis (JSA), which addresses all health and safety issues in detail.

8.3 TANK SYSTEM CLOSURE ACTIVITIES

8.3.1 Closure of System Components

Closure of the above ground and underground portions of RCRA Unit 40 is dependent upon the amount of contamination (if any) discovered in the final characterization. These units will:

1. Meet the rinsate standards (Option 1); or

2. Be removed, characterized and managed in accordance with all applicable rules and regulations (Option 2); or

3. Meet debris Treatment Standards (Option 3); or

4. Deferred to ER, in the event Tier 2 standards can not be met for underground piping, non-removable ancillary equipment (e.g., concrete sumps) and/or contaminated soils.

The WSRIC system documents that the process waste system in Building 123 has been used as an elementary neutralization unit from 1989 to date. There is little information regarding disposal practices prior to 1989. However, it seems clear that the majority of the discarded liquids were acids and bases. According to the WSRIC data, no listed wastes were disposed in the system since 1989.

Both the above ground and below ground portions of RCRA Unit 40 will be closed following an approved RCRA Closure Plan using one of the following options:

1. Pipelines and ancilliary equipment (e.g., concrete sumps, secondary containment, etc.) will be decontaminated using a solution of water, sodium carbonate and trisodium phosphate. The rinsate will be tested to determine if it meets the Tier 2 levels identified in Attachment 5 of RFCA. If the rinsate meets these standards, then the system will be considered closed. If the rinsate is above the standards, the pipe will be removed. Underground piping, non-removable ancillary equipment (e.g., concrete sumps) and soil contamination that does not meet standards will be deferred to ER.

2. The process waste system can be removed and managed as Mixed Waste; or

3. The process waste system can be Debris Treated in accordance with 40 CFR 268.45 and exit RCRA once debris treatment performance standards are met.

8.3.2 Closure Scenarios Associated with Soil Contamination

Soil remediation is not within the scope of this RCRA Closure Plan. Soil contamination will be characterized to the extent that it can be evaluated and ranked by ER.

Contamination below RFCA Tier 2 levels

If analytical results indicate that the soil is below RFCA Tier 2 levels, the following actions will be taken:

- Underground pipelines will be filled with grout, capped and left in place.
- Sample results will be summarized and forwarded to ER for inclusion in the site-wide ER evaluation.

Contamination above RFCA Tier 2 Levels

If analytical results indicate that soil contamination is above the Tier 2 levels, the following actions will be taken:

- Underground pipelines will be filled with grout, capped and left in place.
- The site will be deferred to ER for further evaluation;
- All analytical data will be summarized in a sample report. This report along with copies of all analytical data will be submitted to ER for evaluation.
- ER will use the data to update the ER Rankling List.
- The ER Rankling List will be used to prioritize soil remediation projects at Rocky Flats. As part of the RFCA Plant Closure, a risk assessment will be conducted. Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document.

9.0 DISPOSITION OF WASTE GENERATED DURING CLOSURE

Remediation and closure activities may generate a combination of radioactive, hazardous, and mixed wastes. Contaminated soil, pipeline, sumps and ancilliary equipment are expected to be the major sources of waste. Wastes consisting of plastic, tools, personal protective equipment and other materials associated with demolition and remediation will also be a major source of waste. Contaminated waste will be handled by qualified waste packaging technicians who will work with decontamination specialists and radiation control technicians to identify and segregate the Hazardous or Low Level waste. Waste packaging technicians will package and label the waste, and will arrange for radioactive waste to be certified. Liquid hazardous or radioactive waste generated after the process waste lines are no longer in service will be collected in drums and shipped to Building 374 for processing. Solid waste in drums or boxes will be managed by the Waste Disposal group in an appropriate storage area prior to off-site shipment.

9.1 ESTIMATE OF WASTE VOLUMES TO BE GENERATED

Table 9-1 describes the types, estimated quantities of waste to be generated, and how the waste will be handled and disposed.

Table 9-1 Estimated Volume of Waste to be Generated if Options are Successful

Waste Forms	Waste Type	Disposition of Waste	Estimated Quantity
Option 1 Decontamination			
Process waste pipelines/ancilliary equipment	Low Level	LLW will be recycled at SEG, Oak Ridge, TN or sent to the Nevada Test Site.	800 Linear Ft. or 100-200 Cubic Ft.
Rinsate	Low Level Mixed	Building 374, WWTU	7,500 gallons
Plastic, paper, etc. decontamination or LLW handling	Low Level	Nevada Test Site	100-200 Cubic Ft.
Option 2 Handle as Hazardous Waste			
Process Waste Pipeline/ancilliary equipment	Low Level Mixed Waste	Approved TSDF	800 Linear Ft. or 100-200 Cubic Ft., 9 yd^3
Rinsate	Low Level Mixed Waste	Building 374, WWTU	200-1000 gallons
Plastic, paper, etc. that comes in direct contact with listed waste	Low Level Mixed Waste	Approved TSDF	< 100 Cubic Ft.
Option 3 Debris Treatment			
Process waste pipelines/ancilliary equipment	Low Level Waste	Nevada Test Site	800 Linear Ft. or 100-200 Cubic Ft.
Plastic, paper, etc. coming in to direct contact with listed waste	Low Level Mixed Waste	Mixed Waste will be stored on-site in a TSDF awaiting shipment to Envirocare or another approved TSDF.	< 100 cubic ft.

10.0 RECORD KEEPING

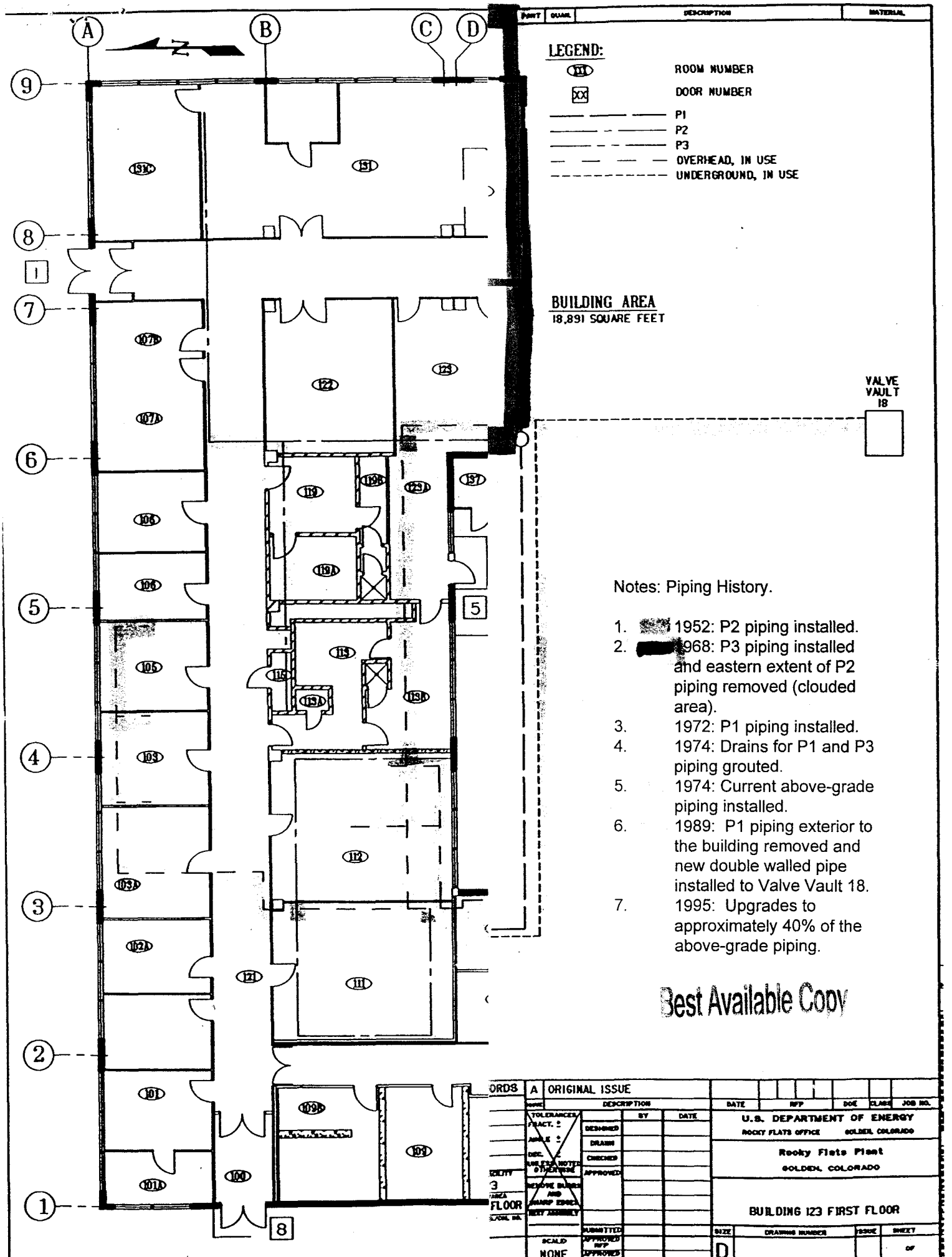
The following closure documentation will be maintained:

- A field logbook indicating the date, number, and type of sampling activities
- Analytical results
- Records of actions taken to decontaminate equipment or structures
- Work control packages developed to govern closure activities

Certification and other documentation indicating that closure was conducted in accordance with the closure plan.

Attachment 1

First Floor Plan



Notes: Piping History.

1. [redacted] 1952: P2 piping installed.
2. [redacted] 1968: P3 piping installed and eastern extent of P2 piping removed (clouded area).
3. 1972: P1 piping installed.
4. 1974: Drains for P1 and P3 piping grouted.
5. 1974: Current above-grade piping installed.
6. 1989: P1 piping exterior to the building removed and new double walled pipe installed to Valve Vault 18.
7. 1995: Upgrades to approximately 40% of the above-grade piping.

ORDS	A	ORIGINAL ISSUE							
		DESCRIPTION			BY	DATE	DATE	RFP	DOE	CLASS	JOB NO.
		TOLERANCES FRACT. ± ANGLE ± DEC. ± UNLESS NOTED OTHERWISE REMOVE BURRS AND SHARP EDGES		DESIGNED			U.S. DEPARTMENT OF ENERGY ROCKY FLATS OFFICE GOLDEN, COLORADO				
				DRAWN			Rocky Flats Plant GOLDEN, COLORADO				
				CHECKED							
				APPROVED							
							BUILDING 123 FIRST FLOOR				
				SUBMITTED			SIZE	DRAWING NUMBER		ISSUE	SHEET
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				APPROVED DOE							

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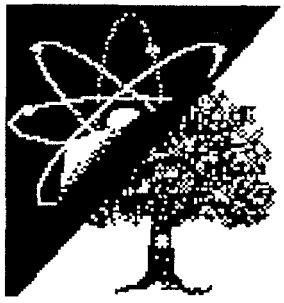

RF/RMRS-97-052

Closure Plan for Building 123 Components of RCRA Unit 40

U. S. Department of Energy

Rocky Flats Environmental Technology Site

~~November 12, 1997~~
March 25, 1998

22

CLOSURE PLAN FOR BUILDING 123
COMPONENTS OF RCRA UNIT 40

REVISION 1 ~~0~~

~~NOVEMBER 1997~~
MARCH 25, 1998

This Closure Plan has been reviewed and approved by:

Vern Guthrie, Project Manager _____ Date _____

Ted Hopkins, Environmental Compliance Manager _____ Date _____

This Closure Plan was prepared by:

Richard T. Jensen, Senior Engineer _____ Date _____

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CLOSURE PLAN FOR BUILDING 123 COMPONENTS OF RCRA UNIT 40

1.0 INTRODUCTION

Partial closure of RCRA Unit 40 includes the closure of the RCRA regulated process waste lines, sumps, and pumping stations associated with Building 123 at the Rocky Flats Environmental Technology Site (RFETS). This system includes above ground process waste lines and ancilliary equipment (sumps, etc.) that are currently used in the building, as well as one active underground line. The Building 123 area encompasses overlapping Individual Hazardous Substance Sites (IHSS) 121 and 148. IHSS 121 includes the underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3. Figure 1-1 shows the location of Building 123 and IHSS 121 and 148. Leakage from old process waste lines and possible spills from operations may have resulted in contaminated soil beneath and adjacent to Building 123. This potentially contaminated soil has been designated IHSS 148. The OPWL is a network of tank and underground pipelines constructed to transport and temporarily store process waste from point of origin to on-site treatment and discharge points. Both the active and inactive systems include above and underground lines that transfer the process waste to valve vaults or holding tanks. All process waste lines inside the building are currently active. Closure will include deactivation, dismantlement, and remediation of all system components in Building 123, and decontamination, rinsing and sampling of the active underground pipeline that leaves the building and extends to Valve Vault 18.

Partial closure of RCRA Unit 40 is part of a larger project to decontaminate and decommission (D&D) Building 123 and surrounding area. This project will remove Buildings 123, 123S, 113, and 114 at RFETS; ~~eliminate~~ characterize portions of IHSS 148 and IHSS 121; and close a portion of RCRA Unit 40. The Building 123 slab and foundation will be ~~removed~~ cored as required to ~~remediate~~ allow for sampling. Sample results will be used to evaluate the contamination beneath the building and modify the ER Ranking List, as results indicate. ~~as dictated by soil sampling results.~~ The overall project is being conducted as an accelerated action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) approved under the Building 123 Proposed Action Memorandum (PAM). The PAM is a decision document for the D&D of Building 123 and has been approved by the Colorado Department of Public Health and Environment (CDPHE). The Building 123 PAM references this unit closure plan. RCRA Unit 40 is currently under Interim status, and as a result, partial closure activities fall under Colorado Hazardous Waste Regulations: Part 265, Subpart G - "Closure and Post Closure".

1.1 APPLICABILITY

This RCRA Closure Plan applies to both the aboveground and subsurface Process Waste Tank System found in and beneath Building 123 as described:

- The above ground waste process line in Building 123;
- The underground process waste line connecting Building 123 to Valve Vault 18 and from Valve Vault 18 to Tank 853 in Building 428; and
- All ancilliary equipment (sumps, etc.) that are the active part of RCRA Unit 40 associated with Building 123.

Note: Pipeline P-1 was modified in 1989. Part of the line (exterior to the building) was removed and replaced with new double walled piping. This line runs from the exterior of the building to Valve Vault 18. This new line is part of RCRA Unit 40 and will be closed in accordance with this plan. .

This Closure Plan will identify the options available for the management, and the removal and/or remediation of this system. This Closure Plan does not apply to:

- the inactive portion of the P-1 Pipeline,
- to Pipelines P-2, or P-3;
- nor to any soil contamination found under this building; and
- Tank 853 in Building 428.

~~The above ground and underground process waste line connecting Building 123 to Valve Vault 18 and from Valve Vault 18 to Tank 853 in Building 428 and all ancilliary equipment (sumps, etc.) that are the active part of RCRA Unit 40 associated with Building 123. Pipeline P-1 was modified in 1989. Part of the line (exterior to the building) was removed and replaced with new double walled piping. This line runs from the exterior of the building to Valve Vault 18. This new line is part of RCRA Unit 40 and will be closed in accordance with this plan.~~

Note: Building operations prior to 1985 that generated mixed waste were not regulated under RCRA, and, therefore, these pipelines are not part of RCRA Unit 40. Non-regulated underground pipelines that were abandoned prior to RCRA regulation include: pipelines P-2 and P-3. (Blue and red on attached First Floor Plan) In 1974, pipelines P-2 and P-3 were grouted in place. The Building 123 PAM and ~~Building 123~~ IHSS 148 and 121 Sampling and Analysis Plan (SAP) address the investigation and ~~potential remediation~~ characterization of ~~the abandoned lines and~~ any soil contamination created by the lines. The implementation of the RCRA Closure Plan is a component of the facility decommissioning plan.

The following is a summary of the decommissioning plan for the process waste piping system in Building 123.

The Decommissioning of Building 123 has been divided into four main phases:

I. Strip-Out and Utility Isolation
II. Asbestos Abatement
III. Demolition
IV. Characterization ~~and Remediation~~ of IHSS 121 and 148.

During Phase I, the above grade section of the process waste line (shown in pink on Attachment 1, First Floor Plan) will be removed under either Option 1, 2 or 3 as described in Section 7.0 of this Closure Plan. The piping will be plugged where it goes below ground in Rooms 156, 157 and 158. After removal, all the above ground piping will be packaged as either Low Level Waste or Mixed Waste depending the results of rinsate sampling. The piping will be removed to prepare the building for demolition in Phase III.

The underground process waste lines will be managed during Phase IV. The underground process waste lines refer to the inactive section of P1 (yellow on the attached sketch), P2 (blue), P3 (orange), and the active underground section of piping which goes to Valve Vault 18 (green).
During Phase IV, the soil and the concrete slab will be sampled (drilled) for characterization. Closure activities for the inactive underground process waste lines, the building slab and surrounding soil will be determined by ER based upon the results of the characterization study and is not considered as part of the work scope of either the 123 PAM or this Closure Plan. Final disposition of the underground portion of the active process waste line (green) will depend on sample analysis of the rinsate. If the rinsate sample of the underground portion of the active waste line is below RFCA Tier 2 standards, the line will have been successfully "Clean Closed". If the rinsate sample does not meet RFCA Tier 2 standards, the piping will be deferred to ER.

2.0 FACILITY CONTACT

The RFETS contact for closure activities is:

Manager, Rocky Flats Field Office
U. S. Department of Energy
P. O. Box 928

Golden, Colorado 80402-0928

Phone: (303) 966-2025

3.0 UNIT CLOSURE NOTIFICATION, CERTIFICATION AND SCHEDULE

The closure of the Building 123 above ground process waste system, sumps, and underground pipelines will be conducted as a partial closure of Unit 40. Notification will be submitted to the Director of the Colorado Department of Public Health and Environment (CDPHE) of the intent to close the process waste system 45 days prior to the planned start of closure activities.

If the total time necessary for closure is expected to exceed 180 days, the facility will notify the Director within 30 days of such a determination (Part 265.113(b)) and at least 30 days prior to the expiration of the 180 day closure period (Part 265.113(c)).

Within 60 days after completion of closure activities, the facility will notify CDPHE through submittal of proper certification that the unit has been closed in accordance with the approved closure plan. The certification package will be signed by the owner or operator and by an independent, Colorado-registered Professional Engineer.

4.0 REGULATORY REQUIREMENTS

A plan for closure of RCRA hazardous waste treatment and storage units at RFETS is required pursuant to 6 CCR 1007-3, Part 265 of the Colorado Hazardous Waste Regulations: Part 265, Subpart G - "Closure and Post Closure", Sections 265.110 through 265.120. No demonstration of financial responsibility is required because compliance with 6 CCR 1007-3, Part 266, Subpart A - "Financial Requirements", is not required for government owned facilities.

5.0 UNIT DESCRIPTION

RCRA Unit 40

RCRA Unit 40 is the site-wide network of tanks, pipelines, and sumps constructed to transport and temporarily store process waste from the point of origin to on-site treatment and discharge points. Operation of the process waste system in Building 123 began in 1952 in the east and central wings. An extension to the east wing was added in 1968, and the west wing was added in 1972. The process waste system for Building 123 was modified with each of the expansions to the building.

The process waste system incorporated into RCRA Unit 40 includes the system components in Rooms 103, 103A, 105, 111, 112, 113B, 121, 123, 123A, 124, 125, 126C, 127, 155, 155B, 156, 157, and 158 in the building, and the active underground line that connects to Valve Vault

18. A drawing of the building and the process waste piping is included in Appendix A. The history of the Building process waste system is described below.

Underground Section: The original process waste lines (P2) were installed below grade in 1952. The southern portion of this system in the east wing was modified in 1968 when the east wing addition was constructed. The process waste line installed in 1968 is referred to as the P3 line.

In 1972, an additional underground process waste piping system was installed which serviced the construction of the west wing (P1). ~~The 1972 line is the P1 line~~. Construction of the west wing included three large interconnected concrete sump pits in Rooms 156, 157, and 158.

In 1974 an above grade process piping system (see below) was installed to replace the old P2 and P3 lines. When this new above-grade system was installed, the P2 and P3 lines were filled with grout.

In 1989, the below grade process waste piping system was upgraded. The sections of P1 that lie outside of Building 123 were removed. A new below grade piping system was installed in 1989 that went from the south west corner of Building 123 to Valve Vault 18. The 1989 section of the underground process waste piping was used until 1997.

Above Ground Section: In 1974 a process waste piping system was installed above-grade in Building 123. This above grade system tied into the P1 below grade system, and later was tied into the 1989 below-grade piping system. In 1995, approximately 40% of the above-grade piping were modified and upgraded. The above grade piping system was used until 1997.

Figure 1-1 Location of Building 123 and Associated IHSS 121 and 148

6.0 CHARACTERIZATION

6.1 EPA WASTE CODES ASSOCIATED WITH THIS UNIT AND SAMPLING PARAMETERS

The following EPA Waste Codes were listed in the Part A application for RCRA Unit 40: D001, D002, D004-D011, D018, D019, D028, D029, D035, D040, F001, F002, F003, F005, F007, F008, and F009. However, not all of the above referenced waste streams have been identified as being disposed of in RCRA Unit 40 in Building 123. The WSRIC identifies the following process wastes as being disposed of in the process waste system:

- From 1987 to 1997, organic compounds such as Dibutyl-n-diethyl carbamoyl phosphate; (DDCP) and toluene were used in very small quantities for Americium separation in Building 123;
- Acids: nitric acid, hydrofluoric acid, sulfuric acid, hydrochloric acid, acetic acid, formic acid, oxalic acid, and perchloric acid;
- Bases: ammonium hydroxide and sodium hydroxide;
- Radionuclides: various isotopes of plutonium, americium, uranium, and curium;
- Metals: Calcium, Magnesium, and Iron effluents, beryllium (trace amounts);
- Ammonium nitrate, ammonium thiocyanate, ammonium chloride, ammonium oxalate, ammonium hydroxylamine, ethylene glycol, Diethylenetriaminepentaacetate (DTPA) potassium permanganate, potassium permanganate, sodium nitrate, and sodium carbonate.

After treatment, using either Option 1 or Option 3, a representative sample of the final rinse water will be taken in Building 428 near Tank #853 where a sampling tap is located. All liquid wastes from Building 123 flow into this tank. This sample will be tested for:

- The Target Analyte List for Metals (Table 6-1);
- Volatile Organics (as identified in Table 6-2); and
- Fingerprinting (pH, flash point, TSS, turbidity, etc.)

These sample parameters will account for all of the EPA Waste codes associated with RCRA Unit 40 except for F007, F008, F009 . These listed waste codes are for cyanide wastes from electroplating operations. No electroplating operations utilizing cyanide were conducted in Building 123 and are therefore omitted from testing. Tables 6-1 and 6- 2 list the contaminants to be analyzed for, and their associated EPA Waste Codes.

Based upon process knowledge and application of the Contained-In Policy, materials from this unit (pipelines, pumps, sumps, etc.) must be managed as RCRA mixed waste and analyzed for characteristics unless Options 1 and 3, Rinsate or Debris Treatment standards, identified in this document are met.

TABLE 6-1 MODIFIED TARGET ANALYTE LIST METALS AND ASSOCIATED EPA WASTE CODES

Aluminum, Al	Antimony, Sb	Arsenic, As **D004**
Barium, Ba **D005**	Beryllium, Be	Cadmium, Cd **D006**
Cesium, Cs	Chromium, Cr **D007**	Cobalt, Co
Copper, Cu	Iron, Fe	Lead, Pb **D008**
Lithium, Li	Magnesium, Mg	Manganese, Mn
Mercury, Hg * **D009**	Molybdenum, Mo	Nickel, Ni
Potassium, K	Selenium, Se **D010**	Silicon, Si
Silver, Ag **D011**	Sodium, Na	Strontium, Sr
Thallium, Tl	Tin, Sn	Vanadium, V
Zinc, zn		

Mercury is not part of the TAL metal list but was added because of its common usage in laboratories.

TABLE 6-2 MODIFIED TARGET COMPOUND LIST OF VOLATILE ORGANIC COMPOUNDS AND ASSOCIATED EPA WASTE CODES

1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane **F002**	1,2-Dichloroethene (total)
1,2-Dichloropropane	1-1-1-Trichoethane **F001/F002**	1-1-Dichloroethane
1,1-Dichloroethylene **D029**	1-2-Dichloroethane **D028**	2-Hexanone
Bromoform	Bromomethane	Carbon disulfide **F005**
Carbon tetrachloride **D019/F001**	Chloroethane	Chlorobenzene **D021/F002**
Chloroform **D022**	Chloromethane	cis-1,3-Dichloropropene
Dibromochloromethane	Ethylbenzene **F003**	Methyl ethyl ketone (butanone)..... **D035/F005**
Methylene chloride **F001/F002**	Pyridine **F005**	Styrene
Tetrachloroethylene **D039/F001/F002**	Toluene **F005**	trans-1,3-Dichloropropene
Trichloroethylene **D040/F001/F002**	Vinyl Chloride **D043**	Xylenes (total) **F003**
Acetone **F003**	4-Methyl-2-pentanone	Benzene **D018/F005**

6.1.1 Above Ground Portion of RCRA Unit 40 in Building 123

Building 123 has always housed laboratory operations. Laboratories routinely generate organic compounds most of which (prior to 1987) were disposed of in the process waste system. Some of these chemicals would today be characterized as listed wastes. In 1987, administrative controls were established that prohibited the disposal of listed hazardous waste to the waste process system. In addition, satellite accumulation areas were established to manage all listed hazardous wastes generated in Building 123. Beginning in 1989, this system was used predominately as an elementary neutralization unit for D002 corrosive waste streams and was in use until the building ceased operations in 1997. The above ground pipeline system was upgraded in 1995 when approximately 40% of this system was replaced.

6.2 SOIL CHARACTERIZATION

A complete soil characterization of the Building 123 area will be conducted as part of the activities outlined in the Building 123 Proposed Action Memorandum. Soil characterization will include sampling and analysis of the soil beneath and surrounding Building 123. Following removal of the building superstructure, samples will be collected through the slab~~. to determine the necessity for soil remediation~~. The ~~Building 123 and~~ IHSS 121 and ~~148~~ SAP has been written to guide characterization activities in these areas. The SAP incorporates a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol. The RFETS Statistical Applications Group will be used to ensure that statistically valid and representative samples of each waste stream are taken. Current planning indicates a need for approximately ~~fifty (50)~~ forty-six (46) soil samples beneath the slab of Building 123 and from areas surrounding underground, abandoned OPWLs. Samples will be collected from one to six feet in ~~at~~ depths ~~immediately below the pipe~~ and are designed to locate any contamination that may have leaked from the lines. Samples will be analyzed for Volatile Organic Compounds (VOCs), Target Analyte List (TAL) Metals, radionuclides, and nitrates. Data quality requirements supporting the analysis effort will conform to criteria established in "Guidance for the Data Quality Objective Process", EPA QA/G-4 (EPA 1994). The Data Quality Objectives are listed in the "Building 123 and IHSS 121 SAP". (See RF/RMRS-97-023)

7.0 CLOSURE PERFORMANCE STANDARD

The closure performance standard specifies that hazardous waste facilities are to be closed in such a way as to (1) minimize the need for further maintenance at the facility, and (2) protect human health and the environment by controlling, minimizing, or eliminating potential releases of hazardous waste to the environment (6 CCR 1007-3, Section 265.111).

For ease in achieving RCRA Closure Performance Standards, that portion of RCRA Unit 40 associated with Building 123 will be divided into two components: above ground piping and associated ancilliary equipment and below ground piping. These units will be treated independently, however, RCRA Closure will not be completed until both components achieve the RCRA Closure Performance Standards and are certified closed by an independent Colorado Registered Professional Engineer. Any of the three closure options described below may be used to achieve closure. For example, the above ground piping may be closed using

the Decontamination Option while the below ground might be closed using Debris Treatment.

To achieve closure of this unit, a selection of one of the following options will be made by DOE/Kaiser-Hill based on characterization data.

7.1 OPTION 1: DECONTAMINATION OF RCRA UNIT 40 ASSOCIATED WITH BUILDING 123

If this option is selected for either the above ground and/or the below ground portions of this unit , closure will consist of decontaminating the pipe and any associated ancilliary equipment with a solution capable of removing the contaminants of concern and testing the final rinsate to verify treatment standards. This decontamination will be conducted in accordance with the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, Section C, Clean Closure by Decontamination.

7.1.1 Closure Performance Standards For Both Above Ground and Below Ground Portions of RCRA Unit 40

Closure Performance Standards for decontamination identified in this section include, but are not limited to:

- The selection of an appropriate solution for decontamination. Selection of the decontamination solution was based on the types of wastes previously managed in the unit and the contaminants that are present. Water containing sodium carbonate and trisodium phosphate will be used as the decontamination solution;

- Flushing the system with a decontamination solution to remove any remaining trace amounts of acids or bases;

- The final rinsate closure performance standards for internal surfaces of tanks (as described in RFCA Permit, Part X Closures) will be used to evaluate the effectiveness of the decontamination; and

- The final rinsate volume will not exceed 5% of the capacity of the piping system.

The above ground and/or below ground portion of this unit will be considered decontaminated and meet Closure Performance Standards if:

- All visible waste residuals have been removed and;

- The final rinsate contains concentrations of priority pollutants (identified as being managed in the unit) and heavy metals (268.48 UHC listing) below the Tier 2 action levels as defined in Attachment 5 of the Rocky Flats Compliance Agreement (RFCA) and;

- The pH of the rinsate is between 6 and 9.

7.1.2 Rinsate Meets Performance Standards

Above Ground Piping System and Ancilliary Equipment

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, all above ground portion of this unit will be removed and managed as LLW. This LLW will be stored on-site until it can be disposed in an approved facility (e.g., Nevada Test Site, Envirocare),

Below Ground Piping System

Two options exist for the below ground portion of the process waste system:

1. The rinsate sample from the piping meet Tier 2 standards and performance standards are certified by an independent engineer. Clean Closure of this unit will require no further activities; or
2. The rinsate sample does not meet Tier 2 standards and therefore the unit can not be Clean Closed. The unit will be deferred to ER for evaluation as part of the site-wide ROD.

Once the building is removed, the soil sampling program as described in the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites 121 and 148 at Building 123* (SAP) will be initiated. The purpose of the SAP is to identify any hazardous constituents present in the soil as a result of releases from either the waste process lines (active or inactive) or Building 123 itself.

~~Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, the soil sampling program approved in the 123 PAM will be initiated. Dependent upon the results of the sampling, one of the following actions will occur:~~

- ~~If the soil contamination is above levels defined in Section 261 Subpart C, the pipeline will be removed as part of the soil remediation program.~~

—

- ~~If the soil contamination is below Section 261 Subpart C levels the lines will be grouted and capped in place.~~

Any ~~remaining~~ soil contaminants identified during sampling operations will be evaluated by Environmental Restoration Projects and will be used to update the ER Ranking List. This list will be used to determine whether or not soil remediation is required. ~~as part of the 123 PAM and/or final Record of Decision (ROD) for the facility.~~

7.2 OPTION 2: MANAGED AS HAZARDOUS WASTE WITH NO ON-SITE TREATMENT

7.2.1 Rinsate Fails to Meet Performance Standards, Manage Piping/Ancilliary Equipment and Rinsate as Hazardous Waste

If this option is selected, the process waste system will be managed as RCRA mixed waste with the EPA Waste Codes of F001/F002/ F005. The piping and ancilliary equipment will be removed, size reduced and placed into storage on-site at a TSDFs until shipment to an off-site

TSDF for final disposition. All hazardous waste and/or mixed wastes generated from this project will be managed in accordance with all applicable state and federal regulations. Further description of waste management activities can be found in Section 10.

In the event that the rinsate sample meets the Tier 2 standards for organics (which contain all the listed wastes identified for this unit), the operator will petition the CDPHE for a "No Longer Container In Determination" that will allow the piping to be managed as non-hazardous waste provided the piping is not also characteristically hazardous waste.

Any rinsate generated from the operation, will be sent to Building 374 for treatment.

7.3 OPTION 3: DEBRIS TREATMENT OF THE ABOVE AND BELOW GROUND PORTIONS OF RCRA UNIT 40

If this option is selected for either the above ground and/or below ground portions of RCRA Unit 40, the process waste system will be managed as RCRA Hazardous Debris in accordance with 40 CFR 268.45. It is anticipated that this option would be selected only for the above ground portion of this unit.

7.3.1 Debris Treatment Closure Performance Standards

Hazardous debris will be considered decontaminated if the process meets the performance standards identified in the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, Section D, Debris Rule Decontamination. Requirements identified in this section include, but are not limited to:

- Material must meet the definition of debris found in 40 CFR 268.45;

- Selection of a specified technology as identified in 40 CFR 268.45. Extraction or destruction technologies should be selected over immobilization technologies whenever possible. For decontaminating hazardous debris piping, tanks and associated ancillary equipment in Building 123 , chemical extraction using water washing and spraying will be selected. Water washing and spraying is defined as application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers. Water containing sodium carbonate and trisodium phosphate will be used as decontamination solution;

- A volume of approximately three times the piping/tanks volume of this unit will be used to decontaminate the piping and ensure adequate residence time; and

- Clean surface debris standards as specified in 40 CFR 268.45 must be met.

All treatment residuals generated from extraction and/or destruction technologies used in the Closure of Building 123 (including rinsates) will be characterized in accordance with 40 CFR 262.11 and managed accordingly. Treatment residuals do not meet the definition of debris.

In the event that closure performance standards for debris are not met, the piping will be

removed and handled as RCRA mixed waste.

8.0 SPECIFIC CLOSURE ACTIVITIES

Closure activities will be performed to achieve the objectives of the closure performance standard. (See RCRA Permit, Part 10 Closure, Section C-6, "Closure Performance Standards"). The activities will be conducted with decontamination and decommissioning activities covered by the Building 123 PAM, which includes remediation of the remainder of the building and abandoned OPWLs under the building. Closure activities will be implemented to ensure the protection of human health and the environment, and waste minimization.

The following sections outline the procedures necessary to close active process waste lines in Building 123, and the active underground line between Building 123 and Valve Vault 18.

8.1 PREPARATION OF ENGINEERING PACKAGES AND WORK PACKAGES

Engineering and work packages will be used to govern the deactivation and decommissioning activities. Engineering designs will be developed for removal and decommissioning activities. The engineering package will define the sequence of activities and methods of size reducing, dismantling, and packaging of the building materials. The packages are being prepared for the Building 123 project in three phases:

1) Deactivation of the building,

2) Demolition of the building,

3) Characterization ~~Remediation~~ of underground contamination ~~and/or closure of the underground pipeline as required.~~

8.2 HEALTH AND SAFETY

The RFETS Health and Safety Practices Manual defines general health and safety measures to be followed at the Site. All closure activities will be conducted in accordance with the manual. In addition, a specific Health and Safety Plan has been written for Building 123 D&D activities, which specifically addresses D&D and RCRA Unit 40 closure activities. As Low As Reasonably Achievable (ALARA) principles will be followed regarding personnel radiation dosage and exposures to hazardous materials. Radiation Control Technicians will survey all rooms in the building for radiation, and the pipelines and sumps will be monitored for radiological contamination.

In accordance with Site procedure 1-74000-IWCP, September 4, 1996, Integrated Work Control Program (IWCP) work packages will be prepared to direct and control all work. The packages will be organized similarly to the engineering packages. Each work package will contain a Job Safety Analysis (JSA), which addresses all health and safety issues in detail.

8.3 TANK SYSTEM CLOSURE ACTIVITIES

8.3.1 Closure of System Components

Closure of the above ground and underground portions of RCRA Unit 40 is dependent upon the amount of contamination (if any) discovered in the final characterization. These units will ~~:meet:~~

1. Meet the rinsate standards (Option 1) or
2. Will be removed, characterized and managed in accordance with all applicable rules and regulations (Option 2); or
3. Meet the Debris Treatment Standards; or
4. In the event Tier 2 standards can not be met for underground piping and/or contaminated soils, deferred to ER.

The WSRIC system documents that the process waste system in Building 123 has been used as an elementary neutralization unit from 1989 to date. There is little information regarding disposal practices prior to 1989. However, it seems clear that the majority of the discarded liquids were acids and bases. According to the WSRIC data, no listed wastes were disposed in the system since 1989.

Both the above ground and below ground portions of RCRA Unit 40 will be closed following an approved RCRA Closure Plan using one of the following options:

1. Pipelines and ancilliary equipment will be decontaminated using a solution of water, sodium carbonate and trisodium phosphate. The rinsate will be tested to determine if it meets the Tier 2 levels identified in Attachment 5 of RFCA. If the rinsate meets these standards, then the system will be considered closed. If the rinsate is above the standards, the pipe will be removed. Underground piping and soil contamination that does not meet standards will be deferred to ER.

2. The process waste system can be removed and managed as Mixed Waste; or

3. The process waste system can be Debris Treated in accordance with 40 CFR 268.45 and exit RCRA once debris treatment performance standards are met.

~~If soil contamination is present that requires removal/remediation, the pipeline will be removed at that time as part of the soil remediation.~~

8.3.2 Closure Scenarios Associated with Soil Contamination

~~The choice of closure options for the underground pipelines will be influenced by the extent of hazardous contamination, found in soil sampled near the pipeline. One or more sets of activities will be pursued, based upon the amount of RCRA regulated contaminants that are found:~~

~~**Contamination above RCRA levels, Subpart C, 261 levels**~~

~~Soil surrounding the pipelines contaminated above RCRA, Subpart C, 261 levels will require thorough decontamination, including removal of the contaminated soil and pipeline. Soil contaminated above RCRA regulated levels will be removed and managed as hazardous waste.~~

~~If sampling shows an extensive contamination plume in the soil, other management options such as soil vapor extraction, thermal drying, or on site stabilization may be pursued upon agreement with CDPHE personnel. If any these options are necessary, an addendum to this closure plan will be submitted.~~

Contamination below RFCA ~~levels, below~~ Tier 2 Levels

If analytical results indicate that soil contamination is below RFCA Tier 2 levels, the following actions will be taken:

- Underground pipelines will be filled with grout, capped and left in place.
- Sample results will be summarized and forwarded to ER for inclusion in the site-wide ER evaluation.

Contamination above RFCA Tier 2 Levels

If analytical results indicate that soil contamination is above the Tier 2 levels, the following actions will be taken:

- The site will be deferred to ER for further evaluation;
- All analytical data will be summarized in a sample report . This report along with copies of all analytical data will be submitted to ER for evaluation.
- ER will use the data to update the ER Ranking List..
- The ER Ranking List will be used to prioritize soil remediation projects at Rocky Flats. As part of the RFCA Plant Closure, a risk assessment will be conducted. Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document

~~**Contamination below RCRA Subpart C, 261 levels, and above RFCA Tier 2**~~

~~If analytical results indicate that the soil is below RCRA Subpart C, 261 levels, but above the RFCA Tier 2 levels, the following actions will be taken. Underground lines will be filled with grout, capped, and left in place. Soil will be left undisturbed. As part of the RFCA Plant Closure, a risk assessment will be conducted. Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document.~~

9.0 DISPOSITION OF WASTE GENERATED DURING CLOSURE

Remediation and closure activities may generate a combination of radioactive, hazardous, and mixed wastes. Contaminated soil, pipeline, sumps and ancilliary equipment are expected to be the major sources of waste. Wastes consisting of plastic, tools, personal protective equipment and other materials associated with demolition and remediation will also be a major source of waste. Contaminated waste will be handled by qualified waste packaging technicians who will work with decontamination specialists and radiation control technicians to identify and

segregate the Hazardous or Low Level waste. Waste packaging technicians will package and label the waste, and will arrange for radioactive waste to be certified. Liquid hazardous or radioactive waste generated after the process waste lines are no longer in service will be collected in drums and shipped to Building 374 for processing. Solid waste in drums or boxes will be managed by the Waste Disposal group in an appropriate storage area prior to off-site shipment.

9.1 ESTIMATE OF WASTE VOLUMES TO BE GENERATED

Table 9-1 describes the types, estimated quantities of waste to be generated, and how the waste will be handled and disposed.

Table 9-1 Estimated Volume of Waste to be Generated if Options are Successful

Waste Forms	Waste Type	Disposition of Waste	Estimated Quantity
Option 1 Decontamination			
Process waste pipelines/ancilliary equipment	Low Level	LLW will be recycled at SEG, Oak Ridge, TN or sent to the Nevada Test Site.	800 Linear Ft. or 100-200 Cubic Ft.
Rinsate	Low Level Mixed	Building 374, WWTU	200-1000 gallons
Plastic, paper, etc. decontamination or LLW handling	Low Level	Nevada Test Site	100-200 Cubic Ft.
Remediation of underground pipelines/soils	Low Level Mixed Waste	Approved TSDF	Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates the need to exhume soil/pipeline.)
Option 2 Handle as Hazardous Waste			
Process Waste Pipeline/ancilliary equipment	Low Level Mixed Waste	Approved TSDF	800 Linear Ft. or 100-200 Cubic Ft.
Rinsate	Low Level Mixed Waste	Building 374, WWTU	200-1000 gallons
Plastic, paper, etc. that comes in direct contact with listed waste	Low Level Mixed Waste	Approved TSDF	< 100 Cubic Ft.
Remediation of underground pipelines/soil	Low Level Mixed Waste	Approved TSDF	Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates need to exhume pipeline.)
Option 3 Debris Treatment			
Process waste pipelines/ancilliary equipment	Low Level Waste	Nevada Test Site	800 Linear Ft. or 100-200 Cubic Ft.
Plastic, paper, etc. coming in to direct contact with listed waste	Low Level Mixed Waste	Mixed Waste will be stored on-site in a TSDF awaiting shipment to Envirocare or another approved TSDF.	Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates need to exhume pipeline.)
Remediation of	Low Level Mixed Waste		

contaminated soil.			

10.0 RECORD KEEPING

The following closure documentation will be maintained:

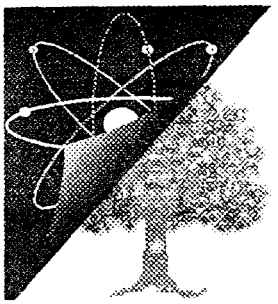
- A field logbook indicating the date, number, and type of sampling activities
- Analytical results
- Records of actions taken to decontaminate equipment or structures
- Work control packages developed to govern closure activities

Certification and other documentation indicating that closure was conducted in accordance with the closure plan

Attachment 1

First Floor Plan

TO: DORETHEA HOYT.
T130F



RF/RMRS-97-052

Closure Plan for Building 123 Components of RCRA Unit 40

U. S. Department of Energy

Rocky Flats Environmental Technology Site

COMMENTS BY
G Schomaker 11/6/97
KH Closure Projects.
x6815 DP. 7615 FAX 8267
CC: KENT DORR

November 1997

MAIN POINT: WHERE IS THE DOCUMENTED STEP(S) THAT THE RINSATE IS CHARACTERIZED; NOT HERE, NOT IN THE IWCP, NOT IN THE RTG RINSATE PROCEDURE?

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CLOSURE PLAN FOR BUILDING 123
COMPONENTS OF RCRA UNIT 40

REVISION 0

NOVEMBER 1997

This Closure Plan has been reviewed and approved by:

Vern Guthrie, Project Manager — Date: 11/5/97

Ted Hopkins, Environmental Compliance Manager — Date: 11/5/97

This Closure Plan was prepared by:

Richard T. Jensen, Senior Engineer — Date: 11/5/97

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CLOSURE PLAN FOR BUILDING 123 COMPONENTS OF RCRA UNIT 40

IS THIS TOO BROAD TO BE UNDERSTOOD IN THE FIELD. I.E. OVERHEAD PIPING REMOVED DURING STRIPOUT

1.0 INTRODUCTION

Partial closure of RCRA Unit 40 includes the closure of the RCRA regulated process waste lines, sumps, and pumping stations associated with Building 123 at the Rocky Flats Environmental Technology Site (RFETS). This system includes above ground process waste lines currently used in the building, as well as one active underground line. The Building 123 area encompasses overlapping Individual Hazardous Substance Sites (IHSS) 121 and 148. IHSS 121 includes the underground Original Process Waste Lines (OPWLs) P-1, P-2, and P-3. Figure 1-1 shows the location of Building 123 and IHSS 121 and 148. Leakage from old process waste lines and possible spills from operations may have resulted in contaminated soil beneath and adjacent to Building 123. This potentially contaminated soil has been designated IHSS 148. The OPWL is a network of tank and underground pipelines constructed to transport and temporarily store process waste from point of origin to on-site treatment and discharge points. Both the active and inactive systems include above and underground lines that transfer the process waste to valve vaults or holding tanks. All process waste lines inside the building are currently active. Closure will include deactivation, dismantlement, and remediation of all system components in Building 123, and the active underground pipeline that leaves the building and extends to Valve Vault 18.

Partial closure of RCRA Unit 40 is part of a larger project to decontaminate and decommission (D&D) Building 123 and surrounding area. This project will remove Buildings 123, 123S, 113, and 114 at RFETS; eliminate IHSS 148; and close a portion of RCRA Unit 40. The Building 123 slab and foundation will be removed as required to remediate contamination beneath the building as dictated by soil sampling results. The overall project is being conducted as an accelerated action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) approved under the Building 123 Proposed Action Memorandum (PAM). The PAM is a decision document for the D&D of Building 123 and has been approved by the Colorado Department of Public Health and Environment (CDPHE). The Building 123 PAM references this unit closure plan. RCRA Unit 40 is currently under Interim status, and as a result, partial closure activities fall under Colorado Hazardous Waste Regulations: Part 265, Subpart G -"Closure and Post Closure".

1.1 APPLICABILITY

This RCRA Closure Plan applies to both the aboveground and subsurface Process Waste Tank System found in and beneath Building 123. This Closure Plan will identify the options available for the management, and the removal and/or remediation of this system. This Closure Plan does not apply to:

- the inactive portion of the P-1 Pipeline,
- to Pipelines P-2, or P-3;
- nor to any soil contamination found under this building.

The above ground and underground process waste line connecting Building 123 to Valve Vault 18 are the active part of RCRA Unit 40 associated with Building 123. Part of P-1 was incorporated into the current system and is part of the RCRA Closure Plan while other sections were removed in 1989.

NEED TO ADDRESS/MENTION PROCESS WASTE SUMPS LOCATED IN B123 - WHERE CHARACTERIZED AS RADIOLOGICAL AND/OR HAZARDOUS; SUMPS SHOULD BE REMEDIATED. RM 109C, 156, 157 & 158 THAT ARE NOT "PRE-RCRA" GDS.

Building operations prior to 1985 that generated mixed waste were not regulated under RCRA, and, therefore, these pipelines are not part of RCRA Unit 40. Non-regulated underground pipelines that were abandoned prior to RCRA regulation include: pipelines P-2 and P-3 which were abandoned in 1974 (Blue and red on attached First Floor Plan) As such, they are not included with this closure plan. The Building 123 PAM and Building 123 IHSS Sampling and Analysis Plan (SAP) address the investigation and potential remediation of the abandoned lines and any soil contamination created by the lines. The implementation of the RCRA Closure Plan will be contained in the facility decommissioning plan.

< THIS DOC. ALSO DOES NOT ADDRESS THE OTHER SUMPS.

The following is a summary of the decommissioning plan for the process waste piping system in Building 123.

The Decommissioning of Building 123 has been divided into four main phases:

I. Strip-Out and Utility Isolation
II. Asbestos Abatement
III. Demolition
IV. Characterization and Remediation of IHSS 121 and 148.

During Phase I, the above grade section of the process waste line (shown in pink on Attachment 1, First Floor Plan) will be removed under either Option 1, 2 or 3 as described in Section 7.0 of this Closure Plan. The piping will be plugged where it goes below ground in Rooms 156, 157 and 158. After removal, all the above ground piping will be packaged as either Low Level Waste or Mixed Waste depending the results of rinsate sampling. The piping will be removed to prepare the building for demolition in Phase III.

↑ RINSATE PROCEDURE DOES NOT INCLUDE RADIOLOGICAL SAMPLING.

THIS IS THE ISSUE

The underground process waste lines will be managed during Phase IV. The underground process waste lines refer to the inactive section of P1 (yellow on the attached sketch), P2 (blue), P3 (orange), and the active underground section of piping which goes to Valve Vault 18 (green). During Phase IV, the soil and the concrete slab will be sampled (drilled) for characterization. Closure activities for the inactive underground process waste lines, the building slab and surrounding soil will be determined based upon the results of the characterization study. Final disposition of the underground portion of the active process waste line (green) will depend on sample analysis of the rinsate.

< WHERE ARE THE SUMPS?

2.0 FACILITY CONTACT

The RFETS contact for closure activities is:

Manager, Rocky Flats Field Office
U. S. Department of Energy
P. O. Box 928
Golden, Colorado 80402-0928

Phone: (303) 966-2025

3.0 UNIT CLOSURE NOTIFICATION, CERTIFICATION AND SCHEDULE

The closure of the Building 123 above ground process waste system, sumps, and underground pipelines will be conducted as a partial closure of Unit 40. Notification will be submitted to the Director of the Colorado Department of Public Health and Environment (CDPHE) of the intent to close the process waste system 45 days prior to the planned start of closure activities.

If the total time necessary for closure is expected to exceed 180 days, the facility will notify the Director within 30 days of such a determination (Part 265.113(b)) and at least 30 days prior to the expiration of the 180 day closure period (Part 265.113(c)).

Within 60 days after completion of closure activities, the facility will notify CDPHE through submittal of proper certification that the unit has been closed in accordance with the approved closure plan. The certification package will be signed by the owner or operator and by an independent, Colorado-registered Professional Engineer.

4.0 REGULATORY REQUIREMENTS

A plan for closure of RCRA hazardous waste treatment and storage units at RFETS is required pursuant to 6 CCR 1007-3, Part 265 of the Colorado Hazardous Waste Regulations: Part 265, Subpart G - "Closure and Post Closure", Sections 265.110 through 265.120. No demonstration of financial responsibility is required because compliance with 6 CCR 1007-3, Part 266, Subpart A - "Financial Requirements", is not required for government owned facilities.

5.0 UNIT DESCRIPTION

RCRA Unit 40

RCRA Unit 40 is the site-wide network of tanks, pipelines, and sumps constructed to transport and temporarily store process waste from the point of origin to on-site treatment and discharge points. Operation of the process waste system in Building 123 began in 1952 in the east and central wings. An extension to the east wing was added in 1968, and the west wing was added in 1972. The process waste system for Building 123 was modified with each of the expansions to the building.

The process waste system incorporated into RCRA Unit 40 includes the system components in Rooms 103, 103A, 105, 111, 112, 113B, 121, 123, 123A, 124, 125, 126C, 127, 155, 155B, 156, 157, and 158 in the building, and the active underground line that connects to Valve Vault 18. A drawing of the building and the process waste piping is included in Appendix A. The history of the Building process waste system is described below.

Underground Section: The original process waste lines (P2) were installed below grade in 1952. The southern portion of this system in the east wing was modified in 1968 when the east wing addition was constructed. The process waste line installed in 1968 is referred to as the P3 line.

In 1972, an additional underground process waste piping system was installed which serviced the construction of the west wing. The 1972 line is the P1 line. Construction of the west wing included three large interconnected concrete sump pits in Rooms 156, 157, and 158.

In 1974 an above grade process piping system (see below) was installed to replace the old P2 and P3 lines. When this new above-grade system was installed, the P2 and P3 lines were filled with grout.

In 1989 the below grade process waste piping system was upgraded. The sections of P1 that lie outside of Building 123 were removed. A new below grade piping system was installed in 1989 that went from the south west corner of Building 123 to Valve Vault 18. The 1989 section of the underground process waste piping was used until 1997.

Above Ground Section: In 1974 a process waste piping system was installed above-grade in Building 123. This above grade system tied into the P1 below grade system, and later was tied into the 1989 below-grade piping system. In 1995, approximately 40% of the above-grade piping were modified and upgraded. The above grade piping system was used until 1997.

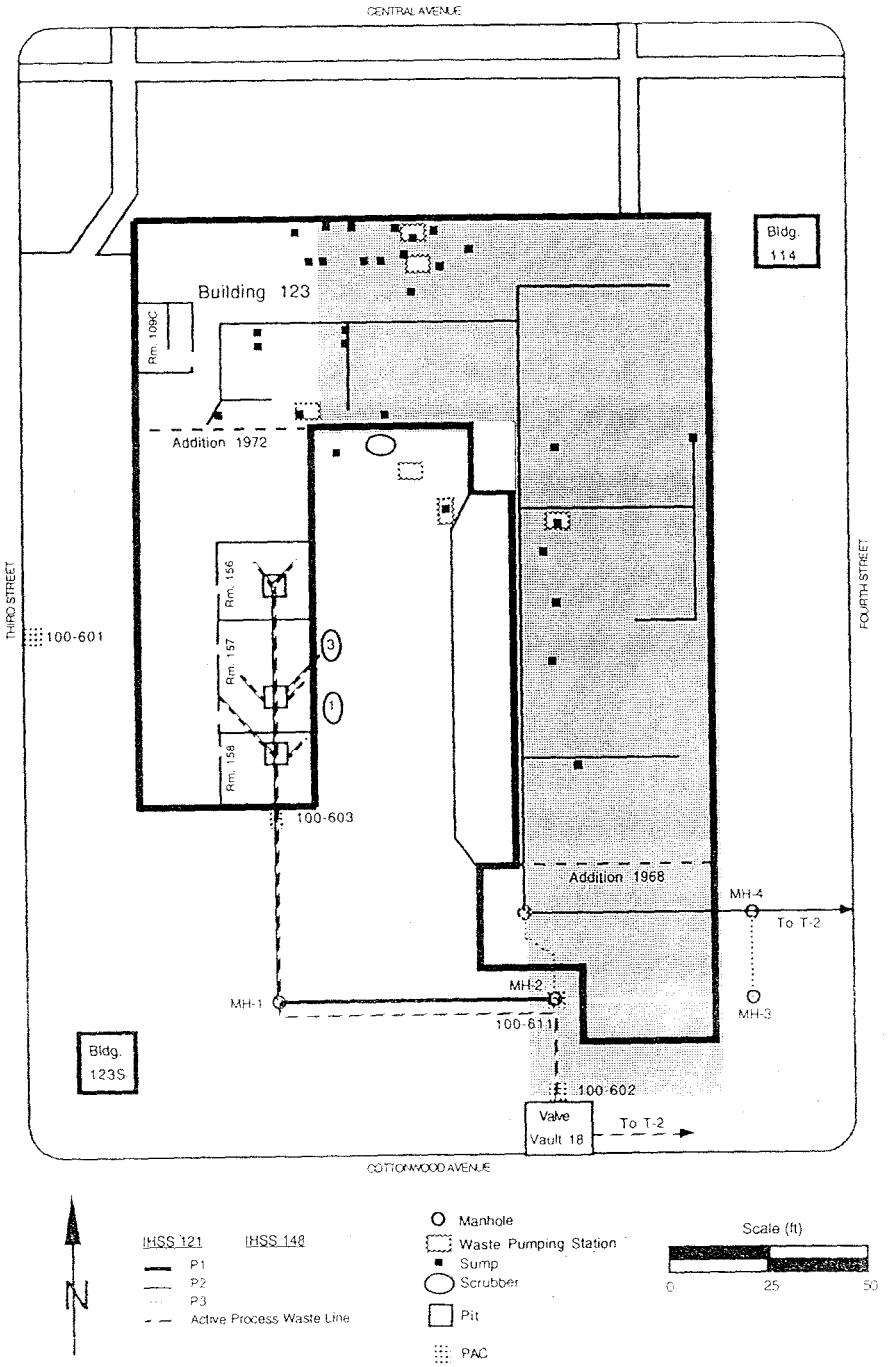

Figure 1-1 Location of Building 123 and Associated IHSS 121 and 148

6.0 CHARACTERIZATION

6.1 EPA WASTE CODES ASSOCIATED WITH THIS UNIT AND SAMPLING PARAMETERS

The following EPA Waste Codes were listed in the Part A application for RCRA Unit 40: D001, D002, D004-D011, D018, D019, D028, D029, D035, D040, F001, F002, F003, F005, F007, F008, and F009. However, not all of the above referenced waste streams have been identified as being disposed of in RCRA Unit 40 in Building 123. The WSRIC identifies the following process wastes as being disposed of in the process waste system:

- From 1987 to 1997, organic compounds such as Dibutyl-n-diethyl carbamoyl phosphate; (DDCP) and toluene were used in very small quantities for Americium separation in Building 123;
- Acids: nitric acid, hydrofluoric acid, sulfuric acid, hydrochloric acid, acetic acid, formic acid, oxalic acid, and perchloric acid;
- Bases: ammonium hydroxide and sodium hydroxide;
- Radionuclides: various isotopes of plutonium, americium, uranium, and curium;
- Metals: Calcium, Magnesium, and Iron effluents, beryllium (trace amounts);
- Ammonium nitrate, ammonium thiocyanate, ammonium chloride, ammonium oxalate, ammonium hydroxylamine, ethylene glycol, Diethylenetriaminepentaacetate (DTPA) potassium permanganate, potassium permanganate, sodium nitrate, and sodium carbonate.

> GOOD REASON IS CHARACTERIZE THE RINSATE!

After treatment, using either Option 1 or Option 3, a representative sample of the final rinse water will be taken in Building 428 near Tank #853 where a sampling tap is located. All liquid wastes from Building 123 flow into this tank. This sample will be tested for:

- The Target Analyte List for Metals (Table 6-1);
- Volatile Organics (as identified in Table 6-2); and
- Fingerprinting (pH, flash point, TSS, turbidity, etc.)

These sample parameters will account for all of the EPA Waste codes associated with RCRA Unit 40 except for F007, F008, F009 . These listed waste codes are for cyanide wastes from electroplating operations. No electroplating operations utilizing cyanide were conducted in Building 123 and are therefore omitted from testing. Tables 6-1 and 6- 2 list the contaminants to be analyzed for, and their associated EPA Waste Codes.

Based upon process knowledge and application of the Contained-In Policy, materials from this unit (pipelines, pumps, sumps, etc.) must be managed as RCRA mixed waste and analyzed for characteristics unless Options 1 and 3, Rinsate or Debris Treatment standards, identified in this document are met.

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TABLE 6-1 MODIFIED TARGET ANALYTE LIST METALS AND ASSOCIATED EPA WASTE CODES

Aluminum, Al	Antimony, Sb	Arsenic, As D004
Barium, Ba D005	Beryllium, Be	Cadmium, Cd D006
Cesium, Cs	Chromium, Cr D007	Cobalt, Co
Copper, Cu	Iron, Fe	Lead, Pb D008
Lithium, Li	Magnesium, Mg	Manganese, Mn
Mercury, Hg * D009	Molybdenum, Mo	Nickel, Ni
Potassium, K	Selenium, Se D010	Silicon, Si
Silver, Ag D011	Sodium, Na	Strontium, Sr
Thallium, Tl	Tin, Sn	Vanadium, V
Zinc, zn		

Mercury is not part of the TAL metal list but was added because of its common usage in laboratories.

TABLE 6-2 MODIFIED TARGET COMPOUND LIST OF VOLATILE ORGANIC COMPOUNDS AND ASSOCIATED EPA WASTE CODES

1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane F002	1,2-Dichloroethene (total)
1,2-Dichloropropane	1-1-1-Trichoethane F001/F002	1-1-Dichloroethane
1,1-Dichloroethylene D029	1-2-Dichloroethane D028	2-Hexanone
Bromoform	Bromomethane	Carbon disulfide F005
Carbon tetrachloride D019/F001	Chloroethane	Chlorobenzene D021/F002
Chloroform D022	Chloromethane	cis-1,3-Dichloropropene
Dibromochloromethane	Ethylbenzene F003	Methyl ethyl ketone (butanone)..... D035/F005
Methylene chloride F001/F002	Pyridine F005	Styrene
Tetrachloroethylene D039/F001/F002	Toluene F005	trans-1,3-Dichloropropene
Trichloroethylene D040/F001/F002	Vinyl Chloride D043	Xylenes (total) F003
Acetone F003	4-Methyl-2-pentanone	Benzene D018/F005

6.1.1 Above Ground Portion of RCRA Unit 40 in Building 123

Building 123 has always housed laboratory operations. Laboratories routinely generate organic compounds most of which (prior to 1987) were disposed of in the process waste system. Some of these chemicals would today be characterized as listed wastes. In 1987, administrative controls were established that prohibited the disposal of listed hazardous waste to the waste process system. In addition, satellite accumulation areas were established to manage all listed hazardous wastes generated in Building 123. Beginning in 1989, this system was used predominately as an elementary neutralization unit for D002 corrosive waste streams and was in use until the building ceased operations in 1997. The above ground pipeline system was upgraded in 1995 when approximately 40% of this system was replaced.

6.2 SOIL CHARACTERIZATION

SUMPS TO BE INCLUDED AS PREVIOUSLY COMMITTED

A complete soil characterization of the Building 123 area will be conducted as part of the activities outlined in the Building 123 Proposed Action Memorandum. Soil characterization will include sampling and analysis of the soil beneath and surrounding Building 123. Following removal of the building superstructure, samples will be collected through the slab to determine the necessity for soil remediation. The Building 123 and IHSS 121 SAP has been written to guide characterization activities in these areas. The SAP incorporates a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol. The RFETS Statistical Applications Group will be used to ensure that statistically valid and representative samples of each waste stream are taken. Current planning indicates a need for approximately fifty (50) soil samples beneath the slab of Building 123 and from areas surrounding underground, abandoned OPWLs. Samples will be collected at depths immediately below the pipe to locate any contamination that may have leaked from the lines. Samples will be analyzed for Volatile Organic Compounds (VOCs), Target Analyte List (TAL) Metals, radionuclides, and nitrates. Data quality requirements supporting the analysis effort will conform to criteria established in "Guidance for the Data Quality Objective Process", EPA QA/G-4 (EPA 1994). The Data Quality Objectives are listed in the "Building 123 and IHSS 121 SAP". (See RF/RMRS-97-023)

7.0 CLOSURE PERFORMANCE STANDARD

The closure performance standard specifies that hazardous waste facilities are to be closed in such a way as to (1) minimize the need for further maintenance at the facility, and (2) protect human health and the environment by controlling, minimizing, or eliminating potential releases of hazardous waste to the environment (6 CCR 1007-3, Section 265.111).

For ease in achieving RCRA Closure Performance Standards, that portion of RCRA Unit 40 associated with Building 123 will be divided into two components: above ground piping and below ground piping. These units will be treated independently, however, RCRA Closure will not be completed until both components achieve the RCRA Closure Performance Standards and are certified closed by an independent Colorado Registered Professional Engineer. Any of the three closure options described below may be used to achieve closure. For example, the above ground piping may be closed using the Decontamination Option while the below ground might be closed using Debris Treatment.

To achieve closure of this unit, a selection of one of the following options will be made by DOE/Kaiser-Hill based on characterization data.

7.1 OPTION 1: DECONTAMINATION OF RCRA UNIT 40 ASSOCIATED WITH BUILDING 123

If this option is selected for either the above ground and/or the below ground portions of this unit , closure will consist of decontaminating the pipe with a solution capable of removing the contaminants of concern and testing the final rinsate to verify treatment standards. This decontamination will be conducted in accordance with the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, Section C, Clean Closure by Decontamination.

7.1.1 Closure Performance Standards For Both Above Ground and Below Ground Piping

Closure Performance Standards for decontamination identified in this section include, but are not limited to:

- The selection of an appropriate solution for decontamination. Selection of the decontamination solution was based on the types of wastes previously managed in the unit and the contaminants that are present. Water containing sodium carbonate and trisodium phosphate will be used as the decontamination solution;
- Flushing the system with a decontamination solution to remove any remaining trace amounts of acids or bases;
- The final rinsate closure performance standards for internal surfaces of tanks (as described in RFCA Permit, Part X Closures) will be used to evaluate the effectiveness of the decontamination; and
- The final rinsate volume will not exceed 5% of the capacity of the piping system.

The above ground and/or below ground portion of this unit will be considered decontaminated and meet Closure Performance Standards if:

- All visible waste residuals have been removed and;
- The final rinsate contains concentrations of priority pollutants (identified as being managed in the unit) and heavy metals (268.48 UHC listing) below the Tier 2 action levels as defined in Attachment 5 of the Rocky Flats Compliance Agreement (RFCA) and;
- The pH of the rinsate is between 6 and 9.

7.1.2 Rinsate Meets Performance Standards

AGAIN IMPLIES RINSATE WILL CONTAIN RADIONUCLIDES AND SHOULD BE CHARACTERIZED.

Above Ground Piping System

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, all above ground piping will be removed and managed as LLW. This LLW will be stored on-site until it can be disposed in an approved facility (e.g., Nevada Test Site, Envirocare),

Below Ground Piping System

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, the soil sampling program approved in the 123 PAM will be initiated. Dependent upon the results of the sampling, one of the following actions will occur:

- If the soil contamination is above levels defined in Section 261 Subpart C, the pipeline will be removed as part of the soil remediation program.

- If the soil contamination is below Section 261 Subpart C levels the lines will be grouted and capped in place.

Any remaining soil contaminants will be evaluated as part of the 123 PAM and/or final Record of Decision (ROD) for the facility.

7.2 OPTION 2: MANAGED AS HAZARDOUS WASTE WITH NO ON-SITE TREATMENT

7.2.1 Rinsate Fails to Meet Performance Standards, Manage Piping and Rinsate as Hazardous Waste

If this option is selected, the piping system will be managed as RCRA mixed waste with the EPA Waste Codes of F001/F002/ F005. The piping will be removed, size reduced and placed into storage on-site at a TSDFs until shipment to an off-site TSDF for final disposition. All hazardous waste and/or mixed wastes generated from this project will be managed in accordance with all applicable state and federal regulations. Further description of waste management activities can be found in Section 10.

Any rinsate generated from the piping will be sent to Building 374 for treatment.

7.3 OPTION 3: DEBRIS TREATMENT OF THE ABOVE AND BELOW GROUND PORTIONS OF RCRA UNIT 40

If this option is selected for either the above ground and/or below ground portions of RCRA Unit 40, the process waste system will be managed as RCRA Hazardous Debris in accordance with 40 CFR 268.45. It is anticipated that this option would be selected only for the above ground portion of this unit.

7.3.1 Debris Treatment Closure Performance Standards

Hazardous debris will be considered decontaminated if the process meets the performance standards identified in the Rocky Flats Environmental Technology Site RCRA Permit, Part 10 Closure, Section D, Debris Rule Decontamination. Requirements identified in this section include, but are not limited to:

- Material must meet the definition of debris found in 40 CFR 268.45;

- Selection of a specified technology as identified in 40 CFR 268.45. Extraction or destruction technologies should be selected over immobilization technologies whenever possible. For decontaminating hazardous debris piping, tanks and associated ancillary equipment in Building 123 , chemical extraction using water washing and spraying will be selected. Water washing and spraying is defined as application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers. Water containing sodium carbonate and trisodium phosphate will be used as decontamination solution;

- A volume of approximately three times the piping/tanks volume of this unit will be used to decontaminate the piping and ensure adequate residence time; and

- Clean surface debris standards as specified in 40 CFR 268.45 must be met.

All treatment residuals generated from extraction and/or destruction technologies used in the Closure of Building 123 (including rinsates) will be characterized in accordance with 40 CFR 262.11 and managed accordingly. Treatment residuals do not meet the definition of debris.

In the event that closure performance standards for debris are not met, the piping will be removed and handled as RCRA mixed waste.

8.0 SPECIFIC CLOSURE ACTIVITIES

Closure activities will be performed to achieve the objectives of the closure performance standard. (See RCRA Permit, Part 10 Closure, Section C-6, "Closure Performance Standards"). The activities will be conducted with decontamination and decommissioning activities covered by the Building 123 PAM, which includes remediation of the remainder of the building and abandoned OPWLs under the building. Closure activities will be implemented to ensure the protection of human health and the environment, and waste minimization.

The following sections outline the procedures necessary to close active process waste lines in Building 123, and the active underground line between Building 123 and Valve Vault 18.

8.1 PREPARATION OF ENGINEERING PACKAGES AND WORK PACKAGES

Engineering and work packages will be used to govern the deactivation and decommissioning activities. Engineering designs will be developed for removal and decommissioning activities. The engineering package will define the sequence of activities and methods of size reducing, dismantling, and packaging of the building materials. The packages are being prepared for the Building 123 project in three phases:

1) Deactivation of the building,

2) Demolition of the building,

3) Remediation of underground contamination and/or closure of the underground pipeline as required.

8.2 HEALTH AND SAFETY

The RFETS Health and Safety Practices Manual defines general health and safety measures to be followed at the Site. All closure activities will be conducted in accordance with the manual. In addition, a specific Health and Safety Plan has been written for Building 123 D&D activities, which specifically addresses D&D and RCRA Unit 40 closure activities. As Low As Reasonably Achievable (ALARA) principles will be followed regarding personnel radiation dosage and exposures to hazardous materials. Radiation Control Technicians will survey all rooms in the building for radiation, and the pipelines and sumps will be monitored for radiological contamination.

In accordance with Site procedure 1-74000-IWCP, September 4, 1996, Integrated Work Control Program (IWCP) work packages will be prepared to direct and control all work. The packages will be organized similarly to the engineering packages. Each work package will contain a Job Safety Analysis (JSA), which addresses all health and safety issues in detail.

8.3 TANK SYSTEM CLOSURE ACTIVITIES

8.3.1 Closure of System Components

Closure of the above ground and underground lines is dependent upon the amount of contamination (if any) discovered in the final characterization. These units will meet:

1. The rinsate standards (Option 1) or

2. Will be removed, characterized and managed in accordance with all applicable rules and regulations (Option 2); or

3. Debris Treatment Standards.

The WSRIC system documents that the process waste system in Building 123 has been used as an elementary neutralization unit from 1989 to date. There is little information regarding disposal practices prior to 1989. However, it seems clear that the majority of the discarded liquids were acids and bases. According to the WSRIC data, no listed wastes were disposed in the system since 1989.

Both the above ground and below ground portions of RCRA Unit 40 will be closed following an approved RCRA Closure Plan using one of the following options:

1. The pipelines will be decontaminated using a solution of water, sodium carbonate and trisodium phosphate. The rinsate will be tested to determine if it meets the Tier 2 levels identified in Attachment 5 of RFCA. If the rinsate meets these standards, then the system will be considered closed. If the rinsate is above the standards, the pipe will be removed.
2. The pipelines can be removed and managed as Mixed Waste; or
3. The pipelines can be Debris Treated in accordance with 40 CFR 268.45 and exit RCRA once debris treatment performance standards are met.

HOW ARE YOU GOING TO DO THIS W/O RADIOLOGICAL CHARACTERIZATION?

If soil contamination is present that requires removal/remediation, the pipeline will be removed at that time as part of the soil remediation.

8.3.2 Closure Scenarios Associated with Soil Contamination

SUMPS?

The choice of closure options for the underground pipelines will be influenced by the extent of hazardous contamination, found in soil sampled near the pipeline. One or more sets of activities will be pursued, based upon the amount of RCRA regulated contaminants that are found:

Contamination above RCRA levels, Subpart C, 261 levels

Soil surrounding the pipelines contaminated above RCRA, Subpart C, 261 levels will require thorough decontamination, including removal of the contaminated soil and pipeline. Soil contaminated above RCRA regulated levels will be removed and managed as hazardous waste.

If sampling shows an extensive contamination plume in the soil, other management options such as soil vapor extraction, thermal drying, or on site stabilization may be pursued upon agreement with CDPHE personnel. If any these options are necessary, an addendum to this closure plan will be submitted.

Contamination below RFCA levels, below Tier 2 levels

If analytical results indicate that the soil is below RFCA Tier 2 levels, the following actions will be taken. Underground pipelines will be filled with grout, capped and left in place.

Contamination below RCRA Subpart C, 261 levels, and above RFCA Tier 2

If analytical results indicate that the soil is below RCRA Subpart C, 261 levels, but above the RFCA Tier 2 levels, the following actions will be taken. Underground lines will be filled with grout, capped, and left in place. Soil will be left undisturbed. As part of the RFCA Plant Closure, a risk assessment will be conducted. Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document.

9.0 DISPOSITION OF WASTE GENERATED DURING CLOSURE

Remediation and closure activities may generate a combination of radioactive, hazardous, and mixed wastes. Contaminated soil and pipeline material are expected to be the major sources of waste. Wastes consisting of plastic, tools, personal protective equipment and other materials associated with demolition and remediation will also be a major source of waste. Contaminated waste will be handled by qualified waste packaging technicians who will work with decontamination specialists and radiation control technicians to identify and segregate the Hazardous or Low Level waste. Waste packaging technicians will package and label the waste, and will arrange for radioactive waste to be certified. Liquid hazardous or radioactive waste generated after the process waste lines are no longer in service will be collected in drums and shipped to Building 374 for processing. Solid waste in drums or boxes will be managed by the Waste Disposal group in an appropriate storage area prior to off-site shipment.

9.1 ESTIMATE OF WASTE VOLUMES TO BE GENERATED

Table 9-1 describes the types, estimated quantities of waste to be generated, and how the waste will be handled and disposed.

Table 9-1 Estimated Volume of Waste to be Generated if Options are Successful

Waste Forms	Waste Type	Disposition of Waste	Estimated Quantity
Option 1 Decontamination			
Process waste pipelines	Low Level	LLW will be recycled at SEG, Oak Ridge, TN or sent to the Nevada Test Site.	800 Linear Ft. or 100-200 Cubic Ft.
Rinsate	Low Level Mixed	Building 374, WWTU	200-1000 gallons
Plastic, paper, etc. decontamination or LLW handling	Low Level	Nevada Test Site	100-200 Cubic Ft.
Remediation of underground pipelines/soils	Low Level Mixed Waste	Approved TSDF	Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates the need to exhume soil/pipeline.)
Option 2 Handle as Hazardous Waste			
Process Waste Pipeline	Low Level Mixed Waste	Approved TSDF	800 Linear Ft. or 100-200 Cubic Ft.
Rinsate	Low Level Mixed Waste	Building 374, WWTU	200-1000 gallons
Plastic, paper, etc. that comes in direct contact with listed waste	Low Level Mixed Waste	Approved TSDF	< 100 Cubic Ft.
Remediation of underground pipelines/soil	Low Level Mixed Waste	Approved TSDF	Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates need to exhume pipeline.)
Option 3 Debris Treatment			
Process waste pipelines	Low Level Waste	Nevada Test Site	800 Linear Ft. or 100-200 Cubic Ft.
Plastic, paper, etc. coming in to direct contact with listed waste	Low Level Mixed Waste	Mixed Waste will be stored on-site in a TSDF awaiting shipment to Envirocare or another approved TSDF.	Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates need to exhume pipeline.)
Remediation of contaminated soil.	Low Level Mixed Waste		

10.0 RECORD KEEPING

The following closure documentation will be maintained:

- A field logbook indicating the date, number, and type of sampling activities
- Analytical results
- Records of actions taken to decontaminate equipment or structures
- Work control packages developed to govern closure activities

Certification and other documentation indicating that closure was conducted in accordance with the closure plan

Attachment 1

First Floor Plan

Rocky Mountain
Remediation Services, L.L.C.
. . . protecting the environment

RF/RMRS-97-0021

WASTE MANAGEMENT PLAN

BUILDING 123

JUNE 1997

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WASTE MANAGEMENT PLAN

BUILDING 123

REVISION 0

JUNE 1997

This Waste Management Plan has been reviewed and approved by:

Martin Wheeler, Vice President Waste Management — Date 6/18/97

Doug Steffen, Project Manager — Date 6/18/97

Gary Konwinski, Environmental Manager — Date 6-18-97

Ken Lenarcic, Traffic Management — Date 6/18/97

Mark Brooks, ESH&Q — Date 6-18-97

This Waste Management Plan was prepared by:

Richard T. Jensen, Senior Engineer, RMRS — Date 6/17/97

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WASTE MANAGEMENT PLAN
BUILDING 123

1.0 SCOPE

Decontamination, dismantlement, and demolition of Rocky Flats Environmental Technology Site (RFETS) facilities generate a variety of solid and liquid wastes. The waste may be designated as radioactive, mixed, hazardous or non-hazardous waste and must be managed in accordance with State and Federal regulations. The purpose of this document is to describe the waste management program that addresses waste management requirements for the decontamination and decommissioning of Building 123. The building was used for analyzing and counting radioactive samples, and as such the amount of radioactive material that entered the building was very low. Less than 5,000 ft^3 of radioactive and hazardous waste is anticipated, with no Transuranic waste.

There will also be a large quantity of asbestos contaminated waste. Asbestos removal will be subcontracted to a commercial vendor who is licensed to remove and handle this type of waste. Transportation and disposal of non-contaminated asbestos waste will be handled by the subcontractor, working with the RMRS Waste Disposal Group and DCI Traffic Management. They will make certain that the waste goes to a site that is licensed for asbestos disposal, that is also approved to accept waste from Rocky Flats. Except for the rare case of asbestos waste contaminated with low-level radioactivity, the subcontractor is expected to perform this work with a minimum of oversight from Waste Operations. The processing, packaging, storage, and transportation of industrial waste and the asbestos waste will be handled by subcontractors. RMRS Waste Disposal and DCI Traffic Management personnel will oversee these operations. Offsite transportation shall comply within Department of Transportation (DOT) regulations. Low-level radioactive waste, mixed wastes, and asbestos contaminated with low-level radioactivity will be certified the Kaiser-Hill Waste Certification group. The technical basis for development of the Waste Management Plan (WMP) is outlined in the U.S. Department of Energy, Office of Environmental Management Decommissioning Resource Manual, dated August 1995, and the Draft Decommissioning Program Plan.

The scope of the project includes the complete removal of all internal piping, ventilation, and above slab process waste systems in Buildings 123, 113, 114, and 123S. The buildings will be demolished and materials removed down to the base slab. If sampling underneath the slab finds contamination present, the building slab and foundation will be removed as required to remediate the contamination. Remediation of the soil around Building 123, and possible underground contamination will be done according to RMRS ER procedures. These remediation activities will also generate low-level radioactive waste in the form of soil, piping, and debris. Some hazardous or mixed waste may also be present. During building demolition this project will generate asbestos and Low-Level Radioactive Waste (LLW). Hazardous and mixed waste may also be found, but the potential for these wastes to be present is extremely low Hazardous chemicals and laboratory equipment will be removed during the building deactivation phase. Process waste lines may have low levels of internal contamination caused by processing bioassay and environmental samples. However, over 60% of the process waste lines were replaced in the past five years. The removed pipelines were surveyed and released for disposal in the onsite sanitary landfill. Localized areas of contamination within the building may be isolated and decontaminated, to limit the amount of low-level and hazardous waste that is generated. Projected volumes and types of waste to be generated are discussed below. They are based upon preliminary planning and reconnaissance characterization activities.

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2.0 RESPONSIBILITIES/POINTS OF CONTACT

This section of the WMP presents an overview of the project organization. These individuals are the main points of contact for various project activities. Key waste management personnel from within the project and other waste management contacts for the project, and a description of their waste management responsibilities is presented below.

2.1 PROJECT MANAGER (Douglas Steffen)

The Project Manager is responsible for management of the project including overall responsibility for the waste generated by the project. These responsibilities include assuring adequate and timely characterization of the waste and the projection of the quantity of waste expected. In addition, the Project Manager should ensure that required plans are in place to handle the types of waste to be generated, see that a cost estimate is made and that funds are available to dispose of the waste, and oversee and coordinate all project-specific waste management issues, including preparation of the WMP and assuring its implementation. Project personnel will also decontaminate and size reduce the waste when it is prudent do so. The Project Manager coordinates activities with the Waste Management Liaison, Project Engineer, and Demolition Manager to ensure that issues associated with waste generation are addressed, including proper characterization, packaging, meeting appropriate RMRS waste acceptance criteria, and filling out relevant paperwork, such as travelers, Waste and Environmental Management System updates, etc. It is the responsibility of the project to ensure that waste is identified, properly documented, segregated, packaged, and prepared for storage or shipment. Waste Operations then receives the waste for onsite storage, or oversees offsite shipment.

D&D project personnel assigned to the project will provide:

- Waste generation, segregation, decontamination and size reduction
- Technical support regarding waste generation, packaging and characterization
- Review of IWCPs for waste management actions.

2.2 WASTE MANAGEMENT - ENVIRONMENTAL COORDINATOR (Ernie Bentsen)

This individual is assigned to the Decontamination & Decommissioning Construction Management group. He assists D&D projects with all aspects of waste management. For this project, he will assume the duties of the Environmental Coordinator when asbestos removal begins. All waste removed prior to this time will be the responsibility of the Building and the Building Coordinator. This includes coordinating with the Waste Management Liaison to handle environmental compliance and waste management issues, and interfacing with waste management personnel to schedule and complete waste management activities in a timely manner and ensure compliance with all relevant requirements.

The Waste Management Coordinator arranges for waste packages for low-level, hazardous, or mixed waste, and schedules technicians and certification personnel, as needed, to package and prepare waste for receipt by Waste Management.

2.3 WASTE MANAGEMENT - LIAISON (Dan Salyers, Waste Disposal Group)

The Waste Management Liaison coordinates with the Project Manager and is responsible for coordination of waste management activities across organizational lines. Some of the groups that may become involved include: Radiological Engineering, the Waste Operations group for handling, storage and disposal, Traffic Management, the Waste Management Environmental Coordinator, and other groups such as Nuclear Safety which may assist with waste management activities. This individual will assist the Waste Management Coordinator as needed, providing access to waste management personnel across organizational lines. This individual is the contact point for all waste management activities. He coordinates onsite transfers, and oversees

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subcontractor operations that deal with the loading of shipments for offsite disposal. He works with Traffic Management to prepare the Bills of lading or EPA Uniform Hazardous Waste Manifests as needed, and coordinate all shipments with Traffic Management.

2.4 WASTE OPERATIONS SUPPORT (GENERAL)

Waste Operations provides services to the Rocky Flats Environmental Technology Site (RFETS), including receipt of waste and other materials from the project, disposal and recycle as available, and storage of waste. Waste Characterization will be done by personnel assigned to the project. Waste Operations will oversee the transportation of waste both onsite and offsite. Industrial waste shipments, and asbestos will be handled by subcontractors. Waste Operations will coordinate offsite shipments and ensure that the waste is sent to an approved disposal site. They will store radioactive waste, unless arrangements are made to ship the directly to a disposal site. If waste is shipped directly offsite, they will provide oversight and coordination of all shipments.

2.4.1 Solid Waste Operations

Solid Waste Operations can provide the following services and support for the project:

- Receipt of radioactive waste that complies with RMRS Waste Acceptance Criteria
- Technical support regarding waste generation, packaging, and characterization
- LL/LLM guidance through established programs
- Storage of waste
- Review of IWCPs for waste management actions.

2.4.2 Waste Disposal Projects

Waste Disposal Projects is responsible for:

- Offsite shipment of project wastes and materials for disposal, and recycling
- Preparing waste for offsite shipment
- Maintaining arrangements with offsite facilities for receipt of RFETS waste
- Scheduling waste disposal activities as necessary to support project requirements.

2.4.3 Waste Certification Oversight (Kaiser-Hill)

Waste Certification Oversight is responsible for:

- waste certification of radioactive waste for shipment purposes.

2.5 TRAFFIC MANAGER (DCI Traffic Management)

Waste transfer onsite and offsite will be accomplished with the assistance of a Traffic Management representative. This individual will coordinate the onsite transfer and offsite shipping of waste. Traffic Management works with the Waste Management Coordinator, Construction Superintendent, Waste Management Liaison, and the EC to ensure that waste packages are transported in a timely manner to the appropriate treatment, storage, or disposal location. A large portion of the waste is expected to be shipped directly offsite for disposal. Traffic Management is responsible to see that waste packages meet the requirements of the Department of Transportation (DOT) (49 CFR) for shipping of waste offsite. This group is also prepares the Bills of lading or EPA Uniform Hazardous Waste Manifests for the waste shipments.

2.6 RADIOLOGICAL ENGINEER (John Miller)

Radiological Engineering is responsible for all radiological surveys, release of equipment or materials to PU&D or for offsite disposal, radiological health & safety, and other miscellaneous activities associated with the radiological aspects of D&D. Radiation Control Technicians (RCTs) working under the direction of Radiological Engineering will perform surveys and assay equipment and materials. No equipment or building materials, including building rubble, will be allowed to leave Building 123 without receiving proper release from this group.

2.7 CHARACTERIZATION SPECIALIST (Mary Aycock)

This individual is responsible for conducting the Reconnaissance Characterization, and directs all sampling and analysis of building areas for both radiological and hazardous materials identification. She works together with Radiological Engineering to develop the survey plans. In the same way, they will work with environmental specialists to develop sampling and analysis plans for the IHSS areas, and as appropriate, sampling strategies for determining hazards within the building. (Asbestos, lead, PCBs, beryllium, and other potential hazardous materials). The Characterization Specialist is responsible for generating a Reconnaissance Characterization Report, Sampling & Analysis plans, and other sampling strategies as needed, and the Final Characterization Report for the project.

3.0 WASTE GENERATION

This section of the WMP provides a detailed description of the wastes and excess materials that are expected to be generated by the Building 123 Decommissioning Project. The Building 123 Waste Stream Residue Identification and Characterization Book (WSRIC), process knowledge and reconnaissance characterization have been used to identify these wastes and excess materials. The Building 123 WSRIC can be referenced to obtain characterization information and a description of the methods for waste segregation based on Item Description Codes (IDCs) or Waste Form Codes (WFCs). This information is required to properly characterize and prepare radioactive or hazardous waste for packaging and certification. Characterization and sampling requirements are defined in the Building 123 Reconnaissance Level Characterization Report, the Characterization Plan and related Integrated Work Control Packages (IWCPs).

Waste will be generated during each of the following phases of the project: (1) Asbestos Abatement, (2) Building Preparation, (3) Demolition, and (4) Remediation of the Individual Hazardous Substance Sites (IHSS). Waste generated prior to asbestos abatement will be the responsibility of the building personnel. All types of waste will follow a similar process flow for disposition. After waste is generated, it must be identified and classified using established methods and documentation. Whenever possible, it is segregated for reuse or recycle. The waste is then prepared for packaging. This may include size reduction, consolidation, and bagging. Project personnel will accomplish these activities, and prepare the required documentation. Radioactive waste must be certified and packaged by trained personnel. It must conform with the particular RMRS waste acceptance criteria, depending on its classification. After the waste is packaged, the project delivers the waste to Waste Operations for storage or offsite disposal. Non-radioactive, non-hazardous waste may be taken directly offsite and handled by a subcontractor, however, Waste Management personnel will oversee their activities. Final documentation must be prepared before shipments leave the Building 123 area. They may include a radiological release, manifests, and Bills of lading. Waste Management will locate the waste in a storage area and arrange for offsite shipment. The following sections describe the types of waste and how they will be handled for each phase of the project.

3.1 ASBESTOS ABATEMENT

During this phase of the project, asbestos will be removed from the building. Materials containing asbestos, or asbestos waste, will be the primary type of waste generated. This waste includes plastic sheeting, gloves, and other materials that are exposed to the asbestos during abatement. Radiation Control Technicians (RCTs) will survey the materials before they are removed from the building. If radiation is detected, the asbestos that is contaminated will be classified as Low Level Waste. Some building rubble will also be accumulated as non-asbestos containing materials are removed to gain access to the asbestos. This rubble will be stockpiled and handled when demolition of the building begins.

The asbestos to be removed includes floor tiles, wall board, pipe insulation, and plastic and gloves used during abatement. The asbestos waste must be handled by qualified asbestos workers. It will be double bagged and placed in containers for shipment to an authorized landfill. The subcontractor will label the containers with asbestos warning labels and other required packaging labels. Project personnel will ensure that the waste is properly packaged, labeled, and that manifests and a bill of lading are prepared. EPA Uniform Hazardous Waste Manifests and the Bills of lading will be prepared by Traffic Management. The Waste Disposal group and Traffic Management will coordinate shipment of the waste offsite.

If radioactive waste is generated; qualified, waste packaging technicians assigned through the project will be called upon to take the waste from the subcontractor. Drums or boxes will be provided by the Waste Disposal group. The technicians will package and label the waste, and arrange for it to be certified by the Kaiser-Hill Waste Certification group. Working with the certification personnel, the Project Waste Coordinator will prepare all required documentation. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

3.2 BUILDING PREPARATION

Activities during this phase will include the removal of any leftover equipment, decontamination of radioactive locations, and stripout of recyclable materials. Process waste lines, plumbing, scrubber systems, and similar types of support systems will be removed or decontaminated. Three potential types of waste will be generated. They are Low Level, Hazardous, and Industrial waste. There is a potential for small amounts of Low Level-Hazardous mixed waste, but it is not expected. Waste forms will consist of building debris, piping, wiring, equipment, fixtures, utility panels, alarms, etc.

Low-level waste will be handled the same as during the Asbestos Abatement. Qualified, waste packaging technicians will work with decontamination personnel and radiation monitors to identify and segregate the Low Level waste. Drums or boxes will be provided by the Waste Disposal group. The technicians will package and label the waste, and arrange for it to be certified by the Kaiser-Hill Waste Certification group. Working with the certification personnel, the Project Waste Coordinator will prepare all required documentation. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

Hazardous waste will be handled in much the same manner, except it will not be necessary to certify the waste. It must be properly packaged in drums, labeled, and the required documentation generated. This will be done by the Project Waste Coordinator. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

Industrial waste will be generated from building debris and leftover materials. It will include any items or debris that will not be accepted by PU&D for recycling. PU&D will take much of the equipment, and certain metallic items such as copper wire or lead that can be recycled. Any items or debris containing hazardous material must be handled as hazardous waste. Industrial waste may be stockpiled for disposal with the building rubble or sent to a landfill. During this phase of the project, any waste destined for a landfill will be handled by the Waste Disposal group.

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Appropriate documentation will be generated by the Project Waste Coordinator and Traffic Management.

3.3 DEMOLITION

This phase of the project will be primarily conducted by a subcontractor. After the final building radiation surveys are completed, the building rubble from decommissioning will be released as industrial waste. This waste will consist of all of the remains of the building including walls, floors, roof, windows, and all remaining fixtures. This waste will be loaded in roll-off boxes or dump trucks in preparation for offsite shipping. It must meet the criteria for shipment to an approved offsite landfill. The Waste Coordinator will ensure that the subcontractor complies with all requirements for offsite shipments, and he will obtain radiological release from Radiological Engineering. The subcontractor will follow procedures as described in "Sanitary Waste Offsite Disposal," 1-PRO-573-SWODP, 1997. The subcontractor will load and ship the waste, under the guidance of Waste Operations. Waste Operations will coordinate with Traffic Management to prepare the Bills of lading.

Should any hazardous waste be discovered during the demolition activities, trained waste technicians from the site will be used to characterize, package, and handle this waste as detailed above.

3.4 REMEDIATION OF IHSS

At this stage of the project, the building will have been removed from its foundation, demolished, and the industrial waste shipped offsite. A sampling plan has been written to characterize the waste under the slab. The results of the sampling will determine how extensive, and what type of remediation is pursued. If underground contamination, radioactive or hazardous, is discovered, the remediation of the site will produce Low Level, Hazardous, or Mixed Wastes. Depending upon the extent of the contamination, and the options pursued, it is expected that contaminated soil and pipelines would be the major source of waste. Plastic, tools, personal protective equipment, and other materials associated with remediation would also be generated. Contaminated waste will be handled by qualified, waste packaging technicians who will work with decontamination personnel and radiation monitors to identify and segregate the Hazardous or Low Level waste. Results from sampling, and radiation surveys will be used to guide this work. Drums or boxes will be provided by the Waste Disposal group. The technicians will package and label the waste, and arrange for radioactive waste to be certified by the Kaiser-Hill Waste Certification group. Working with the certification personnel, the Project Waste Coordinator will prepare all required documentation. The drums or boxes will then be turned over to Waste Operations for storage and disposal.

4.0 WASTE TYPES

This section provides information of the various classifications of waste and materials expected to be generated by the project. Most of the PU&D excess materials are expected to be removed from the building prior to beginning asbestos abatement. They have been included for informational purposes only. This information is based upon the Reconnaissance Level Characterization and interviews with current and prior building occupants.

TABLE 1
PROJECTED WASTE GENERATION FROM BUILDING 123 D&D PROJECT

Waste Type	Waste Forms	Disposition Of Waste	Estimated Quantity
Asbestos	Floor Tile Wall Board Insulation Plastic, Paper, from Abatement Work	- Handled by Asbestos Trained Workers - Double Bagged - Asbestos Warning Labels - Packaged & Shipped by Subcontractor - Documentation prepared by Traffic Management - Shipped to Offsite Disposal site	20,000 ft^3
Contaminated Asbestos (Low Level Waste)	Any of the forms listed with asbestos that are contaminated with radioactivity	- Handled by Radiation Trained Workers - Double Bagged & Waste Prepared for Low Level Drums - Requires Certification by K-H Waste Certification - Packaged by Qualified RFETS Technicians - Delivered to RMRS Waste Operations for storage prior to future offsite disposal	None Currently Expected
Low Level Waste	Hoods Sinks Floor or Ceiling Tile Misc. wall coverings Process Lines Plastic, Paper, from Decontamination or LLW Handling Soil from Remediation Underground Pipelines Plastic, Paper, Tools Etc. from remediation activities	- Handled by Radiation Trained Workers - Packaged by Qualified RFETS Technicians - Prepared for Low Level Drums or Boxes - Requires Certification by K-H Waste Certification - Delivered to RMRS Waste Operations for storage prior to future offsite disposal	3100 ft^3

TABLE 1
PROJECTED WASTE GENERATION FROM BUILDING 123 D&D PROJECT (continued)

Waste Type	Waste Forms	Disposition Of Waste	Estimated Quantity
Toxic Substance Control Act (TSCA) Waste	Light Ballasts No other known forms expected	- Handled by Trained Hazardous Waste Workers - Prepared for Drums - Requires Characterization by Qualified RMRS personnel - Packaged by Qualified RFETS Technicians - Delivered to RMRS Waste Operations for storage prior to future offsite disposal	15 ft^3
Hazardous Waste	None presently known	- Handled by Trained Hazardous Waste Workers - Prepared for Drums - Requires Characterization by Qualified RMRS personnel - Packaged by Qualified RFETS Technicians - Delivered to RMRS Waste Operations for storage prior to future offsite disposal	None Currently Expected
Mixed Waste	None presently known	- Handled by Trained Hazardous Waste Workers - Prepared for Drums - Requires Characterization by Qualified RMRS personnel - Requires Certification by K-H Waste Certification - Packaged by Qualified RFETS Technicians - Delivered to RMRS Waste Operations for storage prior to future offsite disposal	None Currently Expected
Industrial Waste	Floor or Ceiling Tile Misc. wall materials Windows Roofing Materials Cement Plaster Process Lines Building Rubble	- Handled by Subcontractor - Loaded into Roll Offs (No additional packaging) - Can be shipped directly offsite after obtaining radiological release and proper documentation	150 Yd^3

4.1 LOW-LEVEL (LL) WASTE

Low-level waste contains <100 nCi/gram alpha-emitting transuranic nuclides. Historical information suggests that all of the radioactive waste produced as a result of Building 123 decommissioning activities will be low-level in nature. Low-level waste will be generated and managed in compliance with the RMRS WAC and the RFETS Low Level Waste Management Plan. LLW that results from decommissioning activities will be stored onsite or, where feasible, shipped directly to an approved offsite disposal or recycle facility. The low-level waste volume associated with the demolition of the building is estimated to be 2,480 ft^3.

An estimate of amount of Low Level Waste to be generated was prepared based on the following assumptions:

- If a room was not posted as a radiological hazard, all materials contained in the room were considered non-contaminated and therefore, suitable for dispositioning through PU&D.
- Materials contained in rooms identified as Radiological Buffer Areas (RBAs), that were not suspected of being contaminated and can be confirmed and can be confirmed as non-contaminated through smear surveys, were also considered suitable for PU&D. Examples of such materials are desks, cabinets, and chairs.
- Any materials that were located in a RBA were considered as not contaminated, except for hoods, drains, and air intake areas. Surveys of various rooms have shown that more than 90% of the rooms will have no contamination. Therefore, an estimate was made that 10% of the hoods and drains will be contaminated. The amount of LLW is based upon that estimate.
- Material/waste segregation was considered to be appropriate in Contaminated Areas (CAs) because contamination, if any, will be found in localized areas such as hoods, drains, or air intakes.
- Office equipment, excluding computers, located in a CA were deemed suitable for dispositioning to PU&D. Decommissioning historical knowledge is the basis for this assumption. Survey data will be used to confirm this assumption.
- Process pipelines may prove to be non-contaminated. For now, the worst case was assumed; that is, that they are all contaminated with Low Level Radioactivity. The additional factors given below were used to estimate that removal of contaminated pipelines would generate 1000 cubic feet of contaminated pipeline waste.

The total low-level waste volume was determined by estimating that 10% of the hoods, drains, and air intakes in the building will be contaminated. Another 30% was added to account for consumables such as gloves, plastic, coveralls, tape an assorted tools and paper items that will be generated during the strip out of the contaminated items. The resulting LL volume was then multiplied by 125% to compensate for package size limitations. (Not all of the volume of a waste box can be utilized).

4.2 HAZARDOUS WASTE/MIXED WASTE

A hazardous waste is defined as waste that exhibits the characteristics of corrosivity, ignitability, reactivity, or toxicity or that is listed in 6 CCR 1007-3, Section 261, Subpart D. Included in this definition is hazardous waste that has been mixed with radioactive waste. The Building 123 Decommissioning Project anticipates that very little, if any, hazardous or mixed waste will be found. All chemicals used in the building are described in the Building 123 WSRIC book. Hazardous chemicals were disposed of in Satellite Accumulation Areas, and as a result, discovery

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of hazardous chemical waste is unlikely. If found, hazardous waste will be generated and managed in compliance with the Hazardous Waste Requirements Manual, RFETS Low-Level Waste Management Plan, and Non-Radioactive Waste Packaging, 1-E-88-WP-1027-NON-RAD.

Deactivation activities, such as equipment, chemical, and systems removal, which will be performed prior to decommissioning, are anticipated to address the bulk of the radioactive or hazardous waste residing in Building 123. No mixed wastes are anticipated, but plans will be in place to handle mixed waste, should any be found. Most of the waste will either fall into the hazardous or industrial waste categories. Mixed or hazardous waste that results from decommissioning activities will be stored in permitted areas onsite or, where feasible, shipped directly to an approved offsite disposal or recycle facility.

4.3 INDUSTRIAL WASTE

Industrial waste is, for the purpose of this project, defined as that waste which meets industrial landfill requirements. Industrial waste will be generated as a result of the Building 123 Decommissioning Project. The industrial waste volume associated with the demolition of the building is estimated to be 150 yd^3. This estimate is based on 19,000 ft^3 of building to be demolished. The formula used to calculate this volume is: 74 yd^3 per 10,000 ft^3 of building. Richardsons Engineering Services, Inc., in 1994, was used as the basis for this calculation. This estimate does not include foundations; the demolition only includes removal of building structures to the ground level (slab on grade). This waste will be managed in accordance with all applicable rules and regulations. It is anticipated that the resultant rubble will be loaded into roll-offs and shipped to an offsite landfill. The subcontractor will follow procedures as described in "Sanitary Waste Offsite Disposal," 1-PRO-573-SWODP, 1997. These procedures will describe the methods for preparing and shipping the waste. They also include the prohibited items. It will be the responsibility of the subcontractor, with monitoring by the Waste Coordinator, to conform with this procedure. The subcontractor will also provide safe transportation of the rubble and waste to the landfill. The DCI Traffic Management will prepare the Bills of lading for the shipments. Waste Disposal personnel will coordinate these shipments.

4.4 TOXIC SUBSTANCE CONTROL ACT (TSCA) WASTE

Non-radioactive contaminated PCB waste may be produced from the removal of light fixtures. The estimated volume of PCB waste from these sources is less than two 55-gallon drums. (This estimate is based on packaging 100 ballasts per 55-gallon drum.) This waste will be handled and packaged in compliance with 1-10000-EWQA, TSCA Management Plan. The Demolition Contractor will package the waste and onsite Transportation will transfer it to an RMRS storage area. The Waste Disposal group will then be responsible for coordinating offsite shipment and disposal.

4.5 ASBESTOS WASTE

The project anticipates generating approximately 20,000 ft^3 of asbestos containing waste. Calculations for this asbestos estimate were based on measurements of suspected materials and information obtained from blueprints where materials could not be accessed to measure. The estimate includes the asbestos materials such as tiles and insulation, the plastic sheeting used to isolate areas, and perform the abatement activities, and the Tyvex and other consumable items that are used in support of the abatement.

Asbestos containing materials will be handled in accordance with the Colorado Department of Public Health and Environment (CDPH&E), OSHA, and TSCA requirements. Asbestos waste will be packaged in compliance with 1-10000-TRM-WP-2401, Asbestos Waste Management. RMRS Construction Management will oversee the abatement contractor activities. Radiological Engineering is expected to determine whether any of the asbestos areas are contaminated with low-level radioactivity. If so, Radiation Worker Training will be required for the asbestos workers

who remove it. Packages will be provided by the site, and loading of the packages will be supervised by Waste Operations personnel. The low-level asbestos will then be turned over to RMRS Waste Disposal. The subcontractor will label packages with asbestos warning labels. The subcontractor will comply with all other packaging and shipping requirements. The offsite contractor performing the abatement work will be responsible for packaging and preparing the asbestos waste for shipment. Traffic Management will issue the Bills of lading or EPA Uniform Hazardous Waste Manifests, and the offsite contractor will deliver the waste to an approved disposal site. The subcontractor should use the approved offsite disposal company or make certain that any disposal site that is used receives approval from the DOE and the site.

4.6 PROPERTY UTILIZATION AND DISPOSAL (PU&D) MATERIALS

PU&D materials, as defined in this WMP, are those materials that have historically been accepted for storage and reuse by PU&D. These materials include, but are not limited to, office equipment such as desks, chairs, tables, carts, and bookshelves, which are located in non-contaminated areas or have been located in contaminated areas but confirmed as non-contaminated through radiological survey. The estimated volume of materials designated for PU&D is 15,800 ft^3. These materials will be sent to PU&D. Table 2 shows the estimates of PU&D materials and estimated low-level waste by room.

TABLE 2
BUILDING 123 - ESTIMATES OF LOW LEVEL WASTE & PU&D MATERIALS BY ROOM

ROOM NUMBER	ITEM DESCRIPTION	ESTIMATED FT^3 TO PU & D	ESTIMATED FT^3 LL WASTE
158	File System Cabinets & Shelves Desk	700	
163	Counting Systems Cabinets & Desks	360	
157	Fume Hoods (4) Cabinets & Shelves Lab Benches	1780	150
162	Desks, Chairs, Files	300	
156	Fume Hoods (2) Muffler Furnace Storage Unit, Shelves Lab Benches	1930	160
155	Power Supplies Analyzers, Detectors Electrical Equipment	1800	
159	Utility Panels Pipeline	200	
109	Storage Shelves	220	160
111	Lab Benches Shelves & Cabinets Refrigerator, Chambers	750	
112	Fume Hoods Incubator Lab Benches Desk & Shelves	1300	
103A	Fume Hood Furnace Lab Benches Shelves	720	130
103	Fume Hood Lab Benches Cabinets	490	100
105	Fume Hood Lab Benches Cabinets & Shelves	520	210

TABLE 2
BUILDING 123 - ESTIMATES OF LOW LEVEL WASTE & PU & D MATERIALS BY ROOM (continued)

ROOM NUMBER	ITEM DESCRIPTION	ESTIMATED FT³ TO PU & D	ESTIMATED FT³ LL WASTE
124	Fume Hood Lab Benches Shelves	550	100
125	Fume Hoods (9) Lab Benches Cabinets & Refrigerator	2000	370
127	Fume Hood Phosphorimeter Marble Balance Table Lab Benches	590	100
126	Lab Benches Files, Chairs, Desk Air Conditioner Refrigerator	340	
West Hall	Cabinets & Files	370	
North Hall	Cabinets Files & Desks	530	
East Hall	Cabinets	40	
Locker Room	Locker & Cabinets	300	
Throughout Building	Process Waste Piping		1000
	TOTAL	15790	2480

5.0 WASTE CERTIFICATION

Waste Certification activities will be conducted by trained personnel assigned to the project. Waste Characterization data and packaging requirements for low-level wastes will meet the requirements of the Nevada Test Site's Waste Acceptance Criteria (NTSWAC, RO 9/96). Procedures and policies for managing low-level wastes are outlined in the RFETS Low Level Waste Management Plan. (44-RWP/EWQA-0014, Rev. 1, 1996) All radioactive waste must be certified prior to transfer to Waste Operations.

Release of Non-contaminated material, debris, and equipment from a site contaminated with hazardous materials is accomplished by demonstrating that the materials or wastes do not exhibit any of the characteristics of hazardous waste as identified in Subpart C of 6 CCR 1007-3 SS261 or from Subpart D. Process knowledge and operating history related to the facilities can also be used to segregate hazardous contaminant areas from unaffected areas.

Building 123 WSRIC books are used as a part of the certification process. The current Building 123 WSRIC book describes each waste stream resulting from a process currently performed in the building. Processes are described, chemicals used in the process are identified, and resulting wastes IDCs or WFCs are characterized in the Building 123 WSRIC book. This book provides guidance for characterizing and disposing of waste during the deactivation phase of the project.

A second WSRIC book is being prepared to assist with waste characterization during D&D activities in Building 123. This book will describe the waste streams and provide characterization information to provide guidance for project personnel to segregate, package, and prepare the waste for receipt by Waste Disposal or for offsite shipment.

6.0 WASTE PACKAGING

LLW and LLM wastes generated by the project will be sorted at the time of removal. The waste will then be packaged and staged for further decontamination, survey, recycle, processing or packaging. Because the volume of waste is expected to be extremely low, the waste will be packaged in 55-gallon drums. Waste boxes will only be used if large amounts of LLW are discovered or if the materials are too large to fit in a 55-gallon drum. Waste Operations, in conjunction with the project, will designate the storage location for the LLW. It is expected that the majority of LLW will initially be transferred to an approved onsite storage at the site and will eventually be shipped to an offsite disposal facility. With proper approvals, it may be possible to ship the waste directly offsite.

DOT approved packages will be used to contain project generated waste that has been surveyed and packaged. Special packages may be used, under certain circumstances, to contain materials that may not fit into standard plywood boxes. The Project Manager will notify the affected waste management organization and obtain guidance if this occurs. Non-contaminated recyclable materials, such as scrap metal, may be placed in boxes and later segregated into PU&D supplied bins for ease of removal. Additional items may be placed onto pallets for transfer to PU&D.

Liquid wastes drained from process lines or sumps may produce hazardous mixed wastes if radioactive contamination is detected. Unknown liquid wastes will be sampled. Aqueous wastes, if contaminated, will be sent to onsite treatment facilities. Although none are expected to remain, any hazardous organic chemicals will be treated as excess chemicals. They will be properly packaged, and sent offsite to an approved hazardous waste disposal site.

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7.0 ONSITE STORAGE, TRANSPORTATION, AND FINAL DISPOSITION

Wastes that will not be shipped directly offsite will be relocated to an appropriate onsite storage as designated by Waste Operations. Waste Operations personnel will provide site surveillance support to ensure that hazardous and mixed wastes are being managed in accordance with the conditions established in the current Site RCRA Permit.

The RMRS Waste Disposal group and Traffic Management will be involved in developing the requirements for offsite transportation of waste to the selected disposal or treatment site. The Project Manager will comply with the Rocky Flats Transportation Safety Manuals to ensure all relevant transportation requirements are met.

8.0 WASTE MINIMIZATION

The philosophy of waste minimization will be utilized in the planning and management of project generated wastes. Waste minimization will be accomplished using a waste life-cycle approach. Elimination and reduction of waste generated as a result of decommissioning is of high priority. Standard decontamination operations and processes will be evaluated for waste minimization potential and suitable minimization techniques will be implemented. If the cost is greater to demonstrate that the item is not contaminated than to pay for waste disposal, the item will be disposed of as waste.

Opportunities for waste minimization through scrap metal recycle are dependent on successful decontamination operations confirmed through radiation surveys. Equipment will be decontaminated to the greatest extent practical then surveyed in support of waste minimization. Contamination survey data may result in partial or full release of a piece of equipment for scrap metal recycle.

9.0 COMPLETION REPORT

Upon completion of the project, a Project Completion Report will be prepared. This report will include a listing of the wastes removed from the building, characterization data, and waste dispositioning information (e.g. size reduction, decontamination, or treatment) which contributed to the final forms and volumes of the wastes resulting from this project.

10.0 REFERENCES

Hazardous Waste Requirements Manual

Health and Safety Plan, RFETS, Rev. 0, February 1996

RFETS Low-Level Waste Management Plan, 44-RWP/EWQA-0014, Rev. 1, 1996

Rocky Flats Transportation Safety Manuals

RMRS Waste Acceptance Criteria, Rev. 0, July 1996

Waste Stream and Residue Identification and Characterization, Building 123

Waste Stream and Residue Identification and Characterization for D&D

1-M12-WO-4034, Radioactive Waste Packaging Requirements

NOTICE:

"BEST AVAILABLE COPY"

PORTIONS OF THE FOLLOWING DOCUMENT ARE ILLEGIBLE

The Administrative Record Staff

4-D99-WO-1101, Solid Radioactive Waste Packaging Inside of the Protected Area

1-10000-EWQA, TSCA Management Plan

1-C80-WO-1102-WRT, Waste/Residue Traveler Instructions

1-10000-WP-1024, Asbestos Waste Management

1-PRO-573-SWODP, Sanitary Waste Offsite Disposal

1-10000-EWQA, Section 1.5.

1-E-8-WP-1027-NON-RAD, Non-Radioactive Waste Packaging

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

BELOW GRADE PROCESS WASTE PIPING, SUMPS AND PIPE CHASES RCRA CLOSURE PROCEDURE FOR BUILDING 123

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General: Approporiate proceudres shall be taken when entering and/or rinsing the sumps and pipe chases for perchloric acid.

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1. PURPOSE

This procedure details the steps necessary for RCRA Closure of RCRA Unit 40 at the Rocky Flats Environmental Technology Site (RFETS) for the sumps and pipe chases in Rooms 156, 157, and 158 in Building 123, and the below grade process waste piping from Building 123 to tank D853 in building 428.

It is not the intent of this document to deal with radiological concerns. Radiological concerns are addressed in the Radiological Work Permit's (RWP) generated for specific tasks.

The "Closure Plan For Building 123 Components of RCRA Unit 40" (DOE, 1997) will be followed as applicable in accordance with "Building 123 Strip-Out Construction Specifications" (RMRS, 1997), Section 02075. The IWCP for Strip-Out of Building 123 is the controlling document for this work. This procedure will be part of an IWCP that will control the work and specify permit requirements.

2. SCOPE

This procedure applies to all Denver West Remediation and Construction, L.L.C. (DWRC) employees and subcontractors for the Building 123 Strip Out as it pertains to the RCRA Closure of RCRA Unit 40.

This procedure specifically addresses the steps necessary to achieve RCRA Closure of the below grade process drain systems in Rooms 156, 157, and 158 of Building 123 including the following topics:

- Initial cleanout of the sumps;
- Closure of pipe chases and below ground piping;
- Final cleanout of the sumps;
- Removal of remaining piping;
- Closure of sumps and grouting of pipe penetrations; and
- Sampling and analysis as required by the RCRA Unit 40 Closure Plan.

All above grade process waste piping in Building 123 will be stripped out and disposed of as Mixed Wastes which is consistent with Option 2 of the "Closure Plan for Building 123 Components at RCRA Unit 40."

3. OVERVIEW

The process waste drain system in Building 123 consists of above and below ground pipe, sinks, hood drains and vents. Three large, interconnected concrete sump pits and pipe chases are located in the floor of Rooms 156, 157, and 158. The building is connected by an underground line to Vault 18 where it connects to the plant process drain waste system for treatment in Building 374. This procedure deals only with the steps necessary to achieve RCRA closure of the below ground piping to tank D8533 in Building 428, pipe, pipe chases, and sumps in Rooms 156, 157, and 158.

4. LIMITATIONS AND PRECAUTIONS

1. It is assumed that the process waste drains, lines, and sumps may contain hazardous materials and may be radiologically contaminated.

2. The proper completion of perchloric rinsing and rinsate sampling of the above-ground piping system shall be confirmed prior to internal rinsing and subsequent removal of the below grade process waste piping in Rooms 156, 157, and 158. The cleaning of the exterior of below grade pipes and sumps may be started prior to completion of the perchloric rinsing and above ground pipe removal.

3. Lockout/Tagout (LO/TO) controls must be employed where necessary to perform removal activities.

4. Personnel involved in the execution of this procedure require OSHA Hazardous Waste Operations (Hazwoper) Training, Radworker II, Confined Space Training, the DWRC Training Matrix, Waste Generator Qualified, and other training specified in the Health and Safety Plan (HSP).

5. The sumps in Rooms 156, 157, and 158 are confined spaces. Required Confined Space Entry Permits and approvals shall be in place prior to entry for strip-out activities. Site procedures for confined spaces will be used with trained personnel.

6. The intent of this document is to ensure that employees performing RCRA Closure activities are assured a safe work environment. Radiological concerns are addressed in the RWPs generated for specific tasks. The IWCP for Strip-Out of Building 123 is the controlling document for this work.

7. Activity Hazard Analysis (AHA's) will be developed as applicable to this procedure.

5. PREREQUISITE ACTIONS

5.1 PLANNING AND COORDINATION

The coordination of the Building 123 RCRA Unit 40 closure activities must be planned and staged each day to conform with the requirements of the Closure Plan (DOE, 1997) and all applicable Building 123 strip-out specifications. The following describes the duties of the RCRA Closure project personnel as it applies to closure operations.

5.1.1 RCRA Closure Supervisor

1. Ensure that all RCRA closure personnel are trained in accordance with training requirements as indicated in the Building 123 Health and Safety Plan, DWRC Training Matrix, and all applicable OSHA and RCRA Regulations.

2. Coordinate and set priorities for all closure operations.

3. Coordinate Lockout/Tagout requirements with DWRC craft supervisor and building LO/TO manager.

4. Ensure that equipment and personnel are available to accomplish closure activities listed in the DWRC daily planning meeting.

5. Verify that Waste Operations has been notified of the anticipated rinsate volumes that will be introduced to the system.

6. Coordinate with Health and Safety Specialist (HSS) for required safety support necessary to accomplish closure activities.

7. Ensure that daily inspections are performed and recorded in the building Logbook.

8. Conduct necessary training for closure personnel.

9. Ensure that equipment is properly maintained and available for use.

10. Coordinate with the Contractor so that required sampling and inspections by the Independent Professional Engineer may be scheduled.

11. Ensure waste generator instructions are prepared for all wastes generated during closure activities.

5.1.2 RCRA Closure Technician

1. Perform minor and emergency maintenance on equipment, according to manufacturer's specifications.

2. Check oil, grease, and fuel levels on equipment as prescribed in the operations and maintenance manual or procedures.

3. Winterize non-heated equipment when temperatures will drop below 35 degrees Fahrenheit.

5.1.3 Health and Safety Specialist (HSS)

1. Conduct a daily safety briefing covering RCRA Closure operations and discuss planned activities at the Building 123 daily pre-job briefing.

2. Review all applicable Radiological Work Permit (RWP) requirements prior to the start of closure operations.

3. Provide health and safety support for closure activities.

4. Provide inspection for Personal Protective Equipment (PPE) use, if not addressed in the Building 123 HSP.

5. Ensure that an Activity Hazard Analysis (AHA) is prepared and approved for all activities not specifically covered by the Building 123 HSP.

6. Obtain Confined Space Entry Permits for work in Rooms, 156, 157, and 158 sumps.

7. Ensure that appropriate precautions are taken and that any potential perchloric acid safety concerns are addressed and resolved prior to starting this procedure.

6. MATERIALS AND EQUIPMENT

6.1 MATERIALS AND TEST EQUIPMENT

- High pressure heated water sprayers.
- Chemical mix tank to prepare and store decontamination solutions as described in Section 7.0.
- Pumps, hoses, nozzles, extensions, and ancillary decontamination equipment, such as scrub brushes, scrapers,wipes, rags, spray bottles and adsorbents.
- Water-proof light.
- Flow meters and totalizers.
- Sampling devices and sampling bottles.

6.2 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

- PVC Coated Tyvek or Saranex coveralls.
- Hard hat, safety glasses, and safety shoes.
- Splash goggles, face shields, and protective gloves.
- Necessary confined space entry equipment for work in sumps.

7. INSTRUCTIONS FOR RCRA CLOSURE OF BUILDING 123, UNIT 40

7.1 ADVANCE PLANNING

The instructions given in this section detail the prerequisite requirements which will be necessary prior to initiation of the Room 156, 157, and 158 closure activities.

7.1.1 Removal Supervisor

1. Verify that DWRC has conducted a walk-through of the system with the Contractor's Independent Professional Engineer (PE) to identify all the process waste piping and ancillary equipment. RMRS will mark the piping system with yellow paint to ensure that the piping and ancillary equipment is easily identifiable during strip-out.

2. Confirm that during the perchloric rinsing of the vents, ducts, hoods and piping that a sample of rinsate has been obtained by The Contractor and analyzed for Tier II RFCA standards. If the sample results are below Tier II Attachment 5 of the RFCA standards, then any liquid that may be spilled during removal of the process waste piping will not have to be handled as a Mixed Waste. Any spilled liquid shall be handled as directed by the applicable RWP and the waste management requirements of the Building 123 IWCP.

3. Once the above grade piping has been flushed in accordance with the applicable procedures (DWRC, 1997), the process waste piping may be removed in accordance with the IWCP in all rooms of Building 123 except for below grade piping and sumps in Rooms 156, 157, and 158. Below grade piping and sump closure in these rooms shall be in accordance with the instructions contained in this procedure. Documentation of the above grade piping flushing will be done by DWRC. All above grade piping is to be closed according to Option 2 of the Closure Plan for Building 123 Components of RCRA Unit 40 and managed as Mixed Waste with no treatment. Process drain access points in Rooms 156, 157, and 158 must be left in place to support rinsing and closure of the sumps and pipe chases.

4. DWRC will ensure that removed piping and ancillary equipment is segregated into two categories and in accordance with the RWP, as applicable.

    - PVC; and Ra Vista
    - Steel.

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5. Samples of the PVC and steel waste shall be collected by the Contractor to determine if the waste will meet Land Disposal Restrictions. Samples will be collected for analysis in accordance with the Closure Plan for Building 123 Components of RCRA Unit 40.

6. Following completion of these initial closure requirements, the Contractor will be provided with at least 48 hours notice that closure activities for the pipe chases, sumps and below ground piping are ready to begin so that the Independent Professional Engineer may be notified to witness the remaining closure activities of Rooms 156, 157 and 158.

7.2 SUMP AND PIPE CHASE DECONTAMINATION

7.2.1 Health and Safety Specialist (HSS)

Review applicable Radiological Work Permit requirements prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs as necessary. Develop an Activity Hazard Analysis (AHA) for the flushing and rinsing of the sumps and piping systems utilizing the designated chemical cleaning agents. Insure that all applicable MSDS documents are available.

7.2.2 RCRA Closure Technician

Prepare 100 gallons of chemical decontamination solution at a concentration of 5% trisodium phosphate and 1% sodium carbonate. This solution will be prepared in 50-100 gallon poly tanks at the job site.

1. Clean the sumps in Rooms 156, 157, and 158 with a solution of trisodium phosphate and sodium carbonate by washing or spraying the walls of each sump. Physical scrubbing of heavily contaminated areas may be necessary. The solution shall be comprised of 5% by weight trisodium phosphate and 1% by weight sodium carbonate. Used decontamination solution shall be pumped to a sink or other process waste drain in Rooms 156, 157, and/or 158.

Personnel will be briefed on the extent or degree of required decontamination by the Removal Supervisor, the HSS, and the Independent Professional Engineer.

2. Following cleaning with the trisodium phosphate and sodium carbonate solution, rinse the sumps with water. Ensure that residual chemicals and other contamination is removed during this step. Used rinse solution shall be pumped to a sink or other process waste drain in Rooms 156, 157, and/or 158.

3. Clean out the pipe chases in Rooms 156, 157, and 158 with the trisodium phosphate and sodium carbonate solution. The pipe chases are numbered on sketch SK-FB0410-014. Each pipe chase shall be washed with approximately 10 gallons of the trisodium phosphate and sodium carbonate solution.

4. Rinse the pipe chases with water. The pipe chases are numbered on sketch SK-FB0410-014. The volume of water used to rinse each of the pipe chases shall be approximately three times the volume of the chase. The following calculated volumes for each pipe chase are provided.

TABLE 1
PIPE CHASE RINSE VOLUMES

CHASE NUMBER	PIPE CHASE LOCATION	RINSE VOLUME
1	Chase around the drain in Room 156, north side	Rinse with at least 27 gallons
2	Chase around the drain in Room 156, east side	Rinse with at least 22 gallons
3	Chase between Rooms 156 and 157	Rinse with at least 64 gallons
4	Chase around the drain from the scrubbers to Room 157	Rinse with at least 37 gallons
5	Chase around the drain in Room 157, east side	Rinse with at least 25 gallons
6	Chase around the drain from center of Room 157	Rinse with at least 30 gallons
7	Chase around the drain from west side of Room 157	Rinse with at least 49 gallons
8	Chase between Room 157 and 158	Rinse with at least 13 gallons
9	Chase around the drain from the north side of Room 158	Rinse with at least 22 gallons
10	Chase around overhead pipe which drains into Room 158	Rinse with at least 4 gallons

5. During chase washing, pump the wash water into the primary process waste piping through a sink or other convenient process drain.

7.2.3 Health and Safety Specialist (HSS)

1. Document that the sumps and pipe chases have been cleaned and rinsed in accordance with Table 1 on the sketch and/or log book.

7.2.4 Independent Professional Engineer

1. Verify that all visible contamination has been removed from the pipe chases.

7.3 SUMP DRYING

7.3.1 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHA prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as necessary.

7.3.2 RCRA Closure Technician

1. Completely remove all of the water from the sumps in Rooms 156, 157, and 158, by pumping or vacuum removal after the instructions in Section 7.2 are completed. Pump the wash water into the primary process waste piping through a sink or other convenient process drain.

2. Thoroughly dry the sumps with rags or wipes. The rags or wipes shall be disposed of as moist combustible Mixed Waste. Prior to disposal, rags or wipes shall be wrung out adequately so there are no free liquids. Any liquid wrung out of rags or wipes shall be disposed of in the process piping. Absorbent may be used in the waste container as directed by the Contractor.

3. In an effort to reduce waste, the same rags may be reused as much as possible.

7.3.3 Health and Safety Specialist (HSS)

1. Document in the log book that the sumps have been dried.

7.4 CLOSURE OF THE PIPE CHASES

7.4.1 RCRA Closure Supervisor

1. The pipe chases will be closed in accordance with Option 1 of the Closure Plan (DOE, 1997). The pipe chases will be considered decontaminated and meet Closure Performance Standards if all visible waste residues have been removed, and if the final rinsate contains contaminants of concern identified in the Closure Plan below the Tier 2 action levels, and the pH of the final rinsate is between 6 and 9.

2. Provide the Contractor with notice that closure activities for the pipe chases are ready to begin so that the independent Professional Engineer and Contractor's sampling personnel may be notified.

3. Verify that each of the sumps are dry prior to initiation of the final rinse of the pipe chases.

7.4.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as necessary.

7.4.3 RCRA Closure Technician

1. Conduct a final rinse of each chase with clean water. Rinsate volumes to be used in each chase are 5% of the volume of the chase as specified below. These volumes must not be exceeded. Composite samples of the rinsate shall be collected by DWRC's sampling personnel as indicated.

TABLE 2
PIPE CHASE CLOSURE RINSE VOLUMES

CHASE NUMBER	PIPE CHASE LOCATION	RINSE VOLUME
Composite Sample 1		
1	Chase around the drain in Room 156, north side	Rinse with no more than 3.5 pints
2	Chase around the drain in Room 156, east side	Rinse with no more than 2.5 pints
Composite Sample 2		
3	Chase between Rooms 156 and 157	Rinse with no more than 8.5 pints
4	Chase around the drain from the scrubbers to Room 157	Rinse with no more than 4.5 pints
5	Chase around the drain in Room 157, east side	Rinse with no more than 3 pints
6	Chase around the drain from center of Room 157	Rinse with no more than 3.5 pints
Composite Sample 3		
7	Chase around the drain from west side of Room 157	Rinse with no more than 6 pints
8	Chase between Room 157 and 158	Rinse with no more than 1.5 pints
9	Chase around the drain from the north side of Room 158	Rinse with no more than 2.5 pints
10	Chase around overhead pipe which drains into Room 158	Rinse with no more than 0.5 pints

7.4.4 Health and Safety Specialist (HSS)

1. Document that the pipe chases have been rinsed and sampled in accordance with Table 2 of this procedure.

7.4.5 Independent Professional Engineer

1. Verify that the pipe chases have been rinsed and sampled in accordance with Table 2 of this procedure.

7.5 PREPARATION OF SUMPS FOR CLOSURE

7.5.1 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as necessary.

7.5.2 RCRA Closure Technician

1. Thoroughly wash and scrub the sumps (floors and walls) in Rooms 156, 157, and 158 with a solution of trisodium phosphate and sodium carbonate. Used decontamination solution shall be pumped to a sink or other primary process waste drain in Rooms 156, 157, and/or 158.

2. Following cleaning with the trisodium phosphate and sodium carbonate solution, rinse the sumps with water. Ensure that all visible contamination is removed during this step. Used rinse solution shall be pumped to a sink or other primary process waste drain in Rooms 156, 157, and/or 158.

7.5.3 Health and Safety Specialist (HSS)

1. Document that the sumps have been washed and rinsed in the log book.

7.5.4 Independent Professional Engineer

1. Document sump has been washed and rinsed.

7.6 CLOSURE OF UNDERGROUND SECTIONS OF PROCESS WASTE PIPING

7.6.1 RCRA Closure Supervisor

1. The underground sections of the process waste piping system shall be closed in accordance with Option 1 of the Closure Plan (DOE, 1997), decontamination. The pipe chases will be considered decontaminated and meet Closure Performance Standards if all visible waste residues have been removed and if the final rinsate contains contaminants of concern as identified in the Closure Plan below the Tier 2 action levels and the pH of the final rinsate is between 6 and 9.

2. Provide DWRC with notice that closure activities for the underground piping is ready to begin so that the independent Professional Engineer and DWRC's sampling personnel may be notified.

7.6.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as needed.

7.6.3 RCRA Closure Technician

3000 gallons total

1. Prepare approximately 2,500 gallons of the trisodium phosphate and sodium carbonate solution.

   The decontamination solution will be prepared off-site in a 3,000 gallon tanker truck by filling the tanker with 3,000 gallons of water. After establishing recirculation by pumping back to the top of the tanker, the chemicals will be added as 50-60 pound bags until the proper 5% trisodium phosphate and 1% sodium carbonate solution is established. Since the decontamination solution concentration does not have to be exact, the unit of measurement will be the weight of each full bag of chemicals. Water will be measured with the tanker through a totalizer. The prepared solution will be brought to the site on the day of pipe flushing. The tanker will be flushed with clean water from an on-site fire hydrant and this will be disposed of in the drain pipe.

   As an alternate to this chemical preparation procedure, it may be possible to directly purchase a decontamination solution with the proper chemical strength. If this alternate is used, the solution will be brought to the site in a chemical tanker and used directly.

2. Run the decontamination solution down the process waste piping in Room 158.

3. Rinse the underground piping with at least 6,700 gallons of clean water.

4. Coordinate the pump down of tank D-853 during the washing and rinsing operations with Plant Waste Operations and Building 374 Operations.

5. Verify that tank D-853 is empty.

7.6.4 RCRA Closure Supervisor

7.6.5 RCRA Closure Technician

1. Introduce no more than 113 gallons of clean water into the underground piping system in Room 158.

2. The Contractors sampling personnel will collect a sample of the rinsate at tank D-853. The sample shall be a representative of the entire 113 gallons.

7.6.6 Health and Safety Specialist (HSS)

1. Document that the underground piping has been washed and rinsed and that the final rinse and sampling have been performed in the log book.

7.6.7 Independent Professional Engineer

1. Verify D853 is empty prior to the final rinse.

2. Verify volume of final rinsate.

3. Verify collection of the rinsate sample at Building 428, Tank D853.

7.7 PIPING REMOVAL

7.7.1 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs as needed.

7.7.2 RCRA Closure Technician

1. Assist DWRC in the removal of all remaining process waste piping from Rooms 156, 157, and 158 including piping inside of the pipe chases, where feasible.

2. Assist DWRC in the disposal of the process waste piping by segregating it into waste containers by the following two categories and in accordance with the RWP, as applicable.

    - PVC; and

- Steel.

7.7.3 Health and Safety Specialist (HSS)

1. Document in the log book that the remaining process piping has been removed and disposed.

7.8 CLOSURE OF SUMPS

7.8.1 RCRA Closure Supervisor

1. The sumps in Rooms 156, 157, and 158 shall be closed in accordance with Option 3 of the closure Plan, the Clean Surface Debris Standard. Provide the Contractor with notice that closure activities for the sumps are ready to begin so that the Independent Professional Engineer may be notified.

2. Verify that all piping is removed from the sumps.

7.8.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as needed.

7.8.3 RCRA Closure Technician

1. Remove any remaining contamination from the sumps. Ensure that a minimal amount of water is used for this activity. Use of damp rags is recommended.

2. Thoroughly dry the sumps with rags.

3. All rags, scrub brushes, and other cleaning materials are to be disposed of as moist combustible Mixed Waste. Prior to disposal, rags shall be wrung out adequately so that there are no free liquids. Some absorbent may be used in waste containers as specified by the Contractor.

4. Any liquid from final cleaning of the sumps shall be handled as Mixed Waste.

7.8.4 RCRA Closure Supervisor

1. Provide the Contractor with notice that the sump closure activities are complete so that the independent Professional Engineer may perform an inspection.

2. Verify that the Independent Professional Engineer has determined that the sumps meet the Clean Surface Debris Standard.

7.8.5 Independent Professional Engineer

1. Inspect the sumps and verify that the sumps meet the RCRA "Clean Surface Debris" Standard, and that all visible contamination is removed.

7.8.6 Health and Safety Specialist (HSS)

1. Document that the sumps have been closed in the log book.

7.9 PIPE PENETRATION GROUTING

7.9.1 RCRA Closure Supervisor

1. Verify that all closure activities specified in this procedure have been completed and accepted by the Contractor.

7.9.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs as needed.

7.9.3 RCRA Closure Technician

1. Assist DWRC in cutting of all piping flush with the slab in Rooms 156, 157, and 158.

2. Assist DWRC in grouting or foaming of all piping penetrations into the slab, including the penetrations in the sumps in Rooms 156, 157, and 158 in accordance with Plant Standards and Manufacturers recommendations.

7.9.4 Health and Safety Specialist (HSS)

1. Document in the log book.that the piping penetrations have been cut flush and grouted.

8. REFERENCES

Denver West Remediation and Construction, L.L.C., *Rocky Flats Environmental Technology Site Process Drain Flushing Building 123 Procedure*, Revision A, October 6, 1997; Attachment 9.5 to Strip-Out Plan for Building 123 Strip-Out Project, Revision 1.

Rocky Mountain Remediation Services, L.L.C., *Building 123 Strip-Out Construction Specifications*, Revision 6, December 8, 1997.

US Department of Energy, *Closure Plan for Building 123 Components of RCRA Unit 40*, November 12, 1997.

RFP. F-6410.06 (8
Formerly RF-35270

ROCKY FLATS

CONSTRUCTION TRANSMITTA.

A. Date 1/15/98 CC:PM R. Heifland

TO PE RECIPIENT D. Hyt Bldg. T130F
Or PE's Alternate

CONTRACT NO. _____

AUTH. NO. FB0410

PROJECT TITLE Building 123 Strip-Out

SUBCONTRACTOR NAME DWRC

B. _____ Sets submitted for your REVIEW and APPROVAL (listed and identified at right).
*Please RETURN _____ sets on or before _____ to Clerk, CM AREA Office, _____ telephone _____
*_____ Sets of FINAL MANUALS are submitted (list at right).

C. INSTRUCTIONS from CPFF Contractor only:
*_____ Sets of submittals to Eng. for/to PE for Buyer's records (listed and identified at right).

*_____ Sets to be retained by Eng. (identified at right).

D. TRACKING RECORD:

1) Date _____ transmitted by CM for review

CLERK _____
Construction Management

2) Reviewed by:

☐ A-E N.A
Name Date

☒ PE Dorthea L Hyt 1/16/98
Name Date

*3) Date _____ receipt of submittals returned to CM

4) Date _____ transmitted to Subcontractor (see Note-1).

5) Date rec'd 1-16-98 Sherry Colley
Signature of Subcontractor

**6) SUBCONTRACTOR to return one of signed copy of form to CM

7) Date _____ CM RECEIVED COPY FROM SUBCONTRACTOR.

E. LISTING OF TRANSMITTED ITEMS

Seller or Manufacturer	Item/ Description	Drawing No.
	Final Building 123 RCRA Closure Procedure	
	Submittal 02075-1.2.1-2/R1	

RECEIVED
JAN 16 1998
Denver West Remediation and Construction, L.L.C.

Note-1. The above items are returned herewith. The items/material have been A-E reviewed with action taken as noted:

☒ APPROVED ☐ APPROVED AS CORRECTED
☐ NOT APPROVED ☐ REVISE AND SUBMIT

Approval is for conformance in adaptation to the design concept of the plans and specifications and for compliance with these contract documents.

c:Project Manager (PM)-w/o encl.: Project Engineer (PE)-w/encl.;*FPM w/encl.;**FPM w/o encl.
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KAISER • HILL COMPANY

DOCUMENT TRANSMITTAL

Project Name	Transmittal No:	Work Order No.:
Building 123 Strip-Out	Date: 1/16/98	
	___ Transmitted Herewith	___ Returning for Status Noted

Quantity / Description

Item 1.

Submittal 02075 - 1.2.1-2/R1

(Final) Approved Building 123 RCRA Closure Procedure

Note: I have placed the approved procedure in the RCRA Closure IWCP

D. Hoyt 1/16/98

Distribution:	Required Action:
DVORC K. Dorr	For your use.
RECEIPT ACKNOWLEDGEMENT REQUIRED. Please acknowledge receipt of this transmittal and complete the required action. Please sign below and return the original or a photocopy of this form to document control by: ACKNOWLEDGEMENT SIGNATURE: DATE: Sherry Colley 1-16-98	By: D. Hoyt for K. Dorr. Name: Title:

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DWRC Denver West Remediation and Construction, L.L.C.
... restoring the environment

Below Grade Process Waste Piping,

Sumps, and Pipe Chases

BUILDING 123 RCRA CLOSURE PROCEDURE

Rocky Flats Environmental Technology Site

Approved by:

T. G. Bourgeois 1/15/98
Tom, Bourgeois, Construction Manager

Ricky J Carr 1/15/98
Ricky Carr, Health & Safety Manager

Paul M. Bell 1/15/98
Paul Bell, Quality Manager

1/15/98
Kaiser-Hill Concurrence

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

BELOW GRADE PROCESS WASTE PIPING, SUMPS AND PIPE CHASES RCRA CLOSURE PROCEDURE FOR BUILDING 123

Prepared For: Denver West Remediation and Construction , L.L.C.
1819 Denver West Drive, Suite 200
Golden, Colorado 80401

Prepared By: Resource Technologies Group, Inc.
3900 South Wadsworth Boulevard, Suite 155
Lakewood, Colorado 80235

Prepared by:	Michael L. Griffin	(Signature)	1/14/98 (Date)
Reviewed by:	Bartley W. Conroy Quality Assurance Manager	(Signature)	1/14/98 (Date)
Approved by:	John R. Briggs Project Manager	(Signature)	1-14-98 (Date)

Effective Date	January 2, 1998
Revision Number	Revision 1
Copy Number	Not Applicable
Date of Issue	January 14, 1998

TABLE OF CONTENTS

General: Approporiate proceudres shall be taken when entering and/or rinsing the sumps and pipe chases for perchloric acid.

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1. PURPOSE

This procedure details the steps necessary for RCRA Closure of RCRA Unit 40 at the Rocky Flats Environmental Technology Site (RFETS) for the sumps and pipe chases in Rooms 156, 157, and 158 in Building 123, and the below grade process waste piping from Building 123 to tank D853 in building 428.

It is not the intent of this document to deal with radiological concerns. Radiological concerns are addressed in the Radiological Work Permit's (RWP) generated for specific tasks.

The "Closure Plan For Building 123 Components of RCRA Unit 40" (DOE, 1997) will be followed as applicable in accordance with "Building 123 Strip-Out Construction Specifications" (RMRS, 1997), Section 02075. The IWCP for Strip-Out of Building 123 is the controlling document for this work. This procedure will be part of an IWCP that will control the work and specify permit requirements.

2. SCOPE

This procedure applies to all Denver West Remediation and Construction, L.L.C. (DWRC) employees and subcontractors for the Building 123 Strip Out as it pertains to the RCRA Closure of RCRA Unit 40.

This procedure specifically addresses the steps necessary to achieve RCRA Closure of the below grade process drain systems in Rooms 156, 157, and 158 of Building 123 including the following topics:

- Initial cleanout of the sumps;
- Closure of pipe chases and below ground piping;
- Final cleanout of the sumps;
- Removal of remaining piping;
- Closure of sumps and grouting of pipe penetrations; and
- Sampling and analysis as required by the RCRA Unit 40 Closure Plan.

All above grade process waste piping in Building 123 will be stripped out and disposed of as Mixed Wastes which is consistent with Option 2 of the "Closure Plan for Building 123 Components at RCRA Unit 40."

3. OVERVIEW

The process waste drain system in Building 123 consists of above and below ground pipe, sinks, hood drains and vents. Three large, interconnected concrete sump pits and pipe chases are located in the floor of Rooms 156, 157, and 158. The building is connected by an underground line to Vault 18, where it connects to the plant process drain waste system for treatment in Building 374. This procedure deals only with the steps necessary to achieve RCRA closure of the below ground piping to tank D8533 in Building 428, pipe, pipe chases, and sumps in Rooms 156, 157, and 158.

4. LIMITATIONS AND PRECAUTIONS

1. It is assumed that the process waste drains, lines, and sumps may contain hazardous materials and may be radiologically contaminated.

2. The proper completion of perchloric rinsing and rinsate sampling of the above-ground piping system shall be confirmed prior to internal rinsing and subsequent removal of the below grade process waste piping in Rooms 156, 157, and 158. The cleaning of the exterior of below grade pipes and sumps may be started prior to completion of the perchloric rinsing and above ground pipe removal.

3. Lockout/Tagout (LO/TO) controls must be employed where necessary to perform removal activities.

4. Personnel involved in the execution of this procedure require OSHA Hazardous Waste Operations (Hazwoper) Training, Radworker II, Confined Space Training, the DWRC Training Matrix, Waste Generator Qualified, and other training specified in the Health and Safety Plan (HSP).

5. The sumps in Rooms 156, 157, and 158 are confined spaces. Required Confined Space Entry Permits and approvals shall be in place prior to entry for strip-out activities. Site procedures for confined spaces will be used with trained personnel.

6. The intent of this document is to ensure that employees performing RCRA Closure activities are assured a safe work environment. Radiological concerns are addressed in the RWPs generated for specific tasks. The IWCP for Strip-Out of Building 123 is the controlling document for this work.

7. Activity Hazard Analysis (AHA's) will be developed as applicable to this procedure.

5. PREREQUISITE ACTIONS

5.1 PLANNING AND COORDINATION

The coordination of the Building 123 RCRA Unit 40 closure activities must be planned and staged each day to conform with the requirements of the Closure Plan (DOE, 1997) and all applicable Building 123 strip-out specifications. The following describes the duties of the RCRA Closure project personnel as it applies to closure operations.

5.1.1 RCRA Closure Supervisor

1. Ensure that all RCRA closure personnel are trained in accordance with training requirements as indicated in the Building 123 Health and Safety Plan, DWRC Training Matrix, and all applicable OSHA and RCRA Regulations.

2. Coordinate and set priorities for all closure operations.

3. Coordinate Lockout/Tagout requirements with DWRC craft supervisor and building LO/TO manager.

4. Ensure that equipment and personnel are available to accomplish closure activities listed in the DWRC daily planning meeting.

5. Verify that Waste Operations has been notified of the anticipated rinsate volumes that will be introduced to the system.

6. Coordinate with Health and Safety Specialist (HSS) for required safety support necessary to accomplish closure activities.

7. Ensure that daily inspections are performed and recorded in the building Logbook.

8. Conduct necessary training for closure personnel.

9. Ensure that equipment is properly maintained and available for use.

10. Coordinate with the Contractor so that required sampling and inspections by the Independent Professional Engineer may be scheduled.

11. Ensure waste generator instructions are prepared for all wastes generated during closure activities.

5.1.2 RCRA Closure Technician

1. Perform minor and emergency maintenance on equipment, according to manufacturer's specifications.

2. Check oil, grease, and fuel levels on equipment as prescribed in the operations and maintenance manual or procedures.

3. Winterize non-heated equipment when temperatures will drop below 35 degrees Fahrenheit.

5.1.3 Health and Safety Specialist (HSS)

1. Conduct a daily safety briefing covering RCRA Closure operations and discuss planned activities at the Building 123 daily pre-job briefing.

2. Review all applicable Radiological Work Permit (RWP) requirements prior to the start of closure operations.

3. Provide health and safety support for closure activities.

4. Provide inspection for Personal Protective Equipment (PPE) use, if not addressed in the Building 123 HSP.

5. Ensure that an Activity Hazard Analysis (AHA) is prepared and approved for all activities not specifically covered by the Building 123 HSP.

6. Obtain Confined Space Entry Permits for work in Rooms, 156, 157, and 158 sumps.

7. Ensure that appropriate precautions are taken and that any potential perchloric acid safety concerns are addressed and resolved prior to starting this procedure.

6. MATERIALS AND EQUIPMENT

6.1 MATERIALS AND TEST EQUIPMENT

- High pressure heated water sprayers.
- Chemical mix tank to prepare and store decontamination solutions as described in Section 7.0.
- Pumps, hoses, nozzles, extensions, and ancillary decontamination equipment, such as scrub brushes, scrapers,wipes, rags, spray bottles and adsorbents.
- Water-proof light.
- Flow meters and totalizers.
- Sampling devices and sampling bottles.

6.2 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

- PVC Coated Tyvek or Saranex coveralls.
- Hard hat, safety glasses, and safety shoes.
- Splash goggles, face shields, and protective gloves.
- Necessary confined space entry equipment for work in sumps.

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7. INSTRUCTIONS FOR RCRA CLOSURE OF BUILDING 123, UNIT 40

7.1 ADVANCE PLANNING

The instructions given in this section detail the prerequisite requirements which will be necessary prior to initiation of the Room 156, 157, and 158 closure activities.

7.1.1 Removal Supervisor

1. Verify that DWRC has conducted a walk-through of the system with the Contractor's Independent Professional Engineer (PE) to identify all the process waste piping and ancillary equipment. RMRS will mark the piping system with yellow paint to ensure that the piping and ancillary equipment is easily identifiable during strip-out.

2. Confirm that during the perchloric rinsing of the vents, ducts, hoods and piping that a sample of rinsate has been obtained by The Contractor and analyzed for Tier II RFCA standards. If the sample results are below Tier II Attachment 5 of the RFCA standards, then any liquid that may be spilled during removal of the process waste piping will not have to be handled as a Mixed Waste. Any spilled liquid shall be handled as directed by the applicable RWP and the waste management requirements of the Building 123 IWCP.

3. Once the above grade piping has been flushed for perchloric in accordance with the applicable procedures (DWRC, 1997), the process waste piping may be removed in accordance with the IWCP in all rooms of Building 123 except for below grade piping and sumps in Rooms 156, 157, and 158. Below grade piping and sump closure in these rooms shall be in accordance with the instructions contained in this procedure. Documentation of the above grade piping flushing will be done by DWRC. All above grade piping is to be closed according to Option 2 of the Closure Plan for Building 123 Components of RCRA Unit 40 and managed as Mixed Waste with no treatment. Process drain access points in Rooms 156, 157, and 158 must be left in place to support rinsing and closure of the sumps and pipe chases.

4. DWRC will ensure that removed piping and ancillary equipment is segregated into two categories and in accordance with the RWP, as applicable.

    - PVC; and
    - Steel.

5. Samples of the PVC and steel waste shall be collected by the Contractor to determine if the waste will meet Land Disposal Restrictions. Samples will be collected for analysis in accordance with the Closure Plan for Building 123 Components of RCRA Unit 40.

6. Following completion of these initial closure requirements, the Contractor will be provided with at least 48 hours notice that closure activities for the pipe chases, sumps and below ground piping are ready to begin so that the Independent Professional Engineer may be notified to witness the remaining closure activities of Rooms 156, 157 and 158.

7.2 SUMP AND PIPE CHASE DECONTAMINATION

7.2.1 Health and Safety Specialist (HSS)

Review applicable Radiological Work Permit requirements prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs as necessary. Develop an Activity Hazard Analysis (AHA) for the flushing and rinsing of the sumps and piping systems utilizing the designated chemical cleaning agents. Insure that all applicable MSDS documents are available.

7.2.2 RCRA Closure Technician

Prepare 100 gallons of chemical decontamination solution at a concentration of 5% trisodium phosphate and 1% sodium carbonate. This solution will be prepared in 50-100 gallon poly tanks at the job site.

1. Clean the sumps in Rooms 156, 157, and 158 with a solution of trisodium phosphate and sodium carbonate by washing or spraying the walls of each sump. Physical scrubbing of heavily contaminated areas may be necessary. The solution shall be comprised of 5% by weight trisodium phosphate and 1% by weight sodium carbonate. Used decontamination solution shall be pumped to a sink or other process waste drain in Rooms 156, 157, and/or 158.

Personnel will be briefed on the extent or degree of required decontamination by the Removal Supervisor, the HSS, and the Independent Professional Engineer.

2. Following cleaning with the trisodium phosphate and sodium carbonate solution, rinse the sumps with water. Ensure that residual chemicals and other contamination is removed during this step. Used rinse solution shall be pumped to a sink or other process waste drain in Rooms 156, 157, and/or 158.

3. Clean out the pipe chases in Rooms 156, 157, and 158 with the trisodium phosphate and sodium carbonate solution. The pipe chases are numbered on sketch SK-FB0410-014. Each pipe chase shall be washed with approximately 10 gallons of the trisodium phosphate and sodium carbonate solution.

4. Rinse the pipe chases with water. The pipe chases are numbered on sketch SK-FB0410-014. The volume of water used to rinse each of the pipe chases shall be approximately three times the volume of the chase. The following calculated volumes for each pipe chase are provided.

TABLE 1
PIPE CHASE RINSE VOLUMES

CHASE NUMBER	PIPE CHASE LOCATION	RINSE VOLUME
1	Chase around the drain in Room 156, north side	Rinse with at least 27 gallons
2	Chase around the drain in Room 156, east side	Rinse with at least 22 gallons
3	Chase between Rooms 156 and 157	Rinse with at least 64 gallons
4	Chase around the drain from the scrubbers to Room 157	Rinse with at least 37 gallons
5	Chase around the drain in Room 157, east side	Rinse with at least 25 gallons
6	Chase around the drain from center of Room 157	Rinse with at least 30 gallons
7	Chase around the drain from west side of Room 157	Rinse with at least 49 gallons
8	Chase between Room 157 and 158	Rinse with at least 13 gallons
9	Chase around the drain from the north side of Room 158	Rinse with at least 22 gallons
10	Chase around overhead pipe which drains into Room 158	Rinse with at least 4 gallons

5. During chase washing, pump the wash water into the primary process waste piping through a sink or other convenient process drain.

7.2.3 Health and Safety Specialist (HSS)

1. Document that the sumps and pipe chases have been cleaned and rinsed in accordance with Table 1 on the sketch and/or log book.

7.2.4 Independent Professional Engineer

1. Verify that all visible contamination has been removed from the pipe chases.

7.3 SUMP DRYING

7.3.1 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHA prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as necessary.

7.3.2 RCRA Closure Technician

1. Completely remove all of the water from the sumps in Rooms 156, 157, and 158, by pumping or vacuum removal after the instructions in Section 7.2 are completed. Pump the wash water into the primary process waste piping through a sink or other convenient process drain.

2. Thoroughly dry the sumps with rags or wipes. The rags or wipes shall be disposed of as moist combustible Mixed Waste. Prior to disposal, rags or wipes shall be wrung out adequately so there are no free liquids. Any liquid wrung out of rags or wipes shall be disposed of in the process piping. Absorbent may be used in the waste container as directed by the Contractor.

3. In an effort to reduce waste, the same rags may be reused as much as possible.

7.3.3 Health and Safety Specialist (HSS)

1. Document in the log book that the sumps have been dried.

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7.4 CLOSURE OF THE PIPE CHASES

7.4.1 RCRA Closure Supervisor

1. The pipe chases will be closed in accordance with Option 1 of the Closure Plan (DOE, 1997). The pipe chases will be considered decontaminated and meet Closure Performance Standards if all visible waste residues have been removed, and if the final rinsate contains contaminants of concern identified in the Closure Plan below the Tier 2 action levels, and the pH of the final rinsate is between 6 and 9.

2. Provide the Contractor with notice that closure activities for the pipe chases are ready to begin so that the independent Professional Engineer and Contractor's sampling personnel may be notified.

3. Verify that each of the sumps are dry prior to initiation of the final rinse of the pipe chases.

7.4.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as necessary.

7.4.3 RCRA Closure Technician

1. Conduct a final rinse of each chase with clean water. Rinsate volumes to be used in each chase are 5% of the volume of the chase as specified below. These volumes must not be exceeded. Composite samples of the rinsate shall be collected by DWRC's sampling personnel as indicated.

TABLE 2
PIPE CHASE CLOSURE RINSE VOLUMES

CHASE NUMBER	PIPE CHASE LOCATION	RINSE VOLUME
Composite Sample 1		
1	Chase around the drain in Room 156, north side	Rinse with no more than 3.5 pints
2	Chase around the drain in Room 156, east side	Rinse with no more than 2.5 pints
Composite Sample 2		
3	Chase between Rooms 156 and 157	Rinse with no more than 8.5 pints
4	Chase around the drain from the scrubbers to Room 157	Rinse with no more than 4.5 pints
5	Chase around the drain in Room 157, east side	Rinse with no more than 3 pints
6	Chase around the drain from center of Room 157	Rinse with no more than 3.5 pints
Composite Sample 3		
7	Chase around the drain from west side of Room 157	Rinse with no more than 6 pints
8	Chase between Room 157 and 158	Rinse with no more than 1.5 pints
9	Chase around the drain from the north side of Room 158	Rinse with no more than 2.5 pints
10	Chase around overhead pipe which drains into Room 158	Rinse with no more than 0.5 pints

7.4.4 Health and Safety Specialist (HSS)

1. Document that the pipe chases have been rinsed and sampled in accordance with Table 2 of this procedure.

7.4.5 Independent Professional Engineer

1. Verify that the pipe chases have been rinsed and sampled in accordance with Table 2 of this procedure.

7.5 PREPARATION OF SUMPS FOR CLOSURE

7.5.1 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as necessary.

7.5.2 RCRA Closure Technician

1. Thoroughly wash and scrub the sumps (floors and walls) in Rooms 156, 157, and 158 with a solution of trisodium phosphate and sodium carbonate. Used decontamination solution shall be pumped to a sink or other primary process waste drain in Rooms 156, 157, and/or 158.

2. Following cleaning with the trisodium phosphate and sodium carbonate solution, rinse the sumps with water. Ensure that all visible contamination is removed during this step. Used rinse solution shall be pumped to a sink or other primary process waste drain in Rooms 156, 157, and/or 158.

7.5.3 Health and Safety Specialist (HSS)

1. Document that the sumps have been washed and rinsed in the log book.

7.5.4 Independent Professional Engineer

1. Document sump has been washed and rinsed.

7.6 CLOSURE OF UNDERGROUND SECTIONS OF PROCESS WASTE PIPING

7.6.1 RCRA Closure Supervisor

1. The underground sections of the process waste piping system shall be closed in accordance with Option 1 of the Closure Plan (DOE, 1997), decontamination. The pipe chases will be considered decontaminated and meet Closure Performance Standards if all visible waste residues have been removed and if the final rinsate contains contaminants of concern as identified in the Closure Plan below the Tier 2 action levels and the pH of the final rinsate is between 6 and 9.

2. Provide DWRC with notice that closure activities for the underground piping is ready to begin so that the independent Professional Engineer and DWRC's sampling personnel may be notified.

7.6.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as needed.

7.6.3 RCRA Closure Technician

1. Prepare approximately 2,500 gallons of the trisodium phosphate and sodium carbonate solution.

   The decontamination solution will be prepared off-site in a 3,000 gallon tanker truck by filling the tanker with 3,000 gallons of water. After establishing recirculation by pumping back to the top of the tanker, the chemicals will be added as 50-60 pound bags until the proper 5% trisodium phosphate and 1% sodium carbonate solution is established. Since the decontamination solution concentration does not have to be exact, the unit of measurement will be the weight of each full bag of chemicals. Water will be measured with the tanker through a totalizer. The prepared solution will be brought to the site on the day of pipe flushing. The tanker will be flushed with clean water from an on-site fire hydrant and this will be disposed of in the drain pipe.

   As an alternate to this chemical preparation procedure, it may be possible to directly purchase a decontamination solution with the proper chemical strength. If this alternate is used, the solution will be brought to the site in a chemical tanker and used directly.

2. Run the decontamination solution down the process waste piping in Room 158.

3. Rinse the underground piping with at least 6,700 gallons of clean water.

4. Coordinate the pump down of tank D-853 during the washing and rinsing operations with Plant Waste Operations and Building 374 Operations.

5. Verify that tank D-853 is empty.

is drained as much as possible, sample from the hold-up.

7.6.4 RCRA Closure Supervisor

7.6.5 RCRA Closure Technician

1. Introduce no more than 113 gallons of clean water into the underground piping system in Room 158.

2. The Contractors sampling personnel will collect a sample of the rinsate at tank D-853. The sample shall be a representative of the entire 113 gallons.

7.6.6 Health and Safety Specialist (HSS)

1. Document that the underground piping has been washed and rinsed and that the final rinse and sampling have been performed in the log book.

7.6.7 Independent Professional Engineer

1. Verify D853 is empty prior to the final rinse.

2. Verify volume of final rinsate.

3. Verify collection of the rinsate sample at Building 428, Tank D853.

7.7 PIPING REMOVAL

7.7.1 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs as needed.

7.7.2 RCRA Closure Technician

1. Assist DWRC in the removal of all remaining process waste piping from Rooms 156, 157, and 158 including piping inside of the pipe chases, where feasible.

2. Assist DWRC in the disposal of the process waste piping by segregating it into waste containers by the following two categories and in accordance with the RWP, as applicable.

    - PVC; and

- Steel.

7.7.3 Health and Safety Specialist (HSS)

1. Document in the log book that the remaining process piping has been removed and disposed.

7.8 CLOSURE OF SUMPS

7.8.1 RCRA Closure Supervisor

1. The sumps in Rooms 156, 157, and 158 shall be closed in accordance with Option 3 of the closure Plan, the Clean Surface Debris Standard. Provide the Contractor with notice that closure activities for the sumps are ready to begin so that the Independent Professional Engineer may be notified.

2. Verify that all piping is removed from the sumps.

7.8.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit and AHAs prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs and AHAs, as needed.

7.8.3 RCRA Closure Technician

1. Remove any remaining contamination from the sumps. Ensure that a minimal amount of water is used for this activity. Use of damp rags is recommended.

2. Thoroughly dry the sumps with rags.

3. All rags, scrub brushes, and other cleaning materials are to be disposed of as moist combustible Mixed Waste. Prior to disposal, rags shall be wrung out adequately so that there are no free liquids. Some absorbent may be used in waste containers as specified by the Contractor.

4. Any liquid from final cleaning of the sumps shall be handled as Mixed Waste.

7.8.4 RCRA Closure Supervisor

1. Provide the Contractor with notice that the sump closure activities are complete so that the independent Professional Engineer may perform an inspection.

2. Verify that the Independent Professional Engineer has determined that the sumps meet the Clean Surface Debris Standard.

7.8.5 Independent Professional Engineer

1. Inspect the sumps and verify that the sumps meet the RCRA "Clean Surface Debris" Standard, and that all visible contamination is removed.

7.8.6 Health and Safety Specialist (HSS)

1. Document that the sumps have been closed in the log book.

7.9 PIPE PENETRATION GROUTING

7.9.1 RCRA Closure Supervisor

1. Verify that all closure activities specified in this procedure have been completed and accepted by the Contractor.

7.9.2 Health and Safety Specialist (HSS)

1. Review applicable Radiological Work Permit prior to commencing operations. Provide assistance to the closure crew on the implementation of the RWPs as needed.

7.9.3 RCRA Closure Technician

1. Assist DWRC in cutting of all piping flush with the slab in Rooms 156, 157, and 158.

2. Assist DWRC in grouting or foaming of all piping penetrations into the slab, including the penetrations in the sumps in Rooms 156, 157, and 158 in accordance with Plant Standards and Manufacturers recommendations.

7.9.4 Health and Safety Specialist (HSS)

1. Document in the log book.that the piping penetrations have been cut flush and grouted.

8. REFERENCES

Denver West Remediation and Construction, L.L.C., *Rocky Flats Environmental Technology Site Process Drain Flushing Building 123 Procedure*, Revision A, October 6, 1997; Attachment 9.5 to Strip-Out Plan for Building 123 Strip-Out Project, Revision 1.

Rocky Mountain Remediation Services, L.L.C., *Building 123 Strip-Out Construction Specifications*, Revision 6, December 8, 1997.

US Department of Energy, *Closure Plan for Building 123 Components of RCRA Unit 40*, November 12, 1997.

INTEROFFICE MEMO RMRS FORMAT

TO: Kent Dorr, K-H Project Management, Bldg 130, X

FROM: Vern Guthrie, 123 Project Manager, Bldg T130F, X

DATE: Wednesday, April 01, 1998

SUBJECT: **BUILDING 123, TRANSMITTAL OF MODIFICATIONS TO CLOSURE PLAN FOR BUILDING 123 COMPONENTS OF RCRA UNIT 40, REVISION 1**

PURPOSE

The purpose of this letter is to request Kaiser-Hill forward the RCRA Closure Plan for B123, Revision 2, to DOE for approval and subsequent transmittal to CDPHE. Attached is redline/strike-out copy (Revision 1) of the RCRA Closure Plan for B123, Revision 1 along with a final copy of that document.

DISCUSSION

Modifications to the Closure Plan were made in order to maintain consistency between the 123 PAM, RCRA Closure Plan and actual operations. The redline/strikeout copy of the Closure Plan is being provided so that DOE and CDPHE can readily determine both the extent and context of the proposed changes. The following is a summary of those changes:

Change #1
SECTION 1.0 INTRODUCTION

.... Closure will include deactivation, dismantlement, and remediation of all system components in Building 123, and decontamination, rinsing and sampling of the active underground pipeline that leaves the building and extends to Valve Vault 18.

Partial closure of RCRA Unit 40 is part of a larger project to decontaminate and decommission (D&D) Building 123 and surrounding area. This project will remove Buildings 123, 123S, 113, and 114 at RFETS; ~~eliminate~~ characterize portions of IHSS 148 and IHSS 121; and close a portion of RCRA Unit 40. The Building 123 slab and foundation will be ~~removed~~ cored as required to ~~remediate~~ allow for sampling. Sample results will be used to evaluate the contamination beneath the building and modify the ER Ranking List, as results indicate. ~~as dictated by soil sampling results.~~

This change was made for clarification and to specify that soil remediation was not part of the scope of this project.

CHANGE #2
1.1 APPLICABILITY

This RCRA Closure Plan applies to both the aboveground and subsurface Process Waste Tank System found in and beneath Building 123 as described:

- The above ground waste process line in Building 123;
- The underground process waste line connecting Building 123 to Valve Vault 18 and from Valve Vault 18 to Tank 853 in Building 428; and
- All ancillary equipment (secondary containment, sumps, etc.) ~~that~~ are the active part of RCRA Unit 40 associated with Building 123.

Note: Pipeline P-1 was modified in 1989. Part of the line (exterior to the building) was removed and replaced with new double walled piping. This line runs from the exterior of the building to Valve Vault 18. This new line is part of RCRA Unit 40 and will be closed in accordance with this plan. .

This Closure Plan will identify the options available for the management, and the removal and/or remediation of this system. This Closure Plan does not apply to:

- the inactive portion of the P-1 Pipeline,
- to Pipelines P-2, or P-3;
- nor to any soil contamination found under this building; and
- Tank 853 in Building 428.

~~The above ground and underground process waste line connecting Building 123 to Valve Vault 18 and from Valve Vault 18 to Tank 853 in Building 428 and all ancillary equipment (sumps, etc.) that are the active part of RCRA Unit 40 associated with Building 123. Pipeline P-1 was modified in 1989. Part of the line (exterior to the building) was removed and replaced with new double walled piping. This line runs from the exterior of the building to Valve Vault 18. This new line is part of RCRA Unit 40 and will be closed in accordance with this plan.~~

This section was modified for clarification and ease of reading..

CHANGE #3
SECTION 1.1 Applicability

Note Building operations prior to 1985 that generated mixed waste were not regulated under RCRA, and, therefore, these pipelines are not part of RCRA Unit 40. Non-regulated underground pipelines that were abandoned prior to RCRA regulation include: pipelines P-2 and P-3. (Blue and red on attached First Floor Plan) In 1974, pipelines P-2 and P-3 were grouted in place. The Building 123 PAM and ~~Building 123~~ IHSS 148 and 121 Sampling and Analysis Plan (SAP) address the investigation and ~~potential remediation~~ characterization of ~~the abandoned lines and~~ any soil contamination created by the lines. The implementation of the RCRA Closure Plan is a component of the facility decommissioning plan.

The following is a summary of the decommissioning plan for the process waste piping system in Building 123.

The Decommissioning of Building 123 has been divided into four main phases:

I. Strip-Out and Utility Isolation
II. Asbestos Abatement
III. Demolition
IV. Characterization ~~and Remediation~~ of IHSS 121 and 148.

These changes were made to clarify that soil remediation was not part of the scope of this project.

CHANGE #4
SECTION 1.1 Applicability

...During Phase IV, the soil and the concrete slab will be sampled (drilled) for characterization. Closure activities for the inactive underground process waste lines, the building slab and surrounding soil will be determined by ER based upon the results of the characterization

study. Soil remediation is not considered as part of the work scope of either the 123 PAM or this Closure Plan. Final disposition of the underground portion of the active process waste line (green) will depend on sample analysis of the rinsate. If the rinsate sample of the underground portion of the active waste line is below RFCA Tier 2 standards, the line will have been successfully "Clean Closed". If the rinsate sample does not meet RFCA Tier 2 standards, the piping will be deferred to ER .

This change was made to clarify that soil remediation was not part of the scope of this project and to explain how the sample analysis from under building contamination will be used. The discussion on rinsate standards not meeting standards was added to allow these units to be deferred to ER for evaluation.

CHANGE #5
SECTION 5.0 UNIT DESCRIPTION

Building 123 Ancillary Equipment: Four concrete sumps that were used for emergency secondary containment are considered ancillary equipment to RCRA Unit 40 and by their construction an integral part of the buildings floor structure. These sumps are described as follows:

- Sump 125, located in room 125, a small concrete sump with epoxy paint surface, dimensions: 1'8" Long by 1'10" wide by 1'11" deep;
- Sump 156, located in room 156, a concrete sump with a gray epoxy painted surface, dimensions: 4' long by 4' wide by 4"2" deep. Entry into this sump requires a confined space entry permit.;
- Sump 157, located in room 157, a concrete sump with a gray epoxy painted surface, dimensions: 4' long by 6' wide by 5' deep. Entry into this sump requires a confined space entry permit.; and
- Sump 158, located in room 158, concrete sump with a gray epoxy painted surface, dimensions: 4' long by 4' wide by 5"2" deep. Entry into this sump requires a confined space entry permit.;

Because of the importance of the concrete sumps, a description of these units was deemed appropriate.

CHANGE #6
SECTION 5.0 Unit Description
Underground Section

...1972, an additional underground process waste piping system was installed which serviced the construction of the west wing (P1). ~~The 1972 line is the P1 line~~

Editorial change for clarity.

CHANGE #7
6.2 SOIL CHARACTERIZATION

~~A complete~~ Soil characterization of the Building 123 area will be conducted as part of the activities outlined in the Building 123 Proposed Action Memorandum. Soil characterization will include sampling and analysis of the soil beneath and surrounding Building 123. Following removal of the building superstructure, samples will be collected through the slab~~. to determine~~

~~the necessity for soil remediation~~. The ~~Building 123 and~~ IHSS 121 and 148 SAP has been written to guide characterization activities in these areas. The SAP incorporates a review of existing records to establish the location of potentially contaminated areas and to define sampling protocol. The RFETS Statistical Applications Group will be used to ensure that statistically valid and representative samples of each waste stream are taken. Current planning indicates a need for approximately ~~fifty (50)~~ forty-six (46) soil samples beneath the slab of Building 123 and from areas surrounding underground, abandoned OPWLs. Samples will be collected from one to six feet in ~~at~~ depths ~~immediately below the pipe~~ and are designed to locate ~~any~~ contamination that may have leaked from the lines. Samples will be analyzed for Volatile Organic Compounds (VOCs), Target Analyte List (TAL) Metals, radionuclides, and nitrates. Data quality requirements supporting the analysis effort will conform to criteria established in "Guidance for the Data Quality Objective Process", EPA QA/G-4 (EPA 1994). The Data Quality Objectives are listed in the "Building 123 and IHSS 121 SAP". (See RF/RMRS-97-023)

Minor editorial modifications to ensure consistency with the actual IHSS SAP for this site

CHANGE #8
SECTION 7.0 CLOSURE PERFORMANCE STANDARD

For ease in achieving RCRA Closure Performance Standards, that portion of RCRA Unit 40 associated with Building 123 will be divided into ~~two~~ three components: above ground piping; ~~and~~ associated ancillary equipment (concrete sumps) and below ground piping. These units will be treated independently. ~~however,~~ RCRA Closure will not be completed until ~~both~~ these components either :

- Achieve the RCRA Closure Performance Standards and are certified closed by an independent Colorado Registered Professional Engineer; or
- Are deferred to ER after failing to meet standards.

Any of the three closure options described below may be used to achieve "RCRA Clean Closure." For example, the above ground piping may be closed using the Decontamination Option while the below ground might be closed using Debris Treatment.

To achieve "RCRA Clean Closure "of this unit, a selection of one of the following options will be made by DOE/Kaiser-Hill based on characterization data.

This change was made to emphasize the importance of concrete sumps to this closure process and to allow for deferral to ER should the sumps **fail** *to meet standards.*

CHANGE #9
SECTION 7.1.1 Closure Performance Standards For ~~Both~~ Above Ground Piping, Ancillary Equipment (e.g. Concrete Sumps) and Below Ground Piping Associated with ~~Portions of~~ RCRA Unit 40

...The above ground and/or below ground piping and the ancillary equipment (e.g. Concrete sumps) ~~portion of this unit~~ will be considered decontaminated and meet RCRA Clean Closure Performance Standards if:

This modification was made for clarification and to specifically identify Closure Standards for the concrete sumps.

CHANGE #10
SECTION 7.1.2 Rinsate Meets Performance Standards
Above Ground Piping System and Removable Ancillary Equipment

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, all above ground portion of this unit will be removed and managed as LLW. This LLW will be stored on-site until it can be disposed in an approved facility (e.g., Nevada Test Site, Envirocare),

Non-removable Ancillary Equipment (e.g., Concrete Sumps)

Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, the concrete sumps meeting standards will be considered closed and no further work will be required. The floor slab will remain in place and will be evaluated by ER as to whether it will be removed or not.

This change was made to clarify the management of non-removable sumps that meet Tier 2 standards.

CHANGE #11
SECTION 7.1.2 Rinsate ~~Meets~~ Performance Standards
Below Ground Piping System

Two options exist for the below ground portion of the process waste system:

1. The rinsate sample from the piping meet Tier 2 standards and performance standards are certified by an independent engineer. Clean Closure of this unit will require no further activities; or
2. The rinsate sample does not meet Tier 2 standards and therefore the unit can not be Clean Closed. The unit will be deferred to ER for evaluation as part of the site-wide ROD.

Once the building is removed, the soil sampling program as described in the *Soil Sampling and Analysis Plan to Characterize Individual Hazardous Substance Sites 121 and 148 at Building 123* (SAP) will be initiated. The purpose of the SAP is to identify any hazardous constituents present in the soil as a result of releases from either the waste process lines (active or inactive) or Building 123 itself.

~~Once the rinsate solution meets the performance standards, as identified above and is certified by an independent engineer, the soil sampling program approved in the 123 PAM will be initiated. Dependent upon the results of the sampling, one of the following actions will occur:~~

- ~~If the soil contamination is above levels defined in Section 261 Subpart C, the pipeline will be removed as part of the soil remediation program.~~

- ~~If the soil contamination is below Section 261 Subpart C levels the lines will be grouted and capped in place.~~

Any ~~remaining~~ soil contaminants identified during sampling operations will be evaluated by Environmental Restoration Projects and will be used to update the ER Ranking List. This list will be used to determine whether or not soil remediation is required. ~~as part of the 123 PAM and/or final Record of Decision (ROD) for the facility.~~

This change was made to clarify the management options for below ground piping. In addition a section was added stating that characterization of under building contamination will be conducted at a sufficient level to allow this site to be added to the ER Ranking List.

CHANGE #12

SECTION 7.2.1

7.2.1 ~~Rinsate Fails to Meet Performance Standards~~, Manage Piping and Ancillary Equipment That Can be Removed ~~and Rinsate~~ as Hazardous Waste

If this option is selected, all removable ~~the~~ process waste system components will be managed as RCRA mixed waste with the EPA Waste Codes of F001/F002/ F005. The piping and removable ancillary equipment will be removed, size reduced and placed into storage on-site at a TSDFs until shipment to an off-site TSDF for final disposition. All hazardous waste and/or mixed wastes generated from this project will be managed in accordance with all applicable state and federal regulations. Further description of waste management activities can be found in Section 10.

In accordance with 40 CFR 268, a representative sample will be taken of these waste streams (e.g., PVC piping, steel piping, etc.) to determine whether the waste stream meets LDR standards or not. In the event that the TCLP sample meets the MCL Tier 2 standards for organics (which contain all the listed wastes identified for this unit), the operator will consider the waste to "No Longer Contain Listed Waste." This will allow any piping meeting this standard to be managed as non-hazardous waste provided the piping is not also characteristically hazardous waste.

~~Any rinsate generated from the operation, will be sent to Building 374 for treatment.~~

This section was added to clarify how piping and removable ancillary equipment may be managed without treatment as mixed waste. In addition, a discussion of LDR standards and "No Longer Contained In" was added to allow for wastes meeting the MCL standards for organics to meet EPA's No Longer Contained In Test.

CHANGE #13

SECTION 8.1 PREPARATION OF ENGINEERING PACKAGES AND WORK PACKAGES

Engineering and work packages will be used to govern the deactivation and decommissioning activities. Engineering designs will be developed for removal and decommissioning activities. The engineering package will define the sequence of activities and methods of size reducing, dismantling, and packaging of the building materials. The packages are being prepared for the Building 123 project in three phases:

1) Deactivation of the building,

2) Demolition of the building,

3) Characterization ~~Remediation~~ of underground contamination ~~and/or closure of the underground pipeline as required.~~

This change was made in order to be consistent with the 123 PAM. Soil remediation is not part of the Scope of this document nor the 123 PAM and therefore, these changes were required.

CHANGE #14
SECTION 8.3 TANK SYSTEM CLOSURE ACTIVITIES
8.3.1 Closure of System Components

Closure of the above ground and underground portions of RCRA Unit 40 is dependent upon the amount of contamination (if any) discovered in the final characterization. These units will :~~meet:~~

1. Meet the rinsate standards (Option 1) or
2. ~~will~~ Be removed, characterized and managed in accordance with all applicable rules and regulations (Option 2); or
3. Meet the Debris Treatment Standards (Option 3); or
4. Deferred to ER, In the event Tier 2 standards can not be met for underground piping, non-removable ancillary equipment (e.g., concrete sumps) and/or contaminated soils.

...Both the above ground and below ground portions of RCRA Unit 40 will be closed following an approved RCRA Closure Plan using one of the following options:

1. Pipelines and ancillary equipment (e.g., concrete sumps, secondary containment, etc.) will be decontaminated using a solution of water, sodium carbonate and trisodium phosphate. The rinsate will be tested to determine if it meets the Tier 2 levels identified in Attachment 5 of RFCA. If the rinsate meets these standards, then the system will be considered closed. If the rinsate is above the standards, the pipe will be removed. Underground piping, non-removable ancillary equipment (e.g., concrete sumps) and soil contamination that does not meet standards will be deferred to ER.

2. The process waste system can be removed and managed as Mixed Waste; or

3. The process waste system can be Debris Treated in accordance with 40 CFR 268.45 and exit RCRA once debris treatment performance standards are met.

~~If soil contamination is present that requires removal/remediation, the pipeline will be removed at that time as part of the soil remediation.~~

This modification was made to allow for deferral of units not meeting Tier 2 standards.

CHANGE #14
SECTION 8.3.2 Closure Scenarios Associated with Soil Contamination

Soil remediation is not within the scope of this RCRA Closure Plan. Soil contamination will be characterized to the extent that it can be evaluated and ranked by ER.
~~The choice of closure options for the underground pipelines will be influenced by the extent of hazardous contamination, found in soil sampled near the pipeline. One or more sets of~~

~~activities will be pursued, based upon the amount of RCRA regulated contaminants that are found:~~

~~**Contamination above RCRA levels, Subpart C, 261 levels**~~

~~Soil surrounding the pipelines contaminated above RCRA, Subpart C, 261 levels will require thorough decontamination, including removal of the contaminated soil and pipeline. Soil contaminated above RCRA regulated levels will be removed and managed as hazardous waste.~~

~~If sampling shows an extensive contamination plume in the soil, other management options such as soil vapor extraction, thermal drying, or on site stabilization may be pursued upon agreement with CDPHE personnel. If any these options are necessary, an addendum to this closure plan will be submitted.~~

Soil remediation is not within the Scope of this document.

CHANGE #15
SECTION 8.3.2 Closure Scenarios Associated with Soil Contamination

Contamination below RFCA ~~levels, below~~ Tier 2 Levels

If analytical results indicate that soil contamination is below RFCA Tier 2 levels, the following actions will be taken:

- Underground pipelines will be filled with grout, capped and left in place.
- Sample results will be summarized and forwarded to ER for inclusion in the site-wide ER evaluation.

Contamination above RFCA Tier 2 Levels

If analytical results indicate that soil contamination is above the Tier 2 levels, the following actions will be taken:

- Underground pipelines will be filled with grout, capped and left in place.
- The site will be deferred to ER for further evaluation.
- All analytical data will be summarized in a sample report. This report along with copies of all analytical data will be submitted to ER for evaluation.
- ER will use the data to update the ER Ranking List.
- The ER Ranking List will be used to prioritize soil remediation projects at Rocky Flats. As part of the RFCA Plant Closure, a risk assessment will be conducted. Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document

~~**Contamination below RCRA Subpart C, 261 levels, and above RFCA Tier 2**~~

~~If analytical results indicate that the soil is below RCRA Subpart C, 261 levels, but above the RFCA Tier 2 levels, the following actions will be taken. Underground lines will be filled with grout, capped, and left in place. Soil will be left undisturbed. As part of the RFCA Plant Closure, a risk assessment will be conducted. Remediation, if required, will then be conducted on the pipelines and soil in accordance with a CDPHE approved RFCA Decision Document.~~

Table 9-1 Estimated Volume of Waste to be Generated if Options are Successful

Waste Forms	Waste Type	Disposition of Waste	Estimated Quantity
Option 1 Decontamination			
Process waste pipelines/ancillary equipment	Low Level	LLW will be recycled at SEG, Oak Ridge, TN or sent to the Nevada Test Site.	800 Linear Ft. or 100-200 Cubic Ft.
Rinsate	Low Level Mixed	Building 374, WWTU	~~200-1000 gallons~~ 7,500 gallons
Plastic, paper, etc. decontamination or LLW handling	Low Level	Nevada Test Site	100-200 Cubic Ft.
~~Remediation of underground pipelines/soils~~	~~Low Level Mixed Waste~~	~~Approved TSDF~~	~~Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates the need to exhume soil/pipeline.)~~
Option 2 Handle as Hazardous Waste			
Process Waste Pipeline/ancillary equipment	Low Level Mixed Waste	Approved TSDF	800 Linear Ft. or 100-200 Cubic Ft. 9 yd^3
Rinsate	Low Level Mixed Waste	Building 374, WWTU	200-1000 gallons
Plastic, paper, etc. that comes in direct contact with listed waste	Low Level Mixed Waste	Approved TSDF	< 100 Cubic Ft.
~~Remediation of underground pipelines/soil~~	~~Low Level Mixed Waste~~	~~Approved TSDF~~	~~Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates need to exhume pipeline.)~~
~~**Option 3 Debris Treatment**~~ Process waste pipelines/ancillary equipment	Low Level Waste	Nevada Test Site	~~800 Linear Ft. or 100-200 Cubic Ft.~~
Plastic, paper, etc. coming in to direct contact	Low Level Mixed Waste	Mixed Waste will be stored on-site in a TSDF awaiting shipment to Envirocare or another approved TSDF.	< 100 cubic ft.

~~Remediation of contaminated soil.~~	~~Low Level Mixed Waste~~	approved TSDF. ~~Mixed waste will be stored on-site waiting shipment to an approved TSDF~~	~~Up to 2100 Cubic Ft. (Waste will be generated only if contamination indicates need to exhume pipeline.)~~

These changes were made to remove remediation wastes and to update volumes as waste generation was completed.

RESPONSE REQUIREMENTS

Notify Ted Hopkins at X7652 if there are any comments or concerns regarding this document that need to be resolved. If K-H finds the document acceptable, please forward a copy of your submittal to DOE's RFFO to Ted Hopkins.

OUTLINE FOR INTERIM STATUS CLOSURE PLANS UNDER RCRA

General Contents of Closure Description Document

1. Develop unit-specific closure description document
   - Identifies the methods of accomplishing closure;
   - Identifies criteria in the form of closure performance standards (e.g., Tier I, Tier II, MCLs, etc.)

NOTE: Under RFCA, the Closure Description Document must follow all the requirements identified in 6 CCR, 1007-3 Part 265, Subpart G.

General Requirements for Closure Description Documents:

1. Purpose: Identify portions or sections of Closure Plan applicable to specific interim status units;
2. Information on and rationale for the method of closure. Clean closure will be conducted in accordance with one of the following three methodologies:
   - Decontamination; Identify the type of contamination to be addressed; Decontamination methods; and Decontamination media;
   - Debris Rule;
   - Unit removal.
3. Define the boundaries of the interim status unit;
4. Type of RCRA Clean Closure to be performed (partial, full); Note: To meet RCRA "Clean Closure Standards", all waste in the unit must be removed or are below the specified closure standards and the unit owner must verify and document that standards have been met for the unit and all equipment.
5. Determine how the waste will be managed;
6. Schedule for accomplishing closure;
7. Identify the amount of waste to be generated (Each CDD will include a specific waste generation estimate.)
   - See Attachment 2 of the Part A application dated 2/10/97 for authorized volumes of waste; and
   - EPA Waste Code;
9. Contamination Evaluation. Determine the degree of contamination present within an interim status unit scheduled to undergo closure, include this evaluation in the CDD. NOTE: The Reconnaissance Level Characterization Plan is used on-site to meet this requirement. The Contamination Evaluation will include:
   - Process Knowledge;
   - Radiological survey results;
   - Historical records;
   - Wipes/smears or other non-intrusive methods to identify the presence and degree of contamination.
10. Number of Closure Personnel
    - Actual numbers of personnel required will be determined at the time of closure based on the closure schedule; safety, and regulatory standards.
    - Minimum crews are required for health and safety requirements;
    - All personnel will be qualified in accordance with Part IX of the Permit Personnel Training
    - All personnel will be trained, as applicable to accomplish closure, in the necessary mechanical skills for conducting closure;
    - Decontamination techniques;
    - Safety Procedures.

CLEAN CLOSURE

The objective of clean closure is to eliminate the need for maintenance and post-closure care due to waste constituents remaining in the unit or unit equipment. Clean Closure will be accomplished by:

1. Removing all waste;
2. Decontaminating all unit equipment and structures;
3. Removing any contamination present due to the operation of the unit; and
4. Achieving agreed upon closure standards (Attachment 5, Table 2, Tier II). Unit specific standards that deviate from Tier II Standards can be negotiated on a case-by-case basis. It is very important that RMRS

Environmental Compliance and K-H Legal be involved any project proposing different standard than the MCLs as early as possible.

Facility Closure Notification

Notify State at least 45 days prior to performing partial or final closure of any interim status unit.
Accompanying the Closure Notification will be the Closure Description Document (CDD)
The State will have 30 days to approve, modify, or disapprove the CDD;

Closure Extends Beyond 180 Days

If the time required for closure activities exceeds 180 days, the State must be notified within 30 days of the additional time needed to achieve closure and the reason.

Environmental Monitoring:

1. Environmental Monitoring Procedures (groundwater, soil, air, etc.) will be employed for RCRA units which have releases to the environment;
2. Project Manager must notify Steve Singer (IM/IRA Site-wide Monitoring Plan) of your proposed activities.
3. If during environmental monitoring, unanticipated migration of hazardous constituents is identified, remedial actions under RFCA to prevent further migrations will be evaluated and implemented per RFCA.

Closure Activities Deferred to RFCA

When final closure of a unit is delayed to accomplish closure as part of RFCA,

1. Waste inventory will be removed within 180 days of commencing closure activities to achieve partial closure;
2. Administrative and engineering controls (e.g., lock-out/ tag out , restricted access, etc.) will be used to prevent further hazardous or mixed waste inventory from entering the unit.

Restrictions

1. No dismantlement of the unit will commence until the CDD has been approved by CDPHE;
2. Equipment or components to be replaced or removed will be identified in the CDD; and
3. This equipment will be characterized, treated, stored, or disposed in accordance with applicable regulations.
4. Closure of these units are predicated on the availability of some combination of on-site and off-site waste management capabilities for the storage, treatment, and disposal of inventory and cleanup waste.
5. Efforts will be made to minimize waste generation was a result of closure.
6. Closure Performance standards identified in the Site-wide Interim Status Closure Plan are compliance with RFCA, Attachment 5, table 2, Tier II, Groundwater Action Levels. Changes in these standards (e.g., Tier I standards for soils) should be negotiated with the State on a unit specific basis. Contact Ted Hopkins, RMRS Environmental Compliance Manager for assistance. Florence Phillips, K-H Legal, has been instrumental in negotiating changes to these closure standards and will be intimately involved with any modifications/negotiations for any standard that deviates from the approved Table 2, Tier II MCLs.

Document/Recordkeeping:

1. All documents prepared in support of a Closure Project will follow RMRS Document Control Procedures (for example, a CDD is a Controlled Document);
2. All documents prepared to support a Closure Project should be submitted to RMRS Document Control for inclusion in the facility's Project Files. The following closure records will be maintained at the Site during closure activities and at a federal repository for a minimum of 30 years following Closure:
3. Record of sampling activities including screening, decontamination sampling (e.g., rinse waters, soil, groundwater, building characterization, etc.)
4. Actions taken to decontaminate or remove structures or soils, including contaminated soils;
5. Documentation which verifies that the Closure Plan is following the work packages and the conditions of the permit;
6. Records of volumes of waste generated (including soils);

7. CDD that are prepared to support interim status units will be integrated with and tracked on Figure 1, Process Waste Transfer and Collection System to ensure that accurate records are maintained describing what areas have been closed and what activities have been conducted.

Amendments of Closure Plan

A CDD must be amended whenever;

1. Changes in the operating basis or facility design occur that affect the Closure Plan;
2. Change in expected year of closure occurs;
3. Modifications must be made within 30 days of identifying any event that causes modification to be required.

REFERENCES:

Decontamination: Page 7-10 of the Site-wide interim Status Closure Plan;
Debris Rule Decontamination: Page 10-12 of the Site-wide interim Status Closure Plan;
RCRA Stable: page 12-14 of the Site-wide interim Status Closure Plan;
Soil Contamination: page 14 of the Site-wide interim Status Closure Plan;

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RF/RMRS-97-125.UN

Concrete Sampling and Analysis Plan to Characterize the Building 123 Slab

Rocky Flats Environmental Technology Site

Prepared by

Rocky Mountain Remediation Services, L. L. C.

December 1997

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CONCRETE SAMPLING AND ANALYSIS PLAN TO CHARACTERIZE THE BUILDING 123 SLAB

DECEMBER 1997

This Sampling and Analysis Plan has been reviewed and approved by:

John Miller, Radiological Engineering	12-17-97 Date
Gary Konwinski, Environmental Management	12-17-97 Date
Mark Brooks, RMRS Quality Assurance	12-17-97 Date
Greg Sollner, K-H Compliance and Performance Assurance	12-17-97 Date
C.L. Guthrie, RMRS Project Management	12/17/97 Date

This Sampling and Analysis Plan was prepared by:

Kirk K. Hilbelink, Project Scientist	12-17-97 Date

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FIGURES

ACRONYMS

AHA ..... Activity Hazard Analysis
ANSI ..... American National Standards Institute
APO ..... Analytical Projects Office
Ba ..... barium
COCs ..... contaminants of concern
Cf ..... californium
CDPHE .... Colorado Department of Public Health and the Environment
DQO ..... Data Quality Objective
DOE ..... U.S. Department of Energy
dpm ..... disintegrations per minute
EPA ..... U.S. Environmental Protection Agency
GPR ..... Ground-Penetrating Radar
Gd ..... gadolinium
H-3 ..... tritium
HASP ..... Health and Safety Plan
HTO ..... tritium oxide
LLW ..... low-level waste
MDA ..... minimum detectable activity
Ni ..... nickel
NIST ..... National Institute of Standards and Technology
OPWL ..... Original Process Waste Line
PAM ..... Proposed Action Memorandum
Pb ..... lead
PPE ..... personal protective equipment
PRE ..... Property Release Evaluation
QA/QC .... Quality Assurance/Quality Control
QAPD ..... Quality Assurance Program Description
RCRA ..... Resource Conservation and Recovery Act
RCT ..... Radiological Control Technician
RFCA ..... Rocky Flats Cleanup Agreement
RFETS ..... Rocky Flats Environmental Technology Site
RMMA ..... Radioactive Materials Management Area
RMRS ..... Rocky Mountain Remediation Services
RWP ..... Radiological Work Permit
SAA ..... Satellite Accumulation Area
SOPs ..... Standard Operating Procedures
SAP ..... Sampling and Analysis Plan
Sr ..... strontium
TLD ..... thermoluminescent dosimeter
UCL ..... Upper Confidence Limit

LIST OF APPLICABLE STANDARD OPERATING PROCEDURES (SOPs)

Identification Number	Procedure Title
4-ROI-03.02	*Radiological Requirements for Unrestricted Release*
1-P21-HSP-18.04	*Control of Radioactive Sources*
4-U50-REP-1006	*Radiological Characterization of Bulk or Volume Materials*
4-Q97-REP-1003	*Radiological Evaluation for Unrestricted Release of Property/Waste*
1-P73-HSP-18.10	*Radioactive Material Transfer and Unrestricted Release of Property and Waste*
5-21000-OPS-FO.03	*General Equipment Decontamination, Section 5.3.1, Cleaning Steel or Metal Sampling Equipment Without Steam in the Field*
OPS-DIR-006	*Safety Requirements for Work Involving Penetration of Walls, Floors Ceilings, and Concrete, Asphalt, or Masonry Pads*
2-S47-ER-ADM-05.15	*Use of Field Logbooks and Forms*
RM-06.04	*Administrative Record Document Identification and Control*
5-21000-OPS-FO.10	*Receiving, Labeling, and Handling Environmental Containers*
5-21000-OPS-FO.13	*Containerization, Preserving, Handling, and Shipping of Soil and Water Samples, Volume 1*

CONCRETE SAMPLING AND ANALYSIS PLAN TO CHARACTERIZE THE BUILDING 123 SLAB

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide a Sampling and Analysis (SAP) for the radiological characterization of the Building 123 concrete slab, pursuant to the *Proposed Action Memorandum (PAM) for the Decommissioning of Building 123* (RMRS 1997a).

The objective of the SAP is to define specific data needs, sampling and analysis requirements, data handling procedures, and associated project QA/QC requirements to demonstrate that residual radioactive materials existing in the Building 123 slab are below levels appropriate for unrestricted release with respect to 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials.* If necessary, areas will be decontaminated, managed as radioactive material, or released in a restricted manner. The SAP defines activities that will occur in conjunction with efforts outlined in the *Close-out Radiological Survey Plan for the Building 123 Cluster* (RMRS, 1997b). All work will be performed in accordance with the *RMRS Quality Assurance Program Description(QAPD)*(RMRS 1997c).

1.2 Background

1.2.1 Physical Description

Building 123 is located on Central Avenue between Third and Fourth Streets at the Rocky Flats Environmental Technology Site (RFETS, Figure 1.1). Building 123 was erected in 1953 with additions completed in 1968, 1972 and 1989. The 75-room facility covers approximately 19,000 square feet and is constructed of mostly concrete with an asphalt roof. The floor slab is composed of poured-in-place, reinforced concrete, six to eight inches thick, with a barrier on a gravel base (RMRS 1997d).

1.2.1.1 Source Pits

Cylindrical, concrete lined pits were installed during the original construction for the storage of radioactive sources for dosimetry. Three different types of pits were constructed as described below and indicated in Figure 1.2:

1. Type A: approximately 18' deep x 19" diameter
2. Type B: 16" deep x 12" diameter
3. Type D: 8" deep x 6" diameter

1.2.1.2 Floor Drains

Floor drains were installed to divert liquid process waste through OPWL P-2 to Building 374 for treatment (Figure 1.2).

1.2.1.3 Secondary Containment Sumps/Access Pits

Interconnected, secondary containment sumps/access pits for the process waste lines were

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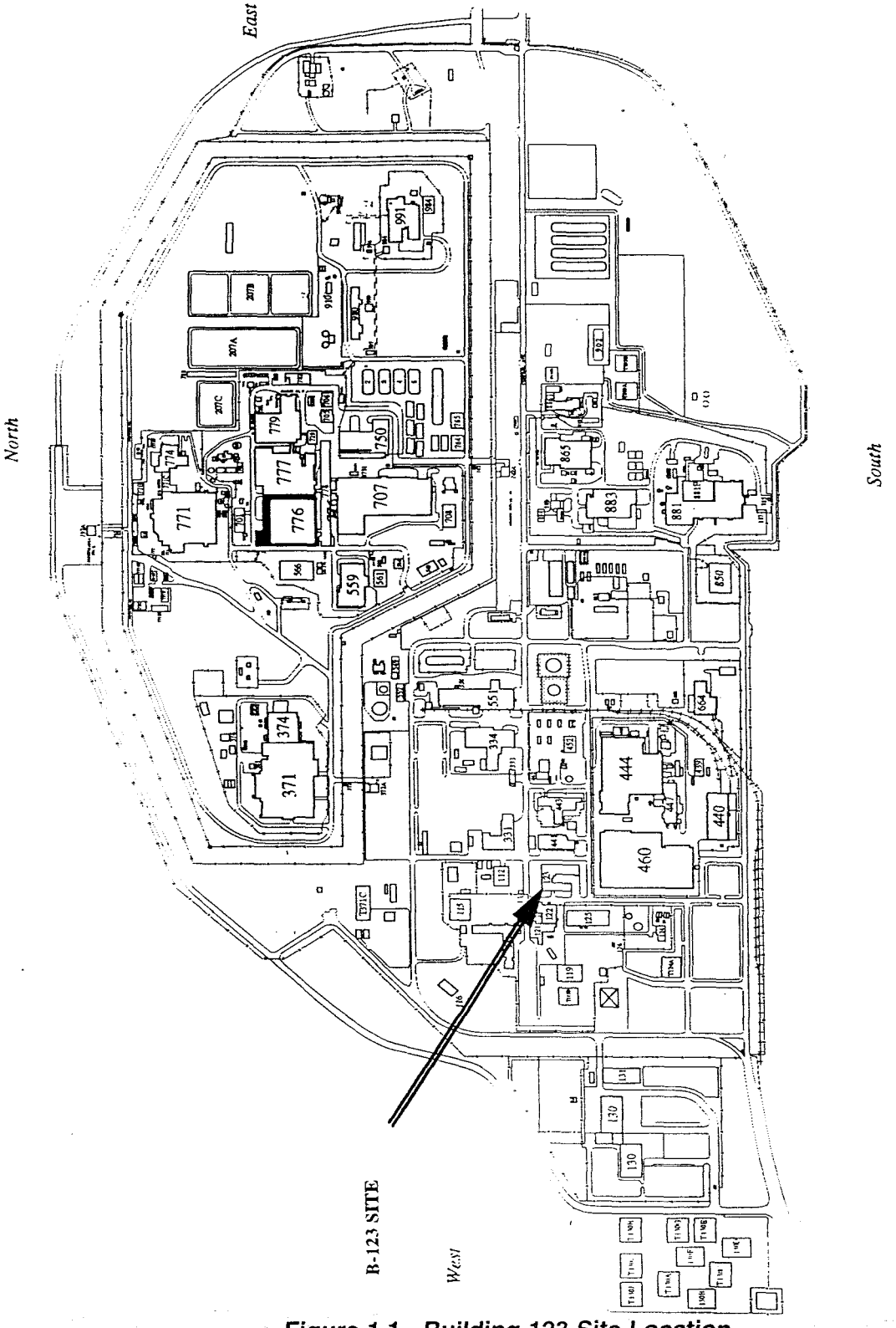

Figure 1.1 Building 123 Site Location

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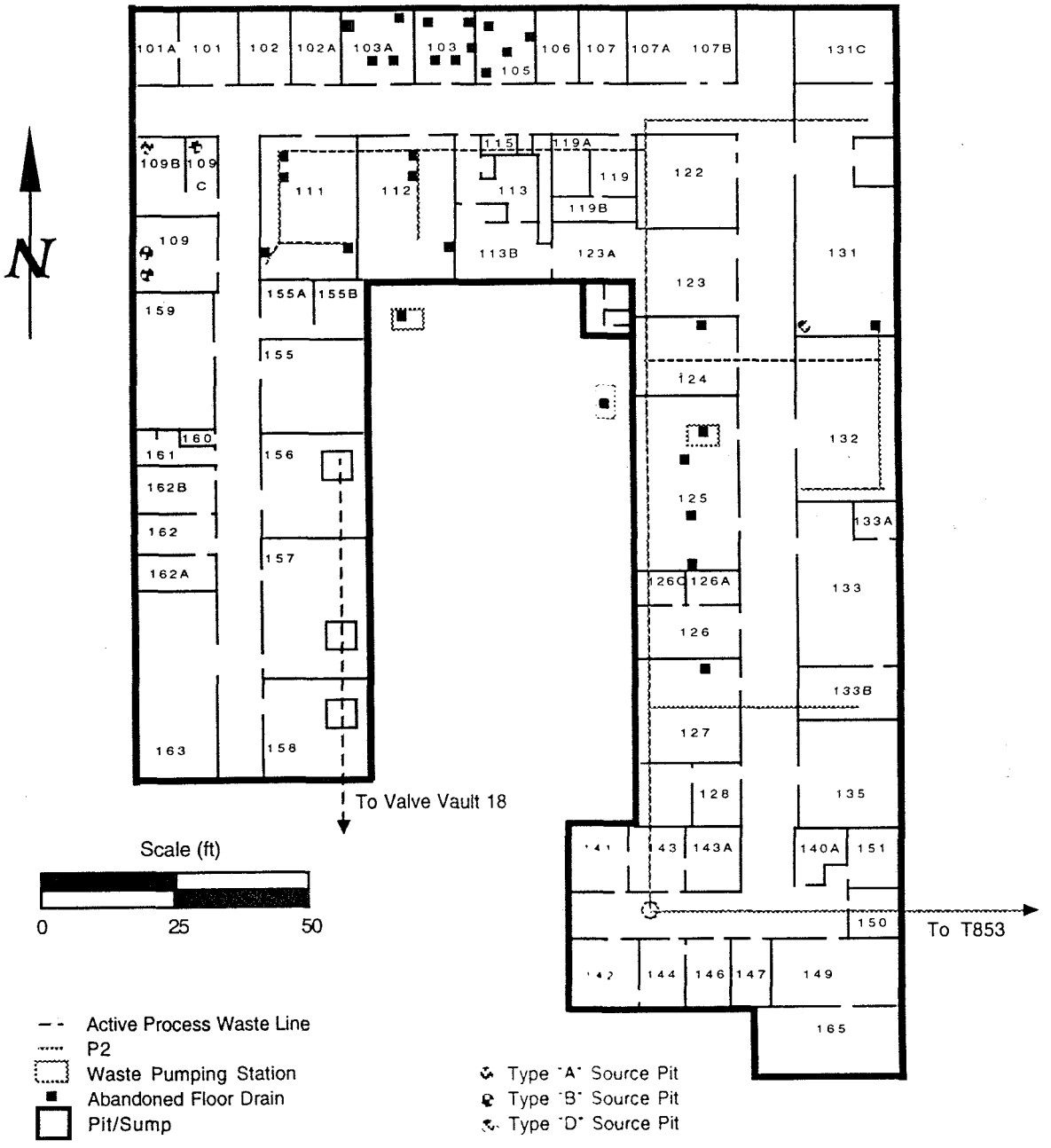

Figure 1.2 Locations of Abandoned Floor Drains and Pits in Building 123

installed in Rooms 156,157, and 158 during the 1972 west wing addition (see Figure 1.2).

Dimensions of the sumps are described below:

1. Room 156: 4' x 4' x 4'-2" deep
2. Room 157: 4' x 6' x 5' deep
3. Room 158: 4' x 4' x 5'-3" deep

Process waste exits the building from the sump in Room 158 through underground pipe P-1 to Valve Vault 18. The floor of all three sumps is 4" thick and the walls are 8" reinforced concrete. The sumps were coated with epoxy paint in approximately 1992.

1.2.1.4 Process Waste Pump Sumps

Three concrete sumps were installed in 1974 to house process waste pumps as part of the overhead process waste system. Two sumps were installed in the Building 123 courtyard and one sumps was installed in Room 124. Dimensions of the sumps are described below:

1. Waste Pumping Station P-5 (outside Room 125): approximately 4' x 3' x 2' deep
2. Waste Pumping Station P-6 (outside Room 112): approximately 4' x 3' x 2' deep
3. Waste Pumping Station P-1 (Room 124): 1'-11" x 1'-8" x 11" deep.

The floor of the sumps is 6" thick and the walls are 4" reinforced concrete. Each of the sumps are overlain by a quarter-inch-thick steel cover.

1.2.2 Building Operating History

Analytical laboratory, dosimetry and instrument calibration activities have been conducted in Building 123 since construction in 1953. Building 123 once housed medical research, generating approximately 95 percent of the building waste, until such operations were relocated to Building 122. The remaining five percent was generated through repair and calibration of radiation detection instruments and process of thermoluminescent dosimeters (TLDs) and film badges.

Analytical laboratory procedures involved the digestion of samples to purify and concentrate the radiological constituents. Sample preparation operations generated the bulk of the building waste. Combustibles, rubber gloves, and broken glass generated in the Radioactive Materials Management Areas (RMMAs) were placed in Satellite Accumulation Areas (SAAs) for eventual handling as low level waste (LLW). Various sample waste and rinse solutions were washed down the process drain for subsequent treatment in Building 774 (Building 374 after 1983). Various isotopes of plutonium (Pu), americium (Am), uranium (U), and curium (Cm) were handled in Building 123.

1.2.2.1 Source Pits

Source pits were used to store radioactive sources for dosimetry activities. Prior to 1966 a spill of cesium-contaminated liquid occurred in the vicinity of one of the Type A pits in Room 109C. The pits were abandoned and filled with concrete in approximately 1970, just prior to construction of the west wing. No further action was initiated to address consequences of the spill.

1.2.2.2 Floor Drains

Floor drains concentrated in the north central area of Building 123 (Figure 1.2) directed liquid process wastes to the process waste system. Most of the drains fed to process waste pumps

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which pumped the wastes into the overhead process waste lines and eventually to underground line P-2. Other drains fed directly to P-2. When P-2 was properly abandoned in 1982, the floor drains were filled to the slab surface with concrete.

1.2.2.3 Secondary Containment Sumps/Access Pits

The secondary containment sumps/access pits in Rooms 156, 157, and 158 served as the final junction of process wastes before the wastes exit the building through underground line P-1. The pits are currently active and will be utilized until RCRA closure of the overhead process waste lines and active underground line P-1 has been completed.

1.2.1.4 Process Waste Pump Sumps

Sumps were installed to house process waste pumps which directed liquid process waste to line P-2. The pumps were decommissioned in 1974 and removed from the sumps, which are currently empty.

2.0 CONTAMINANTS OF CONCERN (COCs)

During the past forty-four years, building operations (primarily analytical laboratory operations) may have contributed, in varying degrees, to the deposition of radioactive contamination within the building. The presence of radioactive contamination above the unrestricted release criteria defined in 4-ROI-03.02, *Radiological Requirements for Unrestricted Release* was confirmed in Rooms 105, 106, 109 and 123A (Table 2.0) during reconnaissance-level characterization surveys

Table 2.0 Summary of Radiological Survey Results above Unrestricted Release Limits *(in dpm/100 cm^2)*[a]

Room Number	Removable		Total	
	Alpha	Beta	Alpha	Beta/Gamma
105 Spike and Electroplating Prep.	<18	<205	<60	124,200
106 Office	<18	<205	<60	1,101
109 Office	<18	<205	<60	9,072
123A Hall to Exit Lockers	<18	<205	<60	7,920

[a] The Unrestricted Release Limit for beta/gamma emitters is 1000 dpm/cm^2 (removable).

of the building. The potential for undetected residual radioactivity in excess of the release criteria varies throughout the building. Interviews with site employees indicated that a cesium spill occurred in Room 109, and undocumented thorium research was performed in Room 105. Scoping surveys conducted in May through July 1997 revealed elevated levels of radioactivity in both areas. The isotopic composition of the detected radioactivity was confirmed in a series of in-situ gamma spectroscopic measurements performed in August 1997. Based on the history of the building, most of the contamination was determined to be Thorium-232. Locations in Room 109 were determined to contain Cesium-137.

The following contaminants have been identified for Building 123:

- Pu-242, Pu-239, U-232, U-234, U-238, Am-241 and Cm-244; radioactive tracers used during bioassay analysis.
- Cs-137, spill, Room 109, confirmed via in-situ gamma spectroscopy.
- Th-232 and associated decay products, research and development Room 105, confirmed via in-situ gamma spectroscopy.

The following isotopes mentioned in the Reconnaissance Level Characterization Report for Building 123 have been ruled out as potential contaminants of concern:

- H-3, in the form of HTO in concentrations up to 1000 dpm/ml used as a standard for liquid scintillation analysis. A review of the *Historical Release Report for the Rocky Flats Plant*, (DOE 1992) and interviews with past building occupants failed to identify spills or releases involving tritium. If an undocumented spill had occurred, it is highly unlikely that residual tritium contamination would exceed the release criteria because the process of evaporation and relatively short half-life would limit the resulting contamination levels.
- H-3, in gaseous form is not expected to result in surface contamination.
- Ni-63, Sr-90, Ba-133, Gd-148 , Pb-210 and Cf-250 in the form of electroplated and sealed check sources. The integrity of electroplated and sealed sources are verified semi-annually in accordance with HSP 1-P21-HSP-18.04 *Control of Radioactive Sources* and are not expected to result in radioactivity contamination of the building.

3.0 DATA QUALITY OBJECTIVES

EPA has established a process to direct Superfund decision-making as the basis for developing DQOs. DQOs are designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application. The data must also facilitate appropriate remedial measures for mitigating risk. Data requirements to support this project were developed and are implemented in the project using criteria established in *Guidance for the Data Quality Objective Process*, QA/G-4 (EPA 1994).

The DQO process contains seven sequential steps which are rationalized below.

1. State the Problem

The problem is the uncertainty of the presence or absence of radioactive constituents in Building 123 concrete slab. The purpose of the SAP is to collect field data to identify and delineate the extent of any radioactive contamination to support unrestricted release of the building slab. Primary COCs are defined in Section 2.0.

2. Identify the Decision

The decision is to characterize the building slab and determine if all, none, or parts of the slab meet unrestricted release criteria defined in Step 3. All materials that do not meet the unrestricted release criteria, including concrete and associated rebar, conduit, and piping materials will be managed as radioactive waste.

3. Identify the Inputs to the Decision

The following information will be required to resolve the decision:

- Historical Information, including COCs defined in Section 2.0.
- Media Sampling (as outlined in Section 4.0)
- A radiological survey as defined in the *Close-out Radiological Survey Plan for the Building 123 Cluster* (RMRS, 1997b)

The sample frequency required to allow an unrestricted release relies heavily upon a judgmental sampling strategy, determined with respect to hand-held radiological survey results and process knowledge (see Section 4.1). Currently, no regulatory guidelines define release criteria for concrete material. Thus, direction will be derived from 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials,* which requires collection and analysis of one or more samples to represent background levels for a particular matrix and environment. A comparison is made of the background sample results with those of the remaining samples. Radiological Engineering personnel then evaluate the materials for disposal. If the remaining samples indicate no measurable increase in COCs, then the material may be released for unrestricted use under DOE Order 5400.5, *Radiation Protection of the Public and the Environment.* All statistical testing used to show that the waste is indistinguishable from background will be calculated based on sample results. Background sample location and frequency are discussed in Section 4.1.

COCs, analysis method names and method detection limits defined by the contract laboratory are indicated in Table 3.0.

Table 3.0 Analysis Methods, Method Detection Limits for Contaminants of Concern at Building 123.

Analyte	Method Name	Method Number	Method Detection Limit
U233	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
U234	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
U235	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
U238	Isotopics by Alpha Spectroscopy	Module RC01-B	1.0 pCi/g
Pu239	Isotopics by Alpha Spectroscopy	Module RC01-B	0.3 pCi/g
Pu240	Isotopics by Alpha Spectroscopy	Module RC01-B	0.3 pCi/g
Th228, Th230, Cs137	Isotopics by Gamma Spectroscopy	[a]	1.0 pCi/g

[a] To date, no method number has been designated for gamma spectroscopy.

4. Define the Study Boundaries

The methodology contained in this document applies only to the Building 123 slab. Coring activities will occur only after normal working hours (after 1730) as not to impede asbestos strip-out and other decommissioning activities. The work is to be completed before demolition of Building 123.

5. Develop a Decision Rule

Data collected during this project will be evaluated by Radiological Engineering in accordance with 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials.* Exceedances of recommended allowable release limits will be evaluated for possible removal of parts or all of the slab.

6. Specify Tolerable Limits on Decision Errors

Sample locations were assigned according to areas defined in Section 4.1 to provide a thorough radiological characterization. In addition, error rates for data collected during this study are incorporated into the detection limits for the analysis parameters. Acceptable levels of decision errors will be used as the basis for establishing the quantity and quality of data needed to support the proper disposition of the Building 123 slab. Upper Confidence Limits (UCLs) will be calculated based on sample results.

7. Optimize the Design

During coring activities, an attempt will be made to ensure that actual sampling locations will closely correspond to the locations indicated in Figure 4.1. In the unlikely event that material other than concrete is encountered during coring activities, the sample location will be moved to a point within a six-inch radius of the original location, and the waste material will be disposed as specified in Section 8.2.

Data will be analyzed and evaluated by Radiological Engineering with respect to 4-U50-REP-1006 *Radiological Characterization of Bulk or Volume Materials.* Evaluation of sample analyses may warrant a source removal action or collection of additional samples. If required, the data will also be the basis for corrective measure design.

4.0 SAMPLING ACTIVITIES

4.1 Sample Location and Frequency

The sampling event will focus on the Building 123 concrete slab. Any locations outside of the building (i.e., waste pumping station sumps in the Building 123 courtyard) will be sampled as part of the soil sampling effort after the building has been demolished.

Thirty-eight (38) locations will be sampled; field duplicates will be collected at two of the locations to effect a total of forty (40) samples (see Section 4.4). Locations were determined with respect to *affected* and *unaffected* areas. *Affected* areas have potential radioactive contamination (based on historical reviews) or known radioactive contamination (based on results summarized in Table 2.0). Such areas include locations where radioactive materials were used and stored, where records indicate spills, or other unusual occurrences that could have resulted in the spread of contamination. Areas immediately surrounding or adjacent to locations where radioactive materials were used, stored, or spilled are included in this classification due to the potential for inadvertent

spread of contamination. The investigation will focus on the following *affected* areas:

- immediately adjacent to locations of abandoned floor drains;
- locations of source pits; a sample will collected directly adjacent from the pit;
- within sumps/access pits; and
- areas of reported surface spills, including Room 109C;

All areas not classified as *affected* will be labeled *unaffected*. These areas are not expected to contain residual radioactivity, based on knowledge of site history, including room use and previous survey information. The following areas are considered to be *unaffected*:

- Rooms 101, 101A, 102, 102A, 107, 107A, 107B, 113, 113A, 113B, 115, 119, 119A, 119B, 122, 123, 123A, 126, 126A, 126C, 128, 131C, 132, 133, 133A, 133B, 135, 140A, 141, 142, 143, 143A, 144, 146, 147, 149, 150, 151, 155, 155A, 155B, 159, 160, 161, 162, 162A, 162B, 163, and 165; and
- All hallways.

The samples will be composed of concrete, with a diameter of one inch and cored to a depth of two inches. Two cores will be collected at each location to ensure that enough material is collected to properly analyze the samples for constituents defined in Section 4.6. Figure 4.1 indicates sample locations.

One background sample will be collected in Rooms 101A, 131C, and 135. The locations were selected based on the following process knowledge:

- the locations represent portions of the original slab;
- Rooms 101A, 131C, and 135 were used only as office areas since original construction of the building; and
- room-by-room radiological surveys indicated no radiological contamination above detection limits (see Section 2.0).

4.2 Sample Designation

The site standard sample numbering system will be implemented in this project. A simple, unique, alphanumeric location code will be assigned to each sample while in the field. The number will include the current year, building number, room number and sequential sample number (i.e. 97-B123-109C.1). Prior to sample collection, locations will be marked on the building slab with fluorescent spray paint. Sample numbers will be assigned to the project by the Rocky Flats Environmental Database System (RFEDS) Group. In preparation of the final report, a matrix will be developed to correlate the individual sample numbers to location codes.

4.3 Site Preparation

On December 11, 1997, all sample locations were marked with paint. On December 15 and 16,

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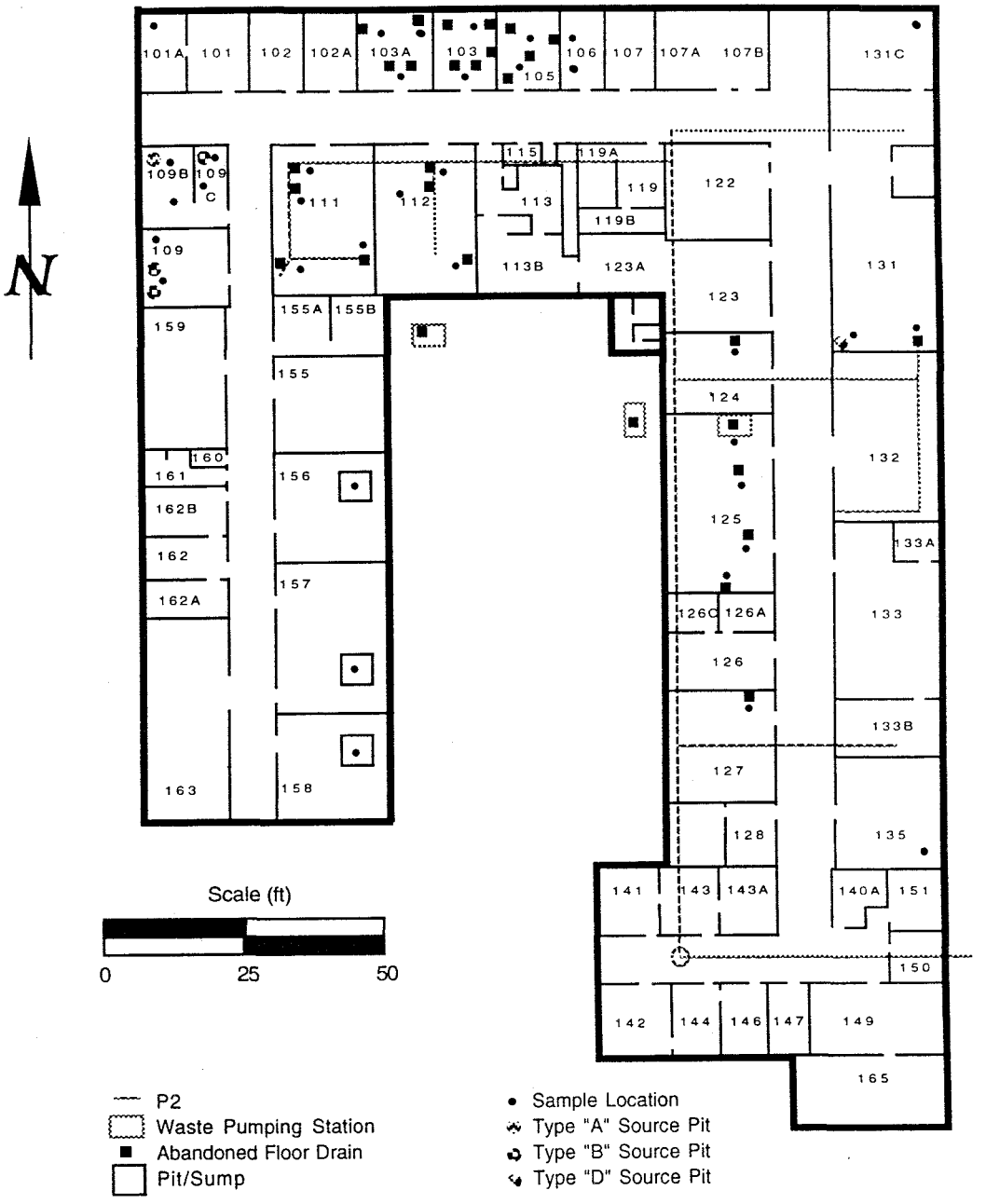

Figure 4.1 Concrete Sampling Locations

1997, a survey was conducted using a Ground-Penetrating Radar (GPR) which can indicate electrical conduit, piping, and rebar. The survey detected a layer of concrete reinforcement at approximately three to four inches below slab surface. The reinforcement is composed of rebar in an eight-inch to one-foot square grid pattern. In some cases the reinforcement was composed of a steel mesh. No evidence of rebar, electrical conduit or piping were detected at depths less than three inches.

An Activity Hazard Analysis (AHA) has been prepared to identify and address job-specific safety concerns specific to concrete sampling activities.

4.4 Sample Collection

Cores will be collected using the Hilty DD-100 Corer, a rotary-type, wet coring system. A portable, manually-pressurized container feeds water to the bit system, which includes a one-inch-diameter, diamond-impregnated core bit. The corer will be mounted on a portable stand which is held to the floor surface by vacuum pressure supplied by a vacuum pump. The slurry produced by coring will be contained by a slurry collection system used in conjunction with a wet/dry shop vacuum. Thus, little or no airborne emissions will be produced during coring activities. The instruction manual provided by the equipment manufacturer will be used to properly operate the drill. At each location, prior to coring activities, a 3-inch hole will be cut into a 3x3-foot sheet of visquine to be placed on the floor over the sample point. The visquine will aid in the cleanup of any waste produced by the core drill that is not collected by the wet/dry vacuum.

A minimum of 125g of material will be placed in a 4-ounce glass jar for gross alpha/gross beta screen; a minimum of 250g of material will be placed in an 8-ounce glass jar for the isotopics analyses. The sample jars will be labeled and handled according to OPS-FO.10 *Receiving, Labeling, and Handling Environmental Containers*.

An RCT will scan personnel, cores, and equipment with a portable Electra scintillation counter. The instrument will be calibrated and maintained in accordance with applicable instrumentation procedures listed in Section 6.0 of the *Rocky Flats Environmental Technology Site Radiological Operating Instructions* (DOE, 1997). Radioactive sources used for the purpose of calibration will be traceable to the National Institute of Standards and Technology (NIST).

Periodic checks of instrument response will be performed to assure that calibration and background have not changed. Following calibration, instrument response will be determined and acceptable range of response established. Instrument response tests will be performed and documented typically prior to beginning the daily measurements to assure continued acceptable operation. If the instrument response does not satisfy the established acceptable range, the instrument will be removed from service until the source of the deviation can be determined and resolved and acceptable response again demonstrated. If repair and/or recalibration is necessary, acceptable response ranges will be reestablished and documented.

Two field duplicates will be collected to represent at least five percent of the sample batch to provide adequate information on sample variability, as defined in *Guidance for Data Quality Objectives Process* (EPA 1994). Locations of duplicates will be determined in the field.

All reusable equipment will be decontaminated in accordance with 5-21000-OPS-FO.03, *General Equipment Decontamination, Section 5.3, Cleaning Procedures for Stainless Steel or Metal Sampling Equipment.* Health and safety requirements are specified in the *Building 123 Decommissioning Project Health and Safety Plan* (HASP, RMRS 1997e). Personal protective equipment (PPE) and air monitoring requirements, and hazard assessments not otherwise defined

in the Building 123 PAM are addressed in the Building 123 HASP. Air monitoring requirements and hazard assessments not otherwise defined in the Building 123 PAM are addressed in the Building 123 HASP.

4.5 Personal Protective Equipment (PPE)

A graded approached will be employed when donning PPE. Level C PPE will initially be worn during coring activities and may be upgraded or downgraded under the direction of the RCT. PPE requirements are also defined in the associated AHA.

4.6 Sample Handling and Analysis

Samples will be handled according to *Environmental Management Department Operating Procedures Volume/ Field Operations*, OPS-FO.13, *Containerization, Preserving, Handling, and Shipping of Soil and Water Samples, Volume 1*, and OPS-FO.10, *Receiving, Labeling, and Handling of Environmental Containers*. Samples will be hand-delivered to the Analytical Projects Office (APO), who will first submit the samples to the onsite laboratory for gross alpha/gross beta screens. The results will be reviewed by Radiological Engineering, who will determine if the samples can leave the site by comparing the results with the corresponding Minimum Detectable Activity (MDA) values. Radiological Engineering will evaluate the sample results for unrestricted release through a Property Release Evaluation (PRE). Upon approval, samples can then be submitted to an offsite, EPA-approved laboratory for analysis under a two-week result turnaround time. Samples will be analyzed for isotopic uranium and plutonium by alpha spectroscopy and for cesium and thorium by gamma spectroscopy.

5.0 DATA MANAGEMENT

A project field logbook will be created and maintained by the project manager or designee in accordance with 2-S47-ER-ADM-05.15 *Use of Field Logbooks and Forms*. The logbook will include time and date of all field activities, sketch maps of sample locations, or any additional information not specifically required by the SAP. The field logbook will also be used to document any unforseen event or necessary changes made to the SAP while in the field. The originator will legibly sign and date each completed original hard copy of data. A peer reviewer will examine each completed original hard copy of data. Any modifications will be indicated in ink, and initialed and dated by the reviewer. Logbooks will be controlled through document control.

Data for this project will be collected, entered, and stored in a secure, controlled, and retrievable environment in accordance with RM-06.04 *Administrative Record Document Identification and Control*. Results will be compiled into a sampling and analysis report. The expected percentage of characterization data validation required for the project is 25 percent. Location and analytical data will be entered into and stored in the Geographical Information System (GIS) files.

6.0 QUALITY ASSURANCE

Analytical data collected in support of this investigation will be evaluated using the guidance established by 2-G32-ER-ADM-08.02 *Evaluation of ERM Data for Usability in Final Reports.* This procedure establishes the guidelines for evaluating analytical data with respect to precision. accuracy, representativeness, completeness, and comparability (PARCC) parameters. For precision, the typical relative percent difference been samples and duplicates is less than or equal to 40% for solid media such as concrete or soil. Duplicates comprise at least 5% of the total sample batch. Accuracy is the responsibility of the laboratory. Comparability will be evaluated by comparing historical data with data collected during this event and will be followed in accordance to EPA regulations and Waste Acceptance Criteria, through which data will be

validated. Completeness (90% of valid data) will be evaluated by comparing the SAP to the actual sampling episode.

7.0 SCHEDULE

Sample collection and analyses will be conducted before building demolition.

8.0 ADDITIONAL ACTIVITIES

8.1 Abandonment of Coreholes

The Building 123 slab is expected to remain in place following completion of demolition activities. All coreholes will be filled with a plug of non-shrinking bentonite slurry.

8.2 Slab Remediation

Remediation options are defined in Section 3.0 and in the *Close-Out Radiological Survey Plan for the Building 123 Cluster* (RMRS 1997b)

8.3 Disposition of Waste

Coring activities will generate approximately twenty gallons of slurry waste which may contain a combination of radioactive, hazardous and mixed wastes. Wastes consisting of asbestos-containing floor tiles, plastic, tools, PPE, and other materials associated with coring activities will also be a source of waste. Contaminated waste will be characterized and handled by a qualified waste generator who will support decontamination specialists and radiation control technicians to identify and segregate hazardous or low level waste. Drums or boxes will be provided by the Waste Disposal group. Waste packaging technicians will package and label the waste and arrange for radioactive waste to be certified. The Project Waste Coordinator will work with the certification personnel and prepare all required documentation. Liquid waste generated during decontamination of sampling and associated equipment will be flushed down an accessible process waste drain or collected in drums and shipped to Building 374 for processing. Solid waste will be managed by the Waste Disposal group and moved to a temporary staging area immediately adjacent to the site to be placed in rolloff containers until proper disposition is determined.

9.0 REFERENCES

DOE, 1997 *Rocky Flats Environmental Technology Site Radiological Operating Instructions* , March.

DOE 1996, *Rocky Flats Cleanup Agreement, Final*, July.

DOE 1992, *Historical Release Report for the Rocky Flats Plant.*

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

EPA 1994, *Guidance for Data Quality Objectives Process*, EPA QA/G-4, September.

Gilbert 1987 *Statistical Methods for Environmental Pollution Monitoring.*

RMRS 1997a, *Proposed Action Memorandum for the Decommissioning of Building 123*, May.

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RMRS 1997b, *Close-out Radiological Survey Plan for the Building 123 Cluster* , November.

RMRS 1997c, *RMRS Quality Assurance Program Description (QAPD).*

RMRS 1997d, *Reconnaissance Level Characterization Report for Building 123*, October.

RMRS 1997e, *Building 123 Decommissioning Project Health and Safety Plan*, June.

Rocky Mountain
Remediation Services, L.L.C.
. . . protecting the environment

INDEPENDENT ASSESSMENT

ASSESSMENT REPORT

Independent Assessment No. 98-0131-RMRS

Building 123 Decontamination and Decommissioning Waste Management Process

Distribution

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cc:
QAEC Records
RMRS Records

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1. EXECUTIVE SUMMARY

This report provides the results of an independent assessment of the waste management process for Building 123 Decontamination and Decommissioning (D&D) activities. The assessment team evaluated both programmatic and functional elements of the project's waste management operations. Programmatic elements were assessed for effective implementation of quality requirements. Functional elements were evaluated for compliance to RFETS waste management directives. The fieldwork for the assessment was conducted between March 25, 1998 and April 8, 1998.

The primary programmatic areas reviewed include:
- Waste Management Planning/Characterization
- Document Control

The primary functional areas reviewed are as follows:
- Waste Inventory/Tracking
- Waste Packaging
- Waste Nonconformances
- Waste Documentation

In summary, the assessment team found that quality assurance requirements were not fully implemented for Building 123 D&D waste management operations.

One Strength, six Deficiencies and two Observations, which were documented during the assessment, are briefly described below. Corrective Action Process (CAP) forms have been initiated for all deficiencies noted below. For a complete description of each condition, refer to the body of the report.

Strengths:

The RMRS staff and Project Manager for Building 123 D&D Operations are dedicated to the success of Building 123 D&D operations and were fully cooperative during the course of the assessment.

Deficiencies:

Deficiency No. 1 - CAP No. 98-000759

The quality of the data generated from Building 123 sampling operations conducted without Sampling and Analysis Plans and associated Data Quality Objectives is indeterminate. A SAP was not used for some Building 123 D&D characterization sampling operations as required by 40 CFR 300.415 (b)(4)(ii); RFCA, Part 4, and Appendix 3, section 3.2; and as prescribed by DOE Decommissioning Handbook, Section 7.

Deficiency No. 2 - CAP No. 98-000758

The Reconnaissance Level Characterization Plan was not reviewed and approved for implementation before the specific work commenced, nor is objective evidence available regarding the review and approval of the Reconnaissance Level Characterization Report (RLCR). The information supplied in the RLCR was used to identify hazards and to determine worker protection, as well as the types and quantities of waste generated from Building 123 D&D activities.

Deficiency No. 3 - CAP No. 98-000760

The assessment team found that six waste crates were generated during Building 123 D&D operations without 100% in-process waste inspection as required.

Deficiency No. 4 - CAP No. 98-000773

The waste description for Waste Generator Instruction (WGI) GI9701230284 does not correlate to the waste description for the selected Item Description Code (IDC) as stated in Solid Radioactive Waste Packaging procedure WO-1100. Note: This CAP was issued to the RMRS Waste Management organization.

Deficiency No. 5 - CAP No. 98-000757

The Building 123 D&D documents reviewed during the assessment, which prescribe work and/or specify quality requirements, are not controlled in accordance with applicable RMRS document control procedures.

Deficiency No. 6 - CAP No. 98-000774

The EG&G Rocky Flats Plant Toxic Substance Control Act (TSCA) Management Plan, 1-10000-EWQA, and the Asbestos Waste Management procedure, 1-10000-TRM-WP-2401, are out of date. These documents no longer provide adequate instruction nor applicable requirements for the generation, handling, and storage of PCB and asbestos-contaminated waste at RFETS. Note: This CAP was issued to the RMRS Waste Management organization.

Observations:

Observation No. 1

It appears that waste from Building 123 D&D operations was characterized as low-level radioactive waste based upon a cost/benefit determination rather than analytical methods or process knowledge, as required by DOE Order 5820.2A and Nevada Test Site Waste Acceptance Criteria (NTSWAC).

Observation No. 1

The Building 123 D&D Waste Management Plan and other waste planning and characterization documents were not reviewed by the appropriate waste program personnel.

2. PURPOSE

2.1 Subject

Building 123 D&D Waste Management Process

2.2 Objective

The assessment team evaluated both programmatic and functional elements of Building 123 D&D waste management operations. Programmatic elements were assessed for effective implementation of quality requirements. Functional elements were evaluated for compliance to RFETS waste management directives.

2.3 Scope

The scope of the assessment was limited to those areas of the Building 123 D&D waste management process that are the direct responsibility of RMRS, L.L.C., and its subcontractors. This assessment was requested by the RMRS Vice President of Operations and was performed in accordance with RMRS procedure 10.1, Independent Assessments.

The primary programmatic areas reviewed include:

- Waste Management Planning/Characterization
- Document Control

The primary functional areas reviewed are as follows:

- Waste Inventory/Tracking
- Waste Packaging
- Waste Nonconformances
- Waste Documentation

3. CONDUCT OF THE ASSESSMENT

3.1 Assessment Schedule

Entrance Meeting:	March 25, 1998
Start of Fieldwork:	March 25, 1998
End of Fieldwork:	April 7, 1998
Exit Meeting:	April 15, 1998

3.2 Previous Assessment Activities in Subject Area

Compliance Review Report No. 98-004-WC&O was reviewed during the course of this assessment. The Compliance Review was conducted by Horne Engineering Services from January 28 through February 7, 1998. The report identified several discrepant conditions with regard to Building 123 waste generating activities. Waste Quality Action Reports were issued to Building 123 Construction Management and the RMRS Customer Service Organization. Deficiencies were identified for marking, storage, and handling requirements for asbestos contaminated waste; waste segregation; hold points for waste treatment; and waste generator training.

A deficient condition regarding obsolete requirements and procedures has been identified as a result of the review of the referenced Compliance Review Report. CAP No. 98-000774 (see Deficiency No. 6) was issued to the RMRS Waste Management organization for failure to provide current and adequate instruction and applicable requirements for the generation, handling, and storage of PCB and asbestos-contaminated waste at RFETS. This CAP effectively closes Waste Quality Action Report Nos. 98-0001 and 98-0004. For more information regarding Deficiency No. 6 and CAP No. 98-000774, refer to section 4.6 of this report.

3.3 Independent Verification of Previously Identified Deficiencies

No deficiencies were verified complete by this assessment. Further, no deficiencies were reopened by this assessment.

3.4 Assessment Methodology/Performance Criteria

The following methods were used during the performance of this assessment:

- Personnel Interviews
- Document and Record Reviews
- Observation

The following performance criteria were used to determine compliance and effectiveness:

- 10 CFR 830.120, *Quality Assurance*
- DOE Order 5700 6.C, *Quality Assurance*
- ANSI/ASQC E4-1994, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*
- ASME-NQA-1-1994, *Quality Assurance Requirements for Nuclear Facility Application*
- DOE/EM-0142P, *US Department of Energy Decommissioning Handbook*, March 1994
- NTSWAC, August 1997, *Nevada Test Site Waste Acceptance Criteria*
- *Final Rocky Flats Clean-Up Agreement*, July 19, 1996
- 94-RWP/EWQA-0014, *Low Level Waste Management Plan*
- RMRS Quality Assurance Program Description

Note: All applicable quality assurance and regulatory requirements are relevant and appropriate for use as performance criteria for this assessment. Many of the above cited documents reference other quality assurance and regulatory standards from which specific requirements are established.

4. RESULTS

4.1 Deficiency No. 1 - CAP No. 98-000759

The quality of the data generated from Building 123 sampling operations conducted without Sampling and Analysis Plans and associated Data Quality Objectives is indeterminate. A SAP was not used for some Building 123 D&D reconnaissance level characterization sampling operations as required by 40 CFR 300.415 (b)(4)(ii); RFCA, Part 4 and Appendix 3, section 3.2; and as prescribed by DOE Decommissioning Handbook, Section 7.

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Requirement(s)

SAPs [Sampling and Analysis Plans] will be required in support of pre-remedial characterization, waste volume calculations, waste characterization, verification of cleanup, and design data needs. Data quality objectives (DQOs) will be developed for all sampling activities. Sampling plans and related DQOs will be focused on collecting data to meet a specific need (i.e., to address a specific decision). Decision making needs will be linked directly to data collection.
Final RFCA: IGD, Appendix 3, 3.2

Work shall be performed according to approved planning and technical documents and according to the prescribed sequence defined during planning when appropriate and stated....All work involving the generation, acquisition, and use of environmental data shall be planned and documented. The type and quality of environmental data needed for their intended use shall be identified and documented using a systematic planning process.
ANSI/ASQC-E4, 2.8.1

Discussion

Reconnaissance characterization is required per the Rocky Flats Cleanup Agreement to determine the type and tractability of radiation and hazardous substances contamination, and physical hazards in buildings selected for D&D. Characterization data is generated through historical document reviews; interviews of RFETS employees whom had first-hand knowledge of facility operations and building construction and maintenance devices; physical inspections; and sampling and analysis of areas and items which are potentially radiologically or hazardous substance contaminated.

The data is used to decide what type of safety systems and personal protective equipment are required for D&D workers, and to determine the type and quantity of waste that will be generated. Characterization data is also used to confirm the inventory of radioactive materials at RFETS, and to identify which items or structures require further characterization.

All sampling and analysis conducted to confirm and characterize radiological and hazardous substance contamination must be performed in accordance with a Sampling and Analysis Plan (SAP) that details the Data Quality Objectives (DQOs) for the analytes. DQOs ensure that decision making needs are linked directly to data collection. According to the RFCA, the purposes of the SAP include:

- to document the decisions/uses for which data are needed, and the decision process used to determine the specific sampling approach;
- to guide the field sampling crew in exactly what samples are to be collected, where and how they are to be collected, and what criteria trigger collection of additional or fewer samples;
- the analytical methods to be used, and the specific requirements of sample collection and handling for those methods.

Samples were collected in Building 123 from April to June 1997 to determine the presence of asbestos, lead, and beryllium contamination. Smears for hazardous chemical contamination (perchloric acid) and radiological surveys were conducted within the same time frame. All samples and initial radiological surveys, with the exception of asbestos, were collected without an approved SAP.

A Reconnaissance Level Characterization Plan for Building 123 (the equivalent of a SAP) was published in September, 1997, six months after sampling in Building 123 commenced. The purpose of the Characterization Plan is stated as:

"...is to outline the data requirements and methodology for Reconnaissance Level Characterization of Building 123."

The Plan further states:

"There are three aspects of the data life cycle that apply to the characterization process: Planning, Implementation, and Assessment. To produce a usable document (i.e., Reconnaissance Level Characterization Report) each of the three must be applied in sequence."

"The additional sampling/survey instructions would be developed into a Reconnaissance Level Characterization Plan (RLCP). The reconnaissance characterization information obtained by completing the RLCP feeds into the following documents: Reconnaissance Level Characterization Report (RLCR), Waste Management Plan, the Decommissioning Waste Stream and Residue Identification and Characterization Report, the project HASP, and the project's Final Survey Plan."

The sampling and analysis data derived from operations conducted in accordance with the Reconnaissance Level Characterization Plan was to provide a baseline of data from which decisions regarding worker protection levels were made. In addition, data based upon and derived from these documents were to be used to determine waste types, volume, and subsequent disposal options. Dates of publication are provided in the following table to indicate the actual sequence of documentation.

Required Sequence	Document	Actual Sequence/ Publication Date
1st	*Reconnaissance Level Characterization Plan	3rd September 1997
2nd	*Reconnaissance Level Characterization Report	2nd August, 1997
3rd or subsequent	Health and Safety Plan	1st June, 1997
3rd or subsequent	Waste Management Plan	1st June, 1997

*Neither file copies of the Plan nor the Report contained approval signatures.

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For low-level radioactive waste destined for NTS, the Nevada Test Site Waste Acceptance Criteria (NTSWAC) requires that waste characterization methods and procedures shall ensure that the physical, chemical, and radiological characteristics of the waste are recorded and known during all stages of the waste management process. Further, the NTSWAC requires that when sampling and analysis is used for waste characterization, SAPs be referenced in Waste Profiles or characterization packages. The SAPS will be reviewed as necessary to ensure that they support the associated analytical data through appropriate sampling approaches, sample collection, sample handling, quality control, and documentation. The NTSWAC requires that SAPs contain DQOs.

Sampling and Analysis planning is required by the Rocky Flats Cleanup Agreement and by the NTSWAC. A review of Building 123 waste management and characterization planning documents revealed that the Reconnaissance Level Characterization for Building 123 D&D was performed and results were published without an approved plan. The quality of the data collected without an equivalent Sampling and Analysis Plan is indeterminate based upon the absence of sampling methodology, strategy, design, and of the lack of Data Quality Objectives.

Recommendation

Evaluate and verify data derived from sampling operations and radiological surveys conducted without approved SAPs. Ensure future D&D characterization efforts are performed in the prescribed sequence to approved sampling and analysis plans with adequate data quality objectives.

4.2 Deficiency No. 2 - CAP No. 98-000758

The Reconnaissance Level Characterization Plan was not reviewed and approved for implementation before the specific work commenced, nor is objective evidence available regarding the review and approval of the Reconnaissance Level Characterization Report (RLCR). The information supplied in the RLCR was used to identify hazards and to determine worker protection, as well as the types and quantities of waste generated from Building 123 D&D activities.

Requirement(s)

Environmental data operations shall be implemented according to the approved applicable planning documents and by qualified personnel. Deviations shall be documented and reported to management.
ANSI/ASQC-E4, 3.3.1

Work-related instructions, procedures, and other forms of direction should be developed, verified, validated, and approved by technically competent personnel.
DOE Order 5700 6.C, B. 1., a (5)

Discussion

The Reconnaissance Level Characterization Report (RF/RMRS-97-021) and the Reconnaissance Level Characterization Plan (RF/RMRS-97-045) submitted to the CERCLA Administrative Record and RMRS Records Management, respectively, did not have required approval signatures. These documents implemented requirements, provided planning, and furnished information and/or instruction.

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An approval signature signifies that the appropriate reviews have occurred and that the information provided within is accurate and technically adequate for the stated purpose of the document.

Work in Building 123, in this case characterization and sampling operations, was performed without an approved plan or instructions. Further, it appears that data collected from characterization and sampling operations were reported in an unapproved document (Reconnaissance Level Characterization Report). The information in the Report was used to identify the chemical and radiological hazards from which to determine the level of worker protection required, and to estimate the type and quantity of waste that would be generated as a result of Building 123 D&D activities.

Recommendation

Ensure that all D&D project documents receive the appropriate level of review for technical adequacy, accuracy, and completeness as signified by review and approval signatures.

4.3 **Deficiency No. 3 - CAP No. 98-000760**

The assessment team found that six waste crates were generated during Building 123 D&D operations without 100% in-process waste inspection as required.

Requirement(s)

Short term subcontractors may package wastes without the applicable waste handling courses if—and only if—a Construction Coordinator trained in waste handling AND a qualified waste inspector are present for the entire packaging operation.
Low-Level Waste Management Plan, 4.9

Discussion

A review of waste generated during Building 123 D&D activities revealed that six crates of waste were generated without required in-process waste inspection. Waste deposited in crates PO-3266, PO-3264, PO-3263, PO-3262, PO-3259, and PO-3257 was generated on 3/16/98 by subcontractors whom were not waste-generator qualified. A qualified waste inspector was not present during the generation and packaging of the referenced waste crates.

Waste Non-Conformance reports (NCRs) will be initiated and applied to the crates to ensure proper identification and segregation.

Recommendation

Disposition the referenced NCRs through visual examination of waste package contents or through Real-Time Radiography. Submit NCR dispositions to the Waste Certification and Oversight for approval. Ensure all waste generators are trained and qualified and/or the presence of a qualified waste inspector during future D&D operations.

4.4 Deficiency No. 4 - CAP No. 98-000773

The waste description for Waste Generator Instruction (WGI) GI9701230284 does not correlate to the waste description for the selected Item Description Code (IDC) as stated in Solid Radioactive Waste Packaging procedure WO-1100. Note: This CAP was issued to the RMRS Waste Management organization.

Requirement(s)

Controls shall be established to ensure the traceability of waste from the point of generation through shipment is maintained. Waste characterization documentation shall be traceable to the exact package in which the waste was placed. Controls shall be established to ensure that only correct and accepted items (e.g., waste containers and liners, cement, solidifiers) are used in the waste certification process. Identification shall be maintained on items or documents traceable to the items.
NTSWAC, 5.8

Discussion

A review of WGIs generated for Building 123 D&D operations revealed a discrepancy between the waste description on WGI No. GI9701230284 and the IDC (0438) designated for use on the WGI. IDCs are used to identify the physical form (matrix) of the waste, from which decisions are made regarding waste segregation to determine liner requirements for waste packaging. Further, IDCs are used to determine which matrix to calibrate to when assessing nuclear material content during NDA.

The IDC 0438 in Solid Radioactive Waste Packaging Procedure WO-1100 is described as: "Insulation: All insulation, fire blankets and sheet-rock to be discarded." The waste description on WGI No. GI9701230284 reads: "Painted and non-painted light metal cabinets and countertops lined with non-friable asbestos and mastic containing asbestos."

Upon discussion with the Customer Service Organization, the designation of IDCs may—in practice—create obstacles to assigning accurate descriptions of the waste forms generated during D&D. Some unusual waste types generated during D&D activities may not be represented in the IDC tables supplied in Appendix 1 of WO-1100. Subsequently, Customer Service Representatives may be designating "best case" IDCs on D&D project WGIs, which do not accurately reflect the waste types.

The Nevada Test Site requires accurate waste characterization, identification, and process control throughout the waste management process. At RFETS, compliance with NTSWAC is demonstrated through adherence to the Low-Level Waste Management Plan and associated low-level waste packaging requirements and procedures. The Low-Level Waste Management Plan must accommodate low-level radioactive waste types that may not otherwise be addressed in packaging requirements documents and procedures.

Recommendation

Revise the Low-Level Waste Management Plan, lower-tier requirements documents, and procedures to include instruction on the identification/characterization of (unusual) D&D wastes. Revise procedure 1-PRO-079-WGI-001, Waste Characterization, Generation and Packaging, to include instructions on the review of Waste Profiles prior to generating WGIs; and instructions on communication with the RFETS Waste Certification Official regarding identification and ultimate disposal of unusual waste types or waste streams prior to waste generating activities.

4.5 Deficiency No. 5 - CAP No. 98-000757

The Building 123 D&D documents reviewed during the assessment, which prescribe work and/or specify quality requirements, are not controlled in accordance with applicable RMRS document control procedures.

Requirement(s)

The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel.
NQA-1-1994, 6

This document applies to RMRS personnel involved in the preparation/use of RMRS documents for quality affecting activities or processes.
QA-05.01, DC-06.01

Discussion

A review of ten Building 123 D&D project documents revealed that several documents which prescribe activities, and their subsequent revisions, were not submitted to RMRS Document Control for appropriate distribution and revision control. Document history files, which include review and comment sheets, were not submitted to RMRS Document Control for most of the Building 123 project documents reviewed.

The following Building 123 project documents are out of compliance with RMRS Document Control procedures QA-05.01 and DC-06.01:

Number	Name	Specifies QA Requirement?	Prescribes Activities?	Deficient Condition
RF/RMRS-97-0021	Waste Management Plan Building 123	yes	yes	Not submitted to RMRS DC No controlled distribution No history file
RF/RMRS-97-029	Waste Management Plan for Building 123, Rev. 1	yes	yes	Not submitted to RMRS DC No controlled distribution No history file
RF/RMRS-97-045	Reconnaissance Level Characterization Plan for Building 123	yes	yes	Not submitted to RMRS DC No controlled distribution No history file
RF/RMRS-97-082	Project Execution Plan Building 123 Decommissioning Project	yes	yes	Not submitted to RMRS DC No controlled distribution No history file
RF/RMRS-97-052	Closure Plan for Building 123 Components of RCRA Unit 40	yes	yes	Not submitted to RMRS DC No controlled distribution No history file
RF/RMRS-97-110	Close-out Radiological Survey Plan for the 123 Cluster - Revisions 0 through 3	yes	yes	Not submitted to RMRS DC No controlled distribution No history file

Uncontrolled document numbers were obtained from RMRS Document Control by document originators; however, the 'UN' designation was not applied to the documents. The use of uncontrolled document numbers does not satisfy document control requirements for the review, approval, distribution, revision, and maintenance of documents that specify quality requirements or prescribe activities.

Recommendation

Submit all Building 123 project documents that specify quality requirements or prescribe activities to RMRS Document Control in accordance with QA-05.01, Preparation and Control of RMRS Documents. Include document history files (review and comment sheets) and all subsequent revisions.

4.6 *Deficiency No. 6 - CAP No. 98-000774*

The EG&G Rocky Flats Plant Toxic Substance Control Act (TSCA) Management Plan, 1-10000-EWQA, and the Asbestos Waste Management procedure, 1-10000-TRM-WP-2401, are out of date. These documents no longer provide adequate instruction nor applicable requirements for the generation, handling, and storage of PCB and asbestos-contaminated waste at RFETS. Note: This CAP was issued to the RMRS Waste Management organization.

Requirement(s)

Items and processes that do not meet established requirements, goals, or do not result in the anticipated quality should be promptly identified, documented, analyzed, resolved, and followed up.
DOE Order 5700 6.C A. 3. e.

Timeliness guidelines should be implemented for distribution of new or revised controlled documents.
DOE Order 5700.6C, A. 4. a. (3)

Discussion

Both revisions of the Waste Management Plan for Building 123 state that PCB and asbestos wastes will be packaged in accordance with 1-10000-EWQA, TSCA Management Plan and with 1-10000-TRM-WP-2401, Asbestos Waste Management, respectively. The referenced documents were effective February, 1993 (TSCA Management Plan) and July, 1992 (Asbestos Waste Management). These documents contain references to organizations which no longer exist (Waste Quality Engineering, Waste Guidance, etc.), forms which are no longer in use (Waste Processing Request Form #RF-46367) and superseded policies and/or canceled procedures.

Recommendation

Review and revise, as applicable, documents and procedures relating to the management, generation, handling, packaging, labeling, storage, and disposal of PCB and asbestos-contaminated wastes.

4.7 Observation No. 1

It appears that waste from Building 123 D&D operations was characterized as low-level radioactive waste based upon a cost/benefit determination rather than analytical methods or process knowledge, as required by DOE Order 5820.2A and Nevada Test Site Waste Acceptance Criteria (NTSWAC).

Requirement(s)

Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal.... Each DOE-low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal.
DOE Order 5820.2A, Management of Low-Level Waste

Attention will be given to waste minimization, in this case, the effort will be to remove the areas of radiation contamination, while segregating the contamination from the bulk (uncontaminated) material.
Final RFCA, Attachment 9, Waste Management

Waste characterization may be conducted using process knowledge, sampling and analysis, or a combination of both.
NTSWAC 4.0

Discussion

A Cost Benefit Analysis was performed and results were report February 11, 1998 for Building 123 Decommissioning Interior Wall Waste Determination. The report was forwarded via memorandum from RMRS Building 123 project management to Kaiser-Hill Project Management on February 12, 1998.

The cost benefit analysis was performed "to determine the most beneficial disposal method of the Building 123 interior walls." The analysis "compared all costs and impacts to characterize, remove, package and dispose of the interior walls as either low level ACM waste and low level non-ACM waste or as uncontaminated asbestos and industrial waste." The analysis results "clearly demonstrate the most beneficial method of disposal is low level waste."

Waste characterization is based upon waste content. The basis for determining waste content is sampling and analysis of the material with application of known well-tested technology, or by sufficient process knowledge including, but not limited to: the generator's knowledge of the physical, chemical, and radiological properties of the waste; historical records, historic analytical data, system descriptions, plans, and drawings, manufacturing specifications, mass balance documentation, literature searches, living memory, and procedures.

Cost benefit analysis is not an approved method of waste characterization.

4.8 Observation No. 2

The Building 123 D&D Waste Management Plan and other waste planning and characterization documents were not reviewed by the appropriate waste program personnel.

Requirement(s)

Waste Management activities are subject to diverse requirements external to RFCA that are dependent upon the levels of radioactivity, the types of hazards and the management strategy employed. For that reason, the amount of waste anticipated from the activity must be evaluated so that onsite storage capacity, onsite or offsite treatment capability (as needed), and final offsite disposal options are identified. This evaluation is critical due to limited capacity for onsite storage, limited onsite and offsite treatment capabilities, restrictive waste acceptance criteria at currently licensed/permitted offsite disposal facilities, and the cost of waste management.
Final RFCA: IGD, Appendix 3, 2.6.1

Discussion

This observation is made as a "best management practice," and is intended to be used as an example for discussion and consideration rather than an identification of a deficient condition.

Neither the Waste Management Plan for Building 123, the Reconnaissance Level Characterization Plan, nor the Reconnaissance Level Characterization Report were reviewed by low-level waste program personnel. Low level waste program personnel may have contributed significant guidance to Building 123 project management regarding the volume of waste, the type of waste, and the waste disposal options for Building 123 D&D operations.

Had RMRS low-level waste management personnel been consulted during the D&D planning stages, NTS Waste Profiles for Asbestos-contaminated radioactive waste may have been initiated sooner, thereby ensuring that all disposal criteria were met prior to the generation of this waste type.

5. REPORT REVIEW AND APPROVAL

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Date

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Greg Ward, Assessment Team
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Date

Approved by: Juan M. Hernandez — 8 MAY 98
J. M. Hernandez, Manager
RMRS, Quality Assurance
Date

APPENDIX A

DOCUMENTS REVIEWED

RF/RMRS-97-0021, *Waste Management Plan Building 123*, June 1997

RF/RMRS-97-029, *Waste Management Plan for Building 123*, Revision 1, March, 1998

RF/RMRS-97-012, *Proposed Action Memorandum for the Decommissioning of Building 123*, Revision 4, August 21, 1997

RF/RMRS-97-045, *Reconnaissance Level Characterization Plan for Building 123*, September 1997

RF/RMRS-97-021, *Reconnaissance Level Characterization Report for Building 123*, August 1997

RF/RMRS-97-022, *Building 123 Decommissioning Project Health and Safety Plan*, Revision 1, February 5, 1998

RF/RMRS-97-082, *Project Execution Plan Building 123 Decommissioning Project*, Revision 4, September 11, 1997

RF/RMRS-97-052, *Closure Plan for Building 123 Components of RCRA Unit 40*, Revision 0, November, 1997

RF/RMRS-97-110, *Close-out Radiological Survey Plan for the 123 Cluster*, Revision 1, January 1998

1-10000-TRM-WP-2401, *Asbestos Waste Management*, July, 1992.

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APPENDIX B

ASSESSMENT PERSONNEL AND PERSONNEL CONTACTED

The following personnel conducted this assessment:

Lead Assessor:	Cynthia Dingman	Independent Assessment	RMRS Quality Assurance
Assessment Team:	Joe Anguiano	Quality Engineer	RMRS Quality Assurance
	Greg Ward	Quality Engineer	RMRS Quality Assurance

The following personnel provided significant contributions to the conduct of the assessment:

Name	Organization	Participation
Aguilar, Paul	RMRS Low Level Waste Projects	1,2,3
Arnold, Pat	RMRS Waste Management	2,3
Aycock, Mary	SEG, Building 123 Characterization	2,3
Bentsen, Ernie	RMRS Environmental Coordinator	1, 2,3
Brooks, Mark	RMRS QA	1, 2,3
Chandler, Skip	RMRS Safety and Health	2
Church, Alan	RMRS Waste Management	2,3
Dieter, Thomas	RMRS Project Management	3
Geisinger, Greg	Horne Engineering, WCO	1,2
Guthrie, Vern	RMRS Project Management	1,2,3
Hopkins, Ted	RMRS Environmental Compliance	2,3
Hoyt, Dorthea	RMRS Engineering	1,2
Lobdell, Dean	RMRS Waste Management	2
Loewenberg, Terry	RMRS Low Level Waste Projects	1,2,3
Manzaneres, Kathy	RMRS Document Control	2
Massie, Jack	RMRS QA	1,2,3
McCafferty, Ruth	RMRS Safety and Health	2
Miller, John	RMRS Rad Engineering	2
Nelson, Mike	RMRS Construction Management	3
Prochazka, Mic	RMRS QA	2
Robbins, Jan	RMRS Administrative Record Coordinator	2
Salyers, Dan	RMRS Disposal Projects	2
Slueterbush, Mike	SEG, Asbestos Inspection	2
Smith, Craig	RMRS Customer Service Organization	2
Wheeler, Martin	RMRS Waste Management	2
Wolf, Kathy	RMRS Quality & Environmental Compliance	3

1 Entrance Meeting
2 Interview and/or evaluation contributor
3 Exit Meeting

D&D WSRIC Process Closure Summary
Process # 123-25

The Construction Management / D&D group has completed the Deactivation, Decommissioning, and Demolition of building 123 under Integrated Work Control Package (IWCP)# FB-0410, using the D&D WSRIC book to document the characterization of the waste generated during this activity. Characterization was based upon various project documents, including the Reconnaissance Level Characterization Report, Asbestos and Lead Characterization Report, Closure Plan for Building 123 Components of RCRA Unit 40, Proposed Action Memorandum for the Decommissioning of Building 123, Waste Management Plan, analytical sampling, process knowledge, and interviews with building residents.

The purpose of this document is to provide a summary of the waste that was generated from these activities. The D&D activities included the removal of all equipment that was abandoned by building personnel in July 1997. Most salvageable items were sent to PU&D and not captured by this summary. Miscellaneous items not fully surveyable from RMMA rooms were disposed of as LLW. Excess chemicals were collected and disposed of by Radian under a contract to Kaiser Hill. Buildings 113, 114, and 123S were included in the scope of this D&D work package.

The stripout started in August of 1997, and demolition started in April 1998. The last waste to be shipped from the site was May 28, 1998. Waste types and volumes generated from the project include:

Radioactive Waste	**665.54 cubic yards**
Straight Low Level Waste (LLW) (9) 55 gal drums, (64) full crates, (4) half crates	275.71 cubic yards
Low Level Asbestos Waste (LLW) (1) 55 gal drum, (92) full crates	381.15 cubic yards
Low Level Mixed Waste (LLM) (1) 5 gal drum, (2) 10 gal drums, (1) 55 gal drum, (2) full crates	8.68 cubic yards

Non-Radioactive Waste **4,733.58 cubic yards**

Hazardous Waste (HAZ) 3.25 cubic yards
(5) small bags, (22) boxes

Non-Rad, Non-Haz Friable Asbestos (NON) 184.23 cubic yards
(44) full crates, (1) half crate

Non-Rad, Non-Haz Special Waste (ballasts) (NON) 1.1 cubic yards
(4) 55 gal drums

Industrial Sanitary Waste (Stripout) (NON) 360 cubic yards
(12) rolloffs

Industrial Sanitary Waste (Demolition) (NON) 4,095 cubic yards
(200) rolloffs

Special Sanitary Waste (Non-Friable Asbestos) (NON) 90 cubic yards
(3) rolloffs

Material to Recycle **490.5 cubic yards**

Recycle Metal (Stripout) 210 cubic yards
(6) rolloffs

Recycle Metal (Demolition) 280 cubic yards
(8) rolloffs

Other Recycle Material .5 cubic yards
1) box (Pb acid batteries), (1)10 gal drum (oil), (1) pallet (lead weights)

Number of containers shipped from Building 123

Rolloffs	229 Total - 0 Rad, 229 Non-Rad
Full Crates	202 Total - 158 Rad, 44 Non-Rad
Half Crates	5 Total - 4 Rad, 1 Non-Rad
55 gallon drums	15 Total - 11 Rad, 4 Non-Rad
Odd Size Containers	33 Total - 3 Rad, 30 Non-Rad

A summary of the wastes generated during D&D is listed below. It is arranged in D&D WSRIC process/output number sequence, which segregates waste types. These processes are as follows:

D&D-1 Non-Hazardous and Non-Radioactive (NON)
D&D-2 Hazardous and Non-Radioactive (HAZ)
D&D-3 Non-Hazardous and Radioactive (LLW)
D&D-4 Hazardous and Radioactive (LLM)

NON-Hazardous & Non-Radioactive Waste Outputs (NON)

D&D-1-1 Combustibles
No WGI required (1) 55 gallon bag
This output is characterized as non-hazardous by process knowledge, and consists of PPE generated during an attempt to strip paint from the south wall in room 111. It did not come in contact with hazardous material, and was disposed of in a rolloff going to USA landfill.

D&D-1-4 Scrap Metal
No WGI Required (14) rolloffs - 490 cu. yds. - 122.06 tons
Characterized by process knowledge as non-hazardous, recyclable material. Six rolloffs were sent to Gahagan Metal and Iron, and eight rolloffs were sent to Newell Recycling for salvage. This waste output included piping, conduit, stainless steel ducting, copper piping, ventilation ducting, metal wall studs, and other various metal items. The metal had been size reduced to ensure efficient use of space in the rolloff.

D&D-1-14 Fluorescent Light Bulbs - Non Hazardous
No WGI required (5) boxes
This output consists only of the four foot green tipped fluorescent light bulbs. These are characterized as non hazardous by RFETS guidance. They were disposed of in sanitary waste rolloff sent to USA landfill.

D&D-1-20 Non-Friable Asbestos
WGI #GI9701230342A (3) rolloffs or 70 cu. yds.
This waste was certified as being non-friable asbestos waste by the project state certified asbestos inspector. It consisted of doors with

asbestos cores, stainless steel countertops with asbestos mastic on the bottom, transite panels removed from above the windows on the outside of the building, and other assorted non-friable asbestos items. Two full and one partial 30 cubic yard rolloff was generated by AFIC the asbestos abatement contractor.

D&D-1-22 Friable Asbestos Waste Material
WGI #GI9801230471B (44) full crates & (1) half crate
Characterized as containing friable asbestos by AFIC the abatement contractor, and the RMRS project certified asbestos professional. This waste consisted of PPE, plastic containment sheeting, metal, wood, rags, vermiculite, cinder block, thermal system insulation (TSI) from non-rad areas, and other items that were in the asbestos containment area that could not be wiped clean of asbestos fibers.

D&D-1-31 Non-Leaking Light Ballasts (PCB)
WGI #GI9701230197B (3) 55 gallon drums
Characterized by process knowledge and visually inspected to ensure they were not labeled 'Non-PCB' ballasts and capacitors. These potential PCB ballasts were packaged from the stripout of lighting fixtures in all rooms of building 123 and 113.

D&D-1-31 Non-Leaking Light Ballasts (Non-PCB)
WGI #GI9701230187A (1) 55 gallon drum
Characterized by process knowledge and visually inspected to ensure they have 'Non-PCB' labeled on the ballast. These PCB free ballasts were packaged from the stripout of lighting fixtures in all rooms of building 123 and 113.

D&D-1-36 Misc. Organic Liquid
No WGI required (1) 10 gallon drum
This output consists of five bottles of Di-2-ethylhexyl Phosphoric Acid that was abandoned by the building. Analytical data (98A0090 and 97P2294) shows these wastes are non-hazardous and non-radioactive. They were packed into drum X01810 and sent to Unit 5001 PU&D.

D&D-1-45 Industrial Sanitary Waste (Non-Routine)
WGI # GI9701230199B (215) rolloffs

4,545 cubic yards **1757 tons**

This waste output includes all waste that was solid, non-radioactive, non-hazardous. During the stripout phase it consisted of items such as ceiling tiles, carpeting and fixtures from Non-RMMA rooms, surveyable items from RMMA rooms, Non-Friable asbestos items, and items on the outside of the building. There were (15) 30 cubic yard rolloffs of this non-structural waste. During the demolition phase it consisted of concrete, cinderblock, rebar, roofing material and other metal and wood building pieces. There were (200) 30 cubic yard rolloffs of this structural debris. All industrial sanitary waste was sent to USA landfill in Erie, Colorado.

Hazardous & Non-Radioactive Waste Outputs (HAZ)

D&D-2-4 Chrome Wire

No WGI required **(1) box**

This waste output was found in the building during the stripout, and consists of a roll of unused chrome wire. The manufacturer label states that chrome is a constituent of the metal.

D&D-2-6 Nicad Batteries

No WGI required **(1) box**

This output consists of dry cell nicads that were characterized by process knowledge. These batteries were removed from various pieces of equipment during the stripout of the building. .

D&D-2-10 Lead Acid Batteries

No WGI required **(1) box**

This output consists of various lead acid batteries found in emergency lighting throughout the building. They were sent to PU&D Unit 5001 as recycle material.

D&D-2-16 Incandescent Light Bulbs

No WGI required **(1) box**

This output consists of incandescent light bulbs removed from various fixtures that were stripped out of the building. These were characterized as hazardous by process knowledge.

D&D-2-17 Mercury Thermometers and Thermostat
No WGI required (1) box
This waste output consists of four thermometers found in various equipment in the building, and one thermostat from building 113. These were characterized as hazardous by process knowledge.

D&D-2-20 Lead Counterweights and Bricks
No WGI required (1) Pallet
This waste consisted of lead counterweights that were removed from laboratory hoods. These were connected to the front windows by a cable, and were enclosed in a metal runway. They were surveyed for free release and sent for recycle to PU&D Unit 5001. The lead bricks were given to Rad Eng for use in shielding a counter in T891R.

D&D-2-22 Fluorescent Light Bulbs
No WGI required (21) boxes
This output consists of light bulbs that are four and eight foot and "U" shaped, and do not have the green tips. They are characterized as hazardous by process knowledge.

D&D-2-31 Paint Chips
No WGI required (2) packages
One package of lead based paint chips was generated in room 109B. This characterization is supported by the building lead characterization report, which shows paint on the walls has lead at levels of 10-4000 PPM (total analysis).
A second package of paint chips was generated after the bldg. was demolished. These chips were collected from the slab where the restroom/lockerrooms and janitor closet were located in the north wing, rooms 113, 113A, 113B, 115, 119 and 119A. The lead characterization report shows levels of chromiun from 260-2,600 PPM and lead from 90-3,700 PPM (total analysis).

<u>Non-Hazardous & Radioactive Waste Outputs (LLW)</u>

D&D-3-3 Dry Combustibles
WGI #GI9701230299A (5) full crates

This waste consists of various combustible items, including PPE, wood, and other combustible material. Visual inspection and process knowledge verified that there were no hazardous constituents in this waste.

D&D-3-6 Moist Combustibles
WGI #GI9701230307A (3) 55 gallon drums
This waste output consists of combustibles such as PPE, kimwipes, and absorbent that are wetted. They were generated during the scabbling of paint from the south wall in room 111. Visual inspection and process knowledge verified that there were no hazardous constituents added to this waste.

D&D-3-9 Plastics
WGI #GI9701230300B (5) full crates & (1) 55 gallon drum
This waste output consists of various plastic type items that include plastic bags, hoses, containers, PPE, plastic containment sheeting, and other plastic type items. Visual inspection and process knowledge verified that there were no hazardous constituents added to this waste.

D&D-3-11 Light Metal
WGI #GI9701230400A (40) full crates
This output consists of metal counters, cabinet, piping, hoods, angle iron, and various metal items that could not surveyed for free release. It was packaged with output D&D-3-13, which consists of the same waste items with lead based paint on it.

D&D-3-13 Light Metal w/ Lead Paint-Non-RCRA
WGI #GI9701230400A (see output 3-11 above)
WGI #GI9801230619A (1) 55 gallon drum
This output consists of the same metal items as in output D&D-3-11, with the addition of lead based paint that is below RCRA TCLP levels on it. Items with painted surfaces in RMMA rooms were considered radioactive.

D&D-3-24 Insulation (Ceiling Tile)
WGI #GI9701230345A (1) full crate
This output consists of ceiling tiles generated in RMMA rooms. According to the Bldg. 123 Asbestos Characterization Report, these ceiling tiles do not contain any asbestos material.

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D&D-3-26 Asbestos Friable
WGI #GI9801230466B (4) full crates
This output consists of various friable asbestos items that were certified as being friable by the project state certified asbestos professional. This included vermiculite and foam glass with vermiculite on it from room 165, and drywall with mud that did not have lead based paint on it.

D&D-3-68 Mixed IDC's
No WGI required (6) full crates & (4) half crates
This waste was generated before Waste Generator Instructions were issued. The waste consists of metal, plastic, glass, and combustibles. Visual inspection and process knowledge verified that there were no hazardous constituents as part of this waste type.

D&D-3-69 Scabbled Concrete
WGI #GI9801230527B (2) 55 gallon drums
This waste consists of bags of concrete that was scabbled from the floor and wall to remove radioactive contamination. It was generated in rooms 105, 109, 123, 124 and 124A. This waste is characterized by process knowledge as being non hazardous. No lead based paint was on this concrete.

D&D-3-70 Scabbled Concrete
WGI #GI9801230624A (1) 55 gallon drum
This waste consists of bags of concrete, cinder block and paint that was scabbled from the wall to remove radioactive contamination. It was generated in room 111 on the south wall. This waste is characterized by process knowledge as being non hazardous since the lead based paint on this concrete was below RCRA TCLP levels.

D&D-3-76 Asbestos, Non-Friable
WGI # GI9701230284B (12) full crates
This waste consists of non-friable asbestos material, including floor tile, cabinet panels, and countertops with mastic that were unsurveyable. These items were certified non-friable by the project state certified asbestos inspector. They did not have any lead based paint on them.

D&D-3-77 Non-Friable Asbestos Insulation w/ Lead Paint
WGI #GI9701230284B (31) full crates
This output consists of non-friable asbestos material such as transite wall board, and was certified non-friable by the project state certified asbestos inspector. It also has lead based paint on it below RCRA TCLP levels.

D&D-3-77 Friable Asbestos Insulation w/ Lead Paint
WGI #GI9701230466B (43) full crates
This output consists of drywall that has asbestos mud attached to it, so it is considered friable asbestos. The drywall also has lead based paint on it below RCRA TCLP levels.

D&D-3-81 Moist Combustibles with Asbestos
WGI #GI9701230186A (1) 55 gallon drum
This waste consists of moist combustibles that were generated during the cleanup of friable asbestos contamination on the floor below where sampling of asbestos occurred.

D&D-3-87 Drywall w/ Lead Paint
WGI #9801230505A (9) full crates
This output consists of drywall that did not have asbestos mud in the joints. This waste has lead based paint below RCRA TCLP levels on its surface.

Hazardous & Radioactive Waste Outputs (LLM)

D&D-4-6 Moist Combustibles
WGI # GI9701230261A (1) 55 gallon drum
This waste consists of kimwipes and rags that were used to wipe down the sumps that were part of the process waste system RCRA unit 40. There was no sludge buildup in these sumps before they were wiped. Characterization is the same as the process waste system for the building, which is F001, F002, F005.

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D&D-4-9 Plastic Process Waste System
WGI # GI9701230258A (1) full crate
This output consists of PVC process waste piping that was removed from RCRA Unit 40 in bldg. 123. There also are some plastic secondary containment pans and pumps that are mostly plastic. Characterization is based upon RCRA Unit 40, minus the "F" codes associated with cyanide processes since they were not used in bldg. 123, and also the "D" codes are not applicable since no sludge was present in the waste that was packaged.

D&D-4-11 Metal Process Waste Pipes
WGI # GI9801230325A (1) full crate
This output consists of metal process waste piping from RCRA Unit 40 removed from bldg. 123. There also are some metal secondary containment pans. Characterization is based upon RCRA Unit 40, minus the "F" codes associated with cyanide processes since they were not used in bldg. 123, and also the "D" codes are not applicable since no sludge was present in the waste that was packaged.

D&D-4-11 Light Metal
No WGI required (1) 5 gallon drum
This output consists of a bag labeled "unused shot" that was found abandoned in the building. This material was sampled under analysis #98A0018 and found to be hazardous for chrome.

D&D-4-14 Circuit Boards
No WGI required (1) 10 gallon drum
This output consists of circuit boards that came from various pieces of equipment that were being stripped out. They could not be free released due to not being 100% surveyable. They were characterized by RFETS guidance as hazardous waste.

D&D-4-53 Dirt from Scrubbers S-1 & S-3
No WGI required (1) 5 gallon drum
This waste is dirt with no free liquid from the bottom of the S-1 and S-3 scrubbers in the courtyard of bldg. 123. Analysis #98A1320 verifies that this soil is hazardous due to traces of the following organics; Methylene Chloride, Trichloroethylene and Methyl Ethyl Ketone, which were used as

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lab solvents. MDA results show that this soil does not meet the free release criteria.