Rocky Mountain
Remediation Services, L.L.C.

. . . protecting the environment

RF/RMRS–2000-012.UN

DECOMMISSIONING CLOSEOUT REPORT

for the

BUILDING 779 PAD

Revision 0
March 2000

Rocky Mountain
Remediation Services, L.L.C.

MAR 2000
RECORDS CENTER

ADMIN RECORD

1/430

TABLE OF CONTENTS

1.0	INTRODUCTION	4
2.0	GOALS MET	10
3.0	TREATMENT PROCESS	10
4.0	RADIOLOGICAL ANALYSIS AND SURVEY RESULTS	10
5.0	NON-RADIOLOGICAL ANALYSIS AND SURVEY RESULTS	14
6.0	WASTE STREAM DISPOSITION	14
7.0	DEVIATIONS FROM DECISION DOCUMENT	16
8.0	DESCRIPTION OF SITE CONDITION	17
9.0	DEMARCATION OF WASTES LEFT IN PLACE	19
10.0	ENVIRONMENTAL RESTORATION	20
11.0	HEALTH AND SAFETY	23
12.0	PROPERTY MANAGEMENT	24
13.0	LESSONS LEARNED	24
14.0	REFERENCES	26

FIGURES

Figure 1-1 Building 779 Cluster Layout
Figure 1-2 Building 779 Layout

TABLES

Table 4-1 Free Release Limits Per DOE Order 5400.5
Table 6-1 Waste Volumes
Table 7-1 Modifications to the 779 DOP
Table 8-1 Final 779 Cluster Drawings
Table 10.1 Groundwater and Sediment Data from the 779 Cluster
Table 10-2 Groundwater and Sediment Data from the 779 Cluster
Table 10.3 Soil Data From The 779 Cluster

2

APPENDICES

Appendix A	SDS's for fixatives
Appendix B	FCA Tier I and Tier II Limits
Appendix C	Concrete Rubble Data
Appendix D	Data From Sampling Groundwater and Sediment
Appendix E	Slab Details for Building 727 and 782
Appendix F	Slab Details for Building 729
Appendix G	Slab Details for Building 779
Appendix H	Slab Details for Building 783
Appendix I	Data from Soil
Appendix J	MSDS for Soil Sement™
Appendix K	Lessons Learned

1.0 INTRODUCTION

The 779 Closure Project was located in the north central section of the RFETS protected area. Main structures in the 779 Cluster were the main R&D facility, Building 779; a filter plenum and emergency generator facility, Building 729; a filter plenum building, Building 782; an emergency generator facility, Building 727; and a cooling tower pump house, Building 783. Additional support structures included a paint storage facility, Building 780; a metal storage facility, Building 780A; a gas bottle storage facility, Building 780B; and ten (10) cooling towers (Buildings 784A/B/C/D, 785, 786, 787A/B/C/D). See Figure 1-1, *Building 779 Cluster Layout*, for layout of the 779 Cluster. In general, the D&D effort removed interior equipment, decontaminated the remaining structures, and dismantled the facilities; leaving facility foundations, basements, and underground utilities in place.

The 779 Closure Project was completed in accordance with the project's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) decision document, the Decommissioning Operations Plan (DOP) for the 779 Cluster Interim Measure/Interim Remedial Action, approved February 1998. Exceptions taken to the 779 DOP during implementation of the closure project are identified in Section 7.0 of this document. This document summarizes the final condition of the 779 Cluster facilities. Following is a listing of the facilities that were deactivated and demolished under the 779 Closure Project and a summary of the tasks performed to render those facilities suitable for demolition.

Building 727, Emergency Diesel Generator Building

Building 727 was a single-story building with a 5-in thick reinforced concrete roof slab supported by 8-in concrete block walls resting on 8-in thick by 5 ft deep foundation walls. The structure was approximately 16 ft. wide by 24 ft. long by 12 ft. high.

Rocky Flats Environmental Technology Site (RFETS) garage personnel drained the emergency diesel generator's fuel oil system. The fuel was transported to the garage for redistribution and use in other RFETS equipment. The above ground storage tank was closed out in accordance with 7 CCR 1101-14, *Storage Tank Regulations*, Colorado Department of Labor and Employment, Oil Inspection Section. The connecting fuel piping was disposed of as industrial waste. The below ground storage tank was closed under a different project, (the tank was foamed and left in place). The demolition contractor drained the diesel cooling system and the coolant transferred to Building 374 for processing. The emergency diesel generator was sent to Property Utilization and Disposal (PU&D) for processing. The remaining piping and components in Building 727 were recycled as scrap metal or disposed of as industrial waste.

Roof media samples taken from Building 782 indicated that the roof was radioactively contaminated above release levels (Reference the Radiological Closeout Survey Plan for the Building 779 Cluster, Rev. 2, June 1999 for relevant release levels.). Due to the proximity of Building 727 to Building 782 (within 20 feet), and the contamination mechanism, (settling of material from the solar ponds), the Building 727 roof was treated as contaminated material, removed

and disposed of as contaminated waste. The remaining building structure was surveyed and released as non-contaminated material. Building 727 was demolished and transported to the 980 pad where the material is stored for future use. Penetrations in the Building 727 slab have been plugged and grouted.

Building 729, Filter Plenum Building

Building 729 was a single-story building approximately 72 ft. long by 38 ft. wide by 16½ ft. high. Reinforced concrete spread footings, 2 ft. high by 3½ ft. wide by 1 ft. thick, supported reinforced concrete grade walls. The internal equipment and components were removed and asbestos was abated from Building 729. In-process characterization surveys identified several areas and systems within Building 729 that were radiologically contaminated. The identified contaminated areas and systems were removed and packaged as waste or the area was decontaminated. The building was demolished and the resulting rubble was transported to the Erie Landfill. The Building 729 foundation slab was left undisturbed.

Building 779, Research and Development Facility

Building 779 was comprised of three main areas: 779 proper, 779A, and 779B (Reference Figure 1-2, *Building 779 Layout*). The foundations for Building 779 are horizontal and poured-in-place with reinforced concrete spread footings. Dimensions vary from 1½ ft. square to 6½ ft. square and from 10 in. to 16 in. thick. In depth below grade, the footings vary from 3 ft. to 9 ft. Reinforced concrete grade beams, 16 in. to 18 in. wide and 10 in. to 13 in. thick rest on the spread footings. The first floor slab is poured-in-place, reinforced concrete 6 in. to 8 in. thick with a barrier on a gravel base.

The internal equipment and components were removed and asbestos was abated from Building 779. In-process characterization surveys identified several areas and systems within Building 779 that were radiologically contaminated. The newly identified contaminated areas and systems were removed and packaged as waste or the area was decontaminated. The building was demolished and the resulting rubble was transported for storage at the 980 pad. The Building 779 foundation slab was left undisturbed.

Foundation penetrations are discussed in Section 9.0 of this document. The Building 779 basement opening was sealed with a watertight cover. Four penetrations were drilled through the basement ceiling to allow groundwater removal from the below grade pits. Hinged lids that are raised 6 inches above the openings protect the water removal penetrations. The raised openings eliminate rain and snow melt accumulation in the basement pits. A metal watertight cover was also installed over the ventilation tunnel between B779 and B782 and an elevator shaft. Pipe and conduit openings in the building slab were plugged and grouted at the foundation level. Process waste piping penetrations were also covered with metal plates that are fastened to the foundation.

Building 780, Paint and Solvent Storage Shed

Building 780 was a corrugated sheet-metal shed. Material, equipment and components were removed from Building 780; asbestos was then abated. The Building 780 structure was then removed and packaged as radioactively contaminated waste, leaving a 140 ft^2 12-in thick reinforced concrete slab.

Building 780A/B, Storage Sheds

Material was removed from the sheds. Building 780A was dismantled and packaged as radioactively contaminated waste. Building 780B was surveyed, released, and packaged as scrap metal.

Building 782, Plenum Filter Building

Building 782 was a single-story building approx. 100 ft. long x 62 ft. wide by 16 ft. high. Reinforced concrete caissons, varying from 2 ft. to 2½ ft. in diameter and from 6 ft. to 24 ft. deep, supported reinforced concrete grade beams that are 10 in. thick by 5 ft. deep. Internal equipment and components were removed and asbestos was abated from Building 782. In-process contamination surveys identified that three areas of Building 782 were contaminated; the internal radioactively contaminated structures were decontaminated. The Building 782 roof was found to have fixed radioactive contamination and was removed and packaged prior to demolition. The building was demolished and the building rubble transported and stored at the 980 pad. The Building 782 foundation slab was left undisturbed.

Pipe and conduit openings in the Building 782 slab were plugged and grouted at the foundation level. Process waste piping penetrations were covered with metal plates that are fastened to the foundation. After the Building 782 structure was removed, a cover was constructed over the Building 782 pit. The pit cover is constructed so that groundwater migration into the Building 782 pit can be removed. The groundwater infiltrate will be sampled and pumped on a periodic basis. Water removed from the Building 782 pit is designated for transport to Building 374 for processing.

Building 783, Cooling Tower Pump House

Building 783 was constructed of aluminum and steel on reinforced concrete pedestals on a reinforced concrete foundation. The internal equipment and components were removed and the cooling water was removed from the pump basins. The cooling tower water was sampled and characterized prior to removal. (This data is contained in IWCP TOO96268, *Waste Sampling Characterization for Building 779*.) Because the cooling tower water was determined to be above free release criteria for beta activity, it was collected and processed in Building 374. The building and pump basins were surveyed for radiological contamination and released as non-contaminated. Building 783 was then disassembled and removed as scrap metal. The Building 783 foundation slab was left undisturbed. Pit covers, with access openings, have been installed

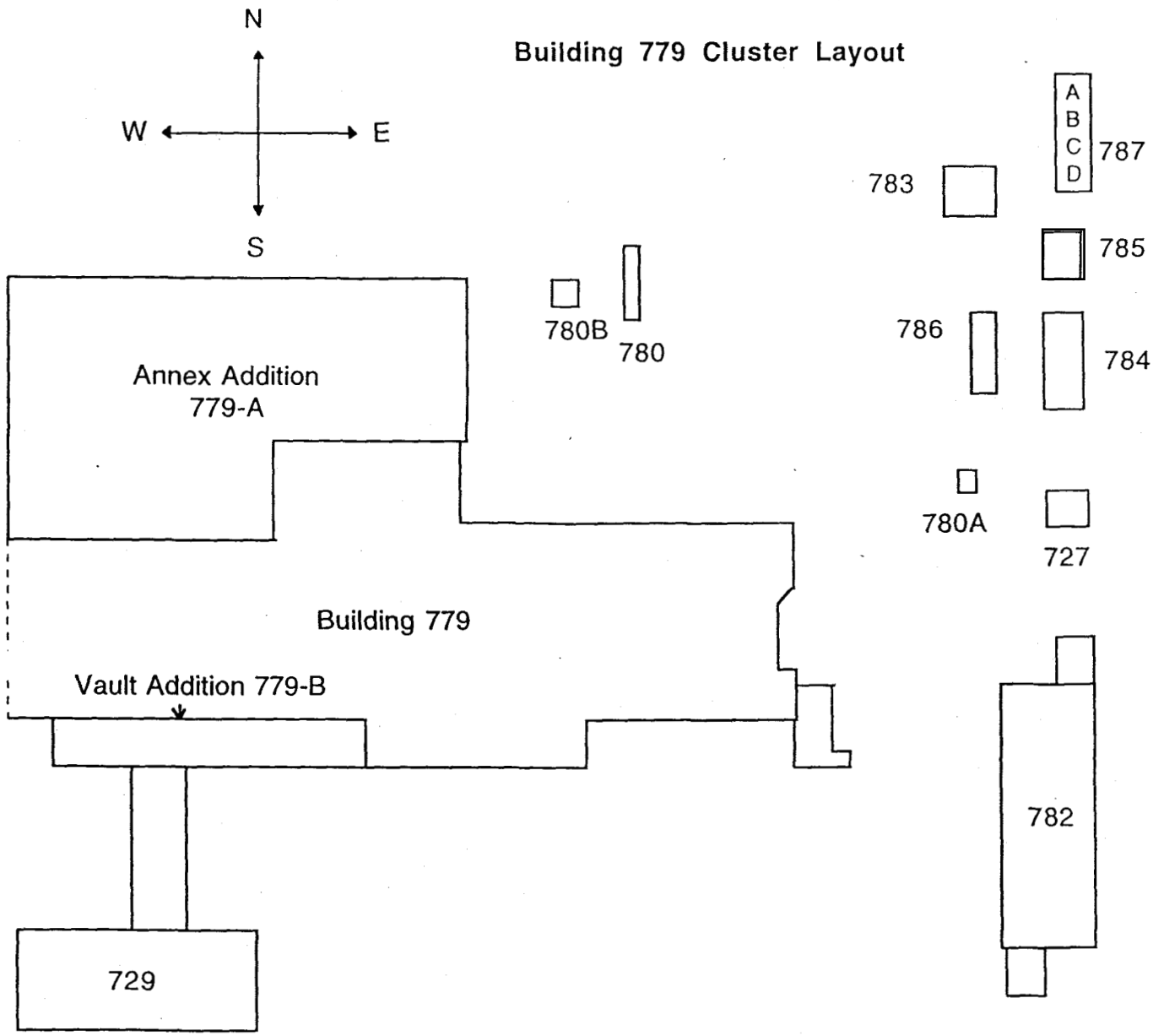
over the pump basins to allow for groundwater removal. The groundwater infiltrate will be sampled and pumped on a periodic basis. Water removed from the Building 782 pit will be transported to Building 374 for processing.

Buildings 784 through 786, Cooling Towers

The cooling towers were surveyed and removed as scrap metal. The cooling tower foundation slab was left undisturbed.

Additional detail reguarding the final condition of the 779 Cluster facilities is contained in the following sections of this document. Figures 1-1 and 1-2 follow.

FIGURE 1-1, Building 779 Cluster Layout



727	Emergency diesel generator facility serving Building 779.
729	Facility containing filter plenums and emergency diesel generator.
779	Research and Development Center.
780	Paint/Storage Facility.
780A	Metal Storage Facility.
780B	Gas Bottle Storage Facility.
782	Filter Plenum Exhaust Enclosure For Building 779 Exhaust.
783	Building 779 Cooling Tower Pump House.
784	Building 779 Cooling Tower Support Facility (A, B, C, D).
785	Building 779 Cooling Tower Support Facility.
786	Building 779 Cooling Tower West Chiller.
'87	Building 779 Cooling Tower East Chiller (A, B, C, D).

FIGURE 1-2, Construction History of Building 779

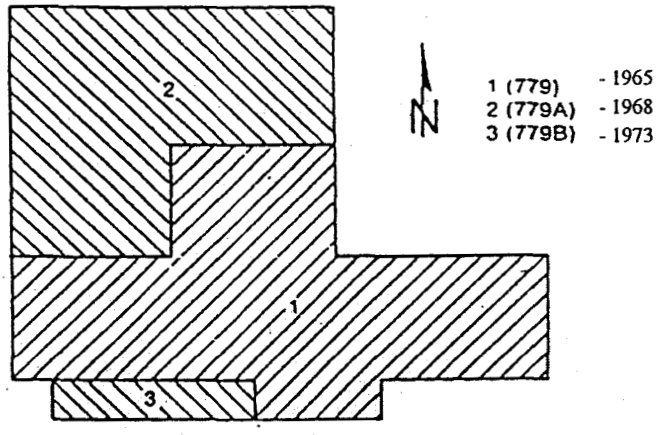


Figure A-1 & A-2 First Floor Key Plan, Building 779

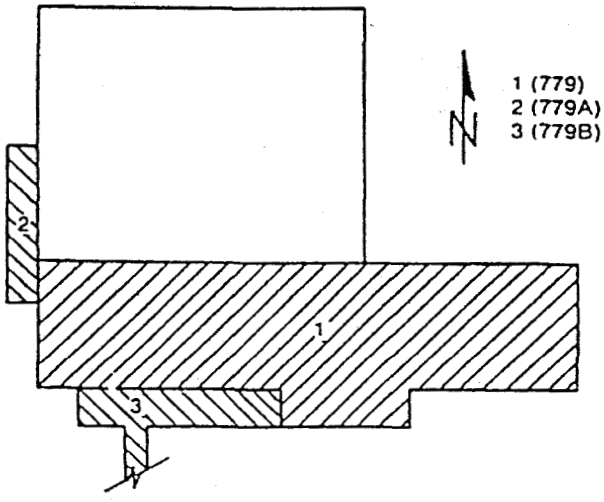


Figure A-2 Second Floor Key Plan, Building 779

2.0 GOALS MET

Throughout the duration of the 779 Closure Project numerous goals and objectives, as identified in the 779 DOP, were met. These goals included the removal of interior equipment, decontamination of main facility structures, and the dismantling of facilities specific to the 779 project boundaries. The most notable accomplishments relevent to the project included the removal of 133 gloveboxes, 6 major filter plenum systems, approximately 7,695 grams of plutonium and the demolition of 76,733 square feet of buildings. The scheduled completion date for demolition of the 779 Closure Project facilities was June 2000. Actual completion of demolition activities was February 18, 2000.

3.0 TREATMENT PROCESSES

No RCRA treatment processes were utilized within the 779 Closure Project. Processes were initiated to fix radioactive contamination in equipment and building systems in order to minimize the potential for airborne radioactivity and worker risk through contamination. These "contamination" treatment processes were used throughout the demolition of the 779 Cluster. The use of fixatives in gloveboxes and the fogging of ductwork assisted in the safe demolition of contaminated systems and equipment as well as lower radiation doses to workers. Products such as StripCoatTM , 3M Firedam, Asbestos Binding Compound (ABC), Peel Away 7 were used in gloveboxes. Encapsulent Technologies Glycerine Solution (ETGS) and ETGS2 were the products used to fog the ductwork. MSDSs are included in Appendix A.

4.0 RADIOLOGICAL ANALYSIS AND SURVEY RESULTS

At the onset of the 779 Cluster Closure Project, a Reconnaissance Level Characterization (RLC) was performed on those buildings within the Cluster in order to plan Decontamination and Demolition (D&D) activities and to provide input to the Final Status Survey Design. A survey breakdown structure was developed for the facilities within the 779 Cluster to delineate radiological survey units and the corresponding final status survey classifications. Subsequently, the Radiological Closeout Survey Plan for the Building 779 Cluster was developed in order to guide the final status survey effort. The plan outlined the requirements for the survey process, and presented the associated free-release limits per DOE Order 5400.5. The limits are provided in Table 4-1, *Free Release Limits per DOE Order 5400.5.*

Table 4-1, Free Release Limits Per DOE Order 5400.5

Contamination Type	Removable (dpm/100 cm2)	*DCGLW Total (Average) (dpm/100 cm2)	**DCGLEMC Total (Maximum) (dpm/100 cm2)
Alpha (Transuranics)	20	100	300
Alpha (Uranium)	1000	5000	15,000

*DCGL – Derived Concentration Guideline Limits, Wilcox and Rank Sum Test
**DCGL - Derived Concentration Guideline Limits, Elevated Measurement Comparison

The Radiological Closeout Survey Plan for the Building 779 Cluster was reviewed and approved by the following approval authorities: RMRS, KH, DOE, CDPHE, and the EPA.

Following the completion of D&D, radiological surveys were performed on building surfaces, including interior and exterior walls, ceilings, floors, etc., as required by the Closeout Radiological Survey Plan for the 779 Cluster. The surveys included total and removable alpha surface contamination measurements, alpha-scan surveys, and media samples. Media samples were analyzed for transuranic (Pu-239 and Am-241) and uranium (U-233/234, U-235, and U-238) isotopes. The media sample results are presented in the Closeout Radiological Survey Reports (Refer to Section 14, *References*).

Final status surveys were performed after equipment and systems were removed from an area. Areas that were surveyed were physically isolated from adjacent areas undergoing D&D and remained isolated until demolition of the specific area occurred. The phased approach to final survey was implemented to support the schedule and to assure a timely review of the reports. The surveys and corresponding reports were presented to the DOE and CDPHE in the following sequence:

1. Closeout Radiological Survey Report For Building 729, Rev. 0, April 1999
2. Closeout Radiological Survey Report For Building 779, Annex B, Rev. 1, October 1999
3. Closeout Radiological Survey Report For Building 779, Administration Building, Rev. 0, October 1999
4. Closeout Radiological Survey Report For Building 779, "A" Annex, Rev. 0, November 1999
5. Closeout Radiological Survey Report For Building 779, Main Building, Rev. 0, December 1999
6. Closeout Radiological Survey Report for Buildings 727, 782, and 783, Rev. 0, February 2000.

11

The reports were subjected to a rigorous review, beginning at the project level with the final survey radiological engineers and manager, and a dedicated QA engineer. Subsequently, a review was performed by the following approval authorities: RMRS, KH, DOE, CDPHE, and the EPA.

An Independent Verification Contractor (IVC) performed independent verification of the final status survey results. This contractor performed independent measurements on greater than ten-percent of the delineated survey units. In addition, the contractor reviewed and concurred with the Final Status Survey Reports. Based on the independent verification measurements and extensive reviews, the IVC concurred that the facilities within the 779 Cluster met the free-release criteria.

A separate independent verification was performed on Annex B as requested by the Environmental Protection Agency. The data from this verification validated the free-release condition of Annex B.

An additional survey effort was performed to verify that the building rubble, resulting from the "free released" 779 Cluster facilities, was not contaminated above the RFETS Tier 2 action limits identified in the Rocky Flats Cleanup Agreement (RFCA). Nine concrete samples were collected from the building rubble staged on the 980 pad. The samples were analyzed for transuranic (Pu-239/240 and Am-241) and uranium (U-233/234, U-235, and U-238) isotopes. The resulting data demonstrated that the building rubble was suitable for free release (i.e., all results were less than RFCA Tier 2 action limits).

Radiological Status of Remaining Areas

Buildings 727, 729 and 783 Slabs

The Building 727 slab was verified as below the DOE Order 5400.5 limits. No contaminated process drains exist in this slab.

The Building 729 trenches, and associated pit surfaces (walls and floor) were verified as below the DOE Order 5400.5 limits. No contaminated process drains exist in this slab. The trenches and pits were grouted after final survey.

The Building 783 slab was verified as below the DOE Order 5400.5 limits. No contaminated process drains exist in this slab. Two pits and a sump exist in this slab. The pits and sump were verified as below the DOE Order 5400.5 limits and covered with steel plates.

Building 779 and 782 Slabs

The Building 779 and 782 slabs were decontaminated to levels less than the DOE Order 5400.5 limits. Contaminated process drains penetrating the foundation slabs were filled to grade with grout. Large penetrations, such as drain clean-outs, were covered with metal plates prior to demolition to maintain the integrity of the grout. The plates will remain in place until the Environmental Restoration (ER) phase of cleanup. Refer to Appendix D for slab details and the associated radiological status of remaining process lines.

Building 779 Basement and Pits

The Building 779 basement was decontaminated to removable levels less than the DOE Order 5400.5 limits. Fixed contamination above these limits exists in isolated spots on the basement floor and within the paint/wall matrix of the south wall. Refer to Appendices E through H for maps of these areas and the associated radiological status.

Building 779 pits (1A, 2A, 2B) contained standing water with radiological contaminants in excess of the RFCA Tier 1 limits (Refer to Appendix B, *RFCA Tier I and Tier II Limits*). The water is suspected to be groundwater infiltrate. The water was removed from all three pits, however, after a two-week period, pit 1A contained approximately 4 inches of standing water. A radiological survey of the pit walls, performed on December 2, 1999, established that the total and removable surface contamination levels were less than the DOE Order 5400.5 limits.

A radiological survey of the T5 tank pit indicated total surface contamination on the floors and north wall was in excess of the DOE Order 5400.5 limits (up to 992 dpm/100 cm2). No removable surface contamination in excess of the DOE Order 5400.5 limits was detected.

B782 Ventilation Tunnel and Basement

The Building 782 basement and tunnel surfaces were surveyed and found to be below the DOE Order 5400.5 limits. A small sump located in the northwest corner of the basement receives groundwater infiltrate. Isotopic analysis of the groundwater collected from the sump indicates radiological levels in excess of RFCA Tier 1 limits. The sump currently fills at a rate of 100 gallons per day.

Building 727, 779, and 782 Rubble

The concrete rubble from Buildings 727, 779, and 782 has been moved to the 980 pad. The final status survey data indicates that the rubble does not contain radiological contamination in excess of the RFCA Tier 2 action limits. Nine concrete samples were collected from the rubble pile. The samples were analyzed for transuranic isotopes (Pu-239 and Am-241) and uranium (U-233/234, U-235, and U-238) isotopes. These data are contained in Appendix D, *Concrete Rubble Data*. The results were less than the RFCA Tier 2 action limits.

5.0 NON-RADIOLOGICAL ANALYSIS AND SURVEY RESULTS

Non-radiological surveys were conducted to support the phased demolition of the 779 Cluster; specific references to the Lead Regulatory Agency (LRA) approved survey reports are as follows:

- Building 779 Cluster Closure Project, Non-Radiological Closeout Report For Building 779, A-Annex, Rev.0, Sept. 3, 1999
- 779 Cluster Closure Project, Non-Radiological Closeout Report For The Administrative Area of Building 779, Rev. 0, Sept. 29, 1999
- Building 779 Cluster Closure Project, Non-Radiological Closeout Report For Main, Utility Area and B-Annex, Rev. 0, Dec. 13, 1999
- Building 779 Cluster Closure Project, Non-Radiological Closeout Report For Buildings 727, 782 and 783, Rev. 0, Feb. 1, 2000

Non-radiological surveys were performed to ensure that contaminants of concern (COCs) within the 779 Cluster were identified, removed, or remediated to a level below regulated levels. The scope of the non-radiological survey included documenting a summary of the applicable information and survey data that was conducted after the Reconnaissance Level Characterization Report was issued. This information included in the Non-Radiological Closeout Reports demonstrated that contaminants of concern (COCs) within the 779 Cluster were identified, removed, or remediated to a level below regulated levels.

6.0 WASTE STREAM DISPOSITION

Waste types generated during the decommissioning of the 779 Cluster include both radioactive and non-radioactive waste. Radioactive waste consists of low level, low-level mixed, TRU, and TRU mixed waste. Non-radioactive waste includes sanitary, asbestos, TSCA (e.g. PCBs), hazardous, and oil. Table 6-1, *Waste Volumes*, summarizes the volumes of the various types of waste generated during the decommissioning and compares the actual volume to that estimated in the 779 Cluster Decommissioning Project Waste Management Plan. Table 6-1 also includes the volume of material originally estimated verses that sent to PU&D or recycled. Approximately 46 tons of radioactively contaminated metal and approximately 627 tons of non-radioactively contaminated metal were sent off site for recycle. The concrete rubble from Buildings 727, 779, and 782 was stored on-site at the 980 pad and is intended for use as fill material at RFETS.

During the course of this project, radioactive contamination was found in areas that were not expected to be contaminated. As a result, the amount of low level waste generated was larger than originally expected, and the amount of material sent to PU&D and disposed of as sanitary waste was less than expected. The amount of low level waste generated also increased due to schedule/cost decisions made during the course of the project. These decisions resulted in the disposal of equipment and selected internal, non-load bearing walls as low-level waste in lieu of performing radiation surveys to free release the material.

Higher than expected levels of radioactive contamination were found in piping systems, ventilation duct work and plenums. The higher than expected contamination levels resulted in a larger amount of TRU waste than had originally been anticipated. Higher than expected contamination levels were found primarily in ventilation duct and plenums.

Waste generated during this project was managed in accordance with relevant RFETS waste operations procedures. State and federal regulations, and DOE orders, have been incorporated into the RFETS Waste Operations Procedures. The 779 Cluster Decommissioning Project Waste Management Plan provides the details associated with characterization, storage, disposal and overall waste management for the 779 Cluster. Waste generated as a result of this project was packaged for disposal in accordance with the applicable RFETS procedures and waste acceptance criteria for the disposal site. All waste has been removed from the 779 Cluster and shipped to the disposal site or is being stored/staged on-site for eventual disposal.

TABLE 6-1, Waste Volumes

WASTE TYPE	VOLUME (ft3) ESTIMATE	VOLUME (ft3) ACTUAL	Notes
Radioactive Waste			
Low Level	53,873	290,220	1
Low Level Mixed	557	920	
TRU/TRM	2,400	14,891	1
Radioactive Waste Total	56,830	306,031	
Non-Radioactive Waste			
Industrial Waste Total	175,000	98,010	
Asbestos Waste	46,573		2
TSCA Hazardous & Oil Waste	110	193	1
Non-Radioactive Waste Total	221,683	98,203	
Rad/Non-Rad Waste Totals	278,513	404,234	
Recycled Material			
PU&D	73,900	5,400	3
Recycle Metal		80,790	1,4
Recycle Concrete		149,299	5
Total Recycled Material	73,900	235,489	

Notes:
1. Number shown in the "Actual" column is based on waste container volume.

2. Asbestos waste is included with totals for LLW and TRU waste. The total shown in the estimate column for asbestos is representative of the actual amount since the estimate was based on detailed characterization with little additional asbestos discovered during actual removal.
3. Approximately 150 pallets of equipment were sent to PU&D. Volume estimate is based on pallet load of 3' x 4' x 3'.
4. 627 tons of metal was free released and 46 tons were recycled as low level radioactive waste.
5. Volume is based on number of loads and 80% loading of transport vehicle. Additional volume reduction took place during grading and stacking at the 980 pad.

7.0 DEVIATIONS FROM DECISION DOCUMENT

Six minor modifications, two major modifications and one field modification to the 779 DOP were initiated and appproved, as appropriate, by CDPHE throughout the duration of the project. Table 7-1, *Modifications to the 779 DOP*, identifies whether the modification was major, minor or a field modification. In addition, a summary level description of the modification is provided.

Table 7-1, Modifications to the 779 DOP

*Mod Number (Identified by Corresp Control No. and date of transmittal)	Type	Modification Description
(98-RF-02546) May 12,1998	minor	Addends Section 9, Regulatory and Environmental Considerations - clarrifies number of RCRA storage units to be closed and EPA hazardous waste numbers.
(98-RF-04543) October 15, 1998	minor	Addends Section 9 - deletes the RCRA storage units that didn't store hazardous waste.
(98-RF-05627) Dec. 7, 1998	minor	Addends Section 9 - clarrifies the state of RCRA storage units and amends inspection requirements.
(99-RF-02061) May 24, 1999	minor	Addends Section 8, Waste Management, and 9 - eliminated the use of temporary units and implements storage in accordance with ARARs; corrects typographical and gramatical errors.
(99-RF-01105) March 24, 1999	minor	Addends Section 9 - incorporates fluorescent bulb crushing as a D&D activity.
(98-RF-05558) Nov. 11, 1998	major	729 Demolition Plan
(99-RF-03072) Aug. 4, 1999	major	779 Demolition Plan
E-mail May 18, 1999	field	Initiated temporary use of process waste lines for transferring arsenic-contaminated water to Building 776/777.
(00-RF-00615) Feb. 15, 2000	minor	Addends Section 3, Decommissioning Overview

In summary, the minor modifications consisted of re-evaluating EPA hazardous waste numbers assigned to permitted storage areas, eliminating the requirement for storing all waste in temporary units, correction of typographical errors and clarification of terms. Major modifications to the 779 DOP consisted of demolition plans for Buildings 729, Building 779 and the remaining facilities. Building 779 was demolished in multiple phases, resulting in three demolition plans. The field modification addressed re-opening the process waste system to RCRA constituents. The system was RCRA closed in 1996 and re-opened in May 1999 to support the removal of 510 gallons of arsenic contaminated water. The system was rinsed and re-sampled to ensure that arsenic levels were below the regulatory threshold; closure documentation is contained in the project files.

8.0 DESCRIPTION OF SITE CONDITION

Following is a description of the condition of 779 Cluster facilities after demolition. Drawings associated with the remaining foundations are identified Table 8-1, *Final 779 Cluster Drawings*. Site utility drawings (Series 15501) covering the 779 Cluster area have been updated to show termination points for nitrogen, steam, condensate, domestic cold water, natural gas, cooling water, tower water, 13.8 KV power, telephone, and alarms.

Building 727 was demolished leaving the 6-in thick, reinforced concrete floor slab. Adjacent concrete pads were for an electric fan, an above ground storage tank, and a cap for a previously removed under-ground storage tank.

Building 729 was demolished to its main slab. The floor slab is reinforced concrete 6 in. thick. There are two pits: one 7 ft. long by 4 ft. wide by 6 ft. deep and the other 7 ft. long by 3 ft. wide by 2½ ft. deep. Both pits have 12-in thick floor slabs. There are also two process waste trenches: one 9 ft. long by 1½ ft. wide by 1½ ft. deep and the other 16½ ft. long by 1½ ft. wide by 1½ ft. deep. The pits and trenches were filled with concrete. Adjacent 12 in. thick concrete pads were for an above-ground storage tank, an exhaust stack, a substation, a radiator, a transformer, and a cap for a previously-removed underground storage tank.

Building 779 was demolished to its main slab. Several pits exist within the slab including two elevator shafts (approx. 6 ft. long by 7 ft. wide by 3 ft. deep), the plenum deluge drain pit (approx. 6 ft. long by 4 ft. wide by 4 ft. deep, the basement pit area (approx. 29 ft. long by 20 ft. wide by 20 ft. deep), and a pump pit (approx. 6 ft. long by 4 ft. wide by 4 ft. deep). A process waste trench network approximately 50 ft. in length exists on the east-side of the slab. Metal covers were placed over these areas to eliminate the safety hazard of the foundation openings. The truck ramp located on the east side of the building, approx. 25 ft. long and sloping to a depth of 4 ft., was filled with building rubble. See Section 10 for additional information on slab penetrations and in-slab waste.

Buildings 780A, 780B were demolished and removed from Site. No foundations remain from these sheds.

Building 782 was demolished to its main slab. The floor slab is reinforced concrete varying from 6 in. to 9 in. thick. One large pit, approx. 24 ft. long by 23 ft. wide by 20 ft. deep, in located at the west-side of the slab. The pit walls are 12 inches thick, reinforced concrete. The pit floor is reinforced concrete 12 in. to 17 in. thick. The Building 782 pit area leads to an under-ground tunnel and vertical corridor. The tunnel/corridor is approx. 30 ft. long by 12 ft. wide x 16 ft. deep that runs west then turns vertical to the surface. Walls of the vertical corridor are 8 inches thick, reinforced concrete block. Walls, floors, and the roof are 12 inches thick, reinforced concrete. The top of the roof slab is about 3 ft. below grade. Five concrete caissons ranging from 2 ft. to 2½ ft. in diameter and 11 ft. to 14 ft. deep support the walls. A metal cover was placed over the 12 ft. long x 12 ft. wide opening at grade to eliminate the safety hazard of the opening. A drainage system installed around the pit and tunnel during original construction is routed to a nearby manhole.

Building 783 was demolished to its main slab. Two pits exist below the main slab, each measuring approx. 22 ft. long by 4 ft. wide by 8 ft. deep. A metal cover was placed over the access plates to the pits. A sump also exits under the slab constructed of 3 ft. ID pre-cast concrete pipe with a 4½ ft. square by 9 in. thick concrete bottom. A metal plate was placed over the manhole for the sump.

Ten (10) cooling towers (Buildings 784A/B/C/D, 785, 786, 787A/B/C/D), piping, and support structures were demolished and removed from the Site. Five (5) concrete pads and 11 concrete caissons that supported the cooling towers remain. The reinforced concrete pads are 12 in. deep and range in size from 15 ft. long by 10 ft. wide to 45 ft. long by 21 ft. wide. The concrete caissons are 2½ ft. in diameter and 4 ft. deep.

Table 8-1, Final 779 Cluster Drawings

Drawing Identification Numbers	Type of Drawing
23473-401	Building 727, foundation plan
51410-0108	Building 727, site plan
19673-4	Building 729, foundation plan and first floor slab detail
51410-0109	Building 729, site plan
28177-301	Building 783, foundation plan
	Building 779, foundation plan and first floor slab
23473-0601 and -0602	Building 782, foundation and first floor slab
23473-0603	Building 782, pit area
23473-0605	Building 782, corridor and tunnel
23472-0604	Building 782, sub-drain and storm drain system
23473-0606	Building 782, manhole

9.0 DEMARCATION OF WASTES LEFT IN PLACE

The primary wastes that were left in place consists of piping penetrations and drain. Following is a description of these waste.

Slab Penetrations and drains

The Bldg. 727 slab contains two domestic water pipes that were grouted and capped. One pipe originates with the site domestic water system. The second pipe travels underground to Building 782. Appendix E, *Slab Details for Buildings 727 and 782,* identifies the approximate location of these isolation points.

The Building 729 slab contains two domestic cold water pipes, that were grouted and capped, and a sanitary sewer line that was grouted. Appendix F, *Slab Details for Building 729*, identifies the approximate location of these isolation points.

The Bldg. 779 slab contains an extensive network of process waste piping (abandoned-in-place in the late 1970's), process waste trenches, sanitary drains, and various branch connections from Site utilities. Process piping was grouted down approximately 5". Isolation points from Site utilities were grouted and capped. Also, six 8-in diameter, cooling water pipes run underground from the east-side of the slab and come up on the east side of the access road. Appendix G, *Slab Details for Building 779*, identifies the approximate location of the piping, trenches, utility isolation points, and the cooling water pipes.

The Bldg. 782 slab contains plenum drain piping, and 3 domestic water pipes. Two pipes originate with the Site domestic water system. The third pipe travels underground to Bldg. 727. Appendix H, *Slab Details for Building 782*, identifies the approximate location of this piping.

Metal covers have been placed over basement areas and pits associated with Buildings 779, 782 and 783. The Building 779 basement has four pits (identified as 1A, 2A, 3A and T5 pit on the map included in Appendix G) located beneath the basement. Three of the pits (1A, 2A and 2B) are known to receive groundwater infiltrate. Four hinged access ports have been installed in the basement cover to allow periodic removal of water from these pits; similar hinged access ports have also been installed in the Building 782 and 783 pits covers. Isotopic, Volatile Organic Analysis (VOA) and total metals data from water samples taken prior to pumping are included in Appendix I, *Data from Soil*, for these pits. The pit associated with Building 783 and the Building 782 sump also have ground water infiltrate. Water sample results for the Building 782 and 783 sumps are also included in Appendix I.

Non-contaminated concrete resulting from the demolition of 779 Cluster facilities was placed on a bermed concrete pad (previously known as Building 980) located northeast of Building 779. A gross segregation of non-cementatious material was preformed prior to relocation of the clean concrete to the 980 Pad. Consequently, other debris, such as roofing material, wood and metal structural reinforcement materials, is co-mingled with

the non-contaminated concrete. Prior to use of the concrete as clean fill, the material will be crushed to the appropriate size.

Presently, the concrete pile has been saturated with a surfactant called Soil SementTM, manufactured by Midwest Industrial Supply. Soil SementTM is a non-hazardous polymer emulsion that is designed to control dust and erosion. The MSDS for Soil SementTM is included in Appendix J, *MSDS for Soil Sement*. The concrete pile will be managed in accordance with the RFCA Standard Operating Protocol For Recycling Concrete, September 28, 1999, until used as clean backfill.

10.0 ENVIRONMENTAL RESTORATION

Following is information regarding groundwater, sediment and soil that have been sampled in support of environmental restoration activities. Tables 10.1 and 10.2, *Groundwater and Sediment Data From The 779 Cluster*, and 10.3, *Soil Data From The 779 Cluster*, contain radioisotopic, gross alpha/beta, volatile organics, nitrate/nitrite and total metals analytical data, as available, for areas where these media have been sampled.

Table 10.1, Groundwater and Sediment Data from the 779 Cluster

Sample ID	*Type of Analysis*	*Matrix*	*Pit 1A, B779*	*Pit 2A, B779*	*Pit 2B, B779*
00A0884	Nitrate/nitrite	Water	.44 mg/L	.05 mg/L	<.05 mg/L
00A0884	Total Metals	Water	>Tier II <Tier I Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lithium, Manganese, Molybdenum, Nickel, Silver, Strontium, Thallium, Zinc Copper	>Tier II <Tier I Antimony, Beryllium, Cadmium, Chromium, Lithium, Manganese, Nickel, Zinc	>Tier II <Tier I Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lithium, Manganese, Nickel, Thallium
00A0884	Volatile Organics	Water	>Tier I 1,1,2,2,-tetrachloro-ethane	None	None
00A0933	$U^{233/234}$	Water	136 pCi/l	2.02 pCi/l	1.15 pCi/l
00A0933	U^{235}	Water	13.4 pCi/l	.382 pCi/l	.208 pCi/l
00A0933	U^{238}	Water	590 pCi/l	9.18 pCi/l	3.41 pCi/l
00A0933	$Pu^{239/240}$	Water	74.9 pCi/l	1.96 pCi/l	1.94 pCi/l
00A0933	Am^{241}	Water	31.3 pCi/l	1.21 pCi/l	.517 pCi/l
00A0933	$U^{233/234}$	Sediment	2.06 pCi/g	1.03 pCi/g	1.45 pCi/g
00A0933	U^{235}	Sediment	.114 pCi/g	.062 pCi/g	.120 pCi/g
00A0933	U^{238}	Sediment	12.6 pCi/g	3.52 pCi/g	5.35 pCi/g
00A0933	$Pu^{239/240}$	Sediment	186 pCi/g	350 pCi/g	319 pCi/g
00A0933	Am^{241}	Sediment	79.4 pCi/g	94.5 pCi/g	81.5 pCi/g
00A1075	$U^{233/234}$	Water	58.5 pCi/l	N/A	N/A
00A1075	U^{235}	Water	3.97 pCi/l	N/A	N/A
00A1075	U^{238}	Water	335 pCi/l	N/A	N/A
00A1075	$Pu^{239/240}$	Water	162 pCi/l	N/A	N/A
00A1075	Am^{241}	Water	77.3 pCi/l	N/A	N/A

Table 10.2, Groundwater and Sediment Data From the 779 Cluster

Sample ID	Type of Analysis	Matrix	Building 782	Building 783
00D1066	Nitrate/nitrite	Water	11.7mg/l	N/A
00A1075	Total Metals	Water	Pending	N/A
00A1075	Volatile Organics	Water	Pending	N/A
00A1075	$U^{233/234}$	Water	5.74 pCi/l	N/A
00A1075	U^{235}	Water	.222 pCi/l	N/A
00A1075	U^{238}	Water	2.98 pCi/l	N/A
00A1075	$Pu^{239/240}$	Water	.09 pCi/l	N/A
00A1075	Am^{241}	Water	.558 pCi/l	N/A
99A6078	Gross alpha	Water	N/A	30 pCi/l 32 pCi/l 34 pCi/l 29 pCi/l
99A6078	Gross beta	Water	N/A	102 pCi/l 109 pCi/l 100 pCi/l 103 pCi/l
99A6078	TCLP	Water	N/A	Non-RCRA

Under Building Contamination

Under building contamination (UBC) has been documented for Building 779. Radiological contamination was removed from slab areas within Rooms 126, 131 and 133 of Building 779. In order to radiologically free release the exposed areas in these rooms, the slab was removed to the soil level and the resulting trenches were backfilled with non-shrink grout. Table 10.3, Soil Data From The 779 Cluster, contains summary level information for soil data. (See Appendix I for a floorplan of Building 779 and a diagram of the trench that was sampled.) Soil samples were taken in the Rooms 131 and133 prior to back filling the connecting trench. (Reference Appendix I for the soil data.)

Table 10.3, Soil Data from the 779 Cluster

Sample ID	Type of Analysis	Matrix	Area 1	Area 2	Area 3	Area 4
00R0970	Volatile organics	Soil	None > Tier II	None > Tier II	None > Tier II	None > Tier II
00R0970	$U^{233/234}$	Soil	.932 pCi/l	.707 pCi/l	1.05 pCi/l	1.00 pCi/l
00R0970	U^{235}	Soil	.019 pCi/l	.036 pCi/l	.280 pCi/l	.148 pCi/l
00R0970	U^{238}	Soil	.882 pCi/l	.876 pCi/l	.754 pCi/l	1.03 pCi/l
00R0970	$Pu^{239/240}$	Soil	11.1 pCi/l	10730 pCi/l	97320 pCi/l	32310 pCi/l
00R0970	Am^{241}	Soil	16.1 pCi/l	5120 pCi/l	40080 pCi/l	15550 pCi/l

11.0 HEALTH AND SAFETY

The Occupational Safety and Industrial Hygiene Program Manual (MAN-072-OS&IH PM) governed work practices during decommissioning, demolition and closure activities of the 779 Cluster. The project operated in accordance with the Building 779 Cluster Closure Project Health and Safety Plan, Rev. XI, Sept. 16, 1999. Once the final clean-up of the 779 Cluster was completed, the area was inspected and safety/industrial hygiene concerns were identified and placed in a safe configuration or remediated to eliminate hazards and protect personnel.

Chemical, biological or physical hazards identified during decommissioning or demolition were remediated in accordance with the OS&IHPM. Hazards such as beryllium, lead and asbestos, were remediated by trained and qualified workers. Chemical hazards identified were remediated under the direction of the Environmental Manager. These hazards were remediated and verified as complete prior to demolition of buildings in the 779 Cluster.

Remaining hazards that could not be remediated are physical in nature. They consist of tripping hazards (foundations, curbs, stairs) and confined spaces. Tripping hazards are located throughout the 779 Cluster due to inconsistencies in the foundation slabs. Personnel are cautioned to read and adhere to signage posted throughout the Cluster. Confined spaces are located in Building 779, Room 001(basement), Building 782 (basement) and Building 783 sumps/pits. These areas are covered with metal plates and the confined spaces are identified by signage.

12.0 PROPERTY MANAGEMENT

At the 779 Cluster Closure Project onset, an inventory of approximately 7,000 line items of equipment and furniture was completed. On October 1, 1997, 1,450 pieces of capital and real equipment were identified on the inventory. After a further review of project specific equipment, the inventory was reduced to 978 pieces; this inventory was incorporated into the project baseline. At the completion of the 779 Closure Project, three pieces of capital equipment were not accounted for on the Baseline Inventory. Those pieces were two Motorola walkie-talkies and one Hewlett-Packard printer. Lost

inventory reports were completed and turned into Closure Site Services (CSS) Property Management.

The Project dispositioned more than 175 pallets and/or shipments of equipment and furniture to Property Utilization and Dispositioning (PU&D), Building 060, 130 Laydown Yard Area, Building 334 and Building 439. These items were either re-utilized on site, sold to the public, sent to an Indian Reservation (SEEDS Program) or sent to a local scrap metal dealer. No funding was returned to the Project for these efforts.

13.0 LESSONS LEARNED

There were several lessons learned during the completion of the 779 Closure Project. In general, the "lessons learned" from the 779 Closure Project were passed along to other members of the RFETS community at the time of the experience. The lessons learned were identified through management reviews, incident reports, or just through management walk arounds. A sampling of the 779 lessons learned, that have already been distributed at RFETS, are accumulated as Appendix K, *Lessons Learned*, of this report. The remainder of this section will discuss a few of the lessons learned that have not been discussed previously or that bear some reemphasis. Note that lessons learned can be either positive or negative. Some of the positive lessons learned during the 779 Closure Project are:

- The 779 Closure project was organized such that all the project personnel (including procurement, RCTs, Rad. Engineering, and custodial services) reported to the Project Manager. This reporting relationship was one of the primary reasons the 779 Closure Project was successful.
- CDPHE and EPA were kept informed and involved in the major decisions of the project. This helped to ensure the project's decision document was interpreted favorably to the activities being accomplished. The 779 DOP changes were minimal due to the up front planning and continued involvement of the regulators.
- During completion of the 779 Closure Project surface contaminated object (SCO) containers were approved and used by the project. The larger waste containers allowed removal of components in larger section thus reducing dismantlement labor and reducing component removal time.
- During the first stages of planning, the project evaluated the size and content of each glovebox and identified how each glovebox would be removed and packaged. These processes saved time and labor.

The Project Safety personnel developed a project-specific "Health and Safety Notes" Newsletter to distribute lessons learned to project personnel. The newsletter was very beneficial in transmitting project information.

During the initial staffing of the 779 Closure Project certain assumptions were made about the responsibilities and the workload of each of the project members. The assumptions were based more on organizational layout, cost, intuition and perceived project needs rather than a detailed evaluation of the duties of each position. The assumptions were made at a cognitive level and not fully documented. This condition lead to problems later in the project. The resulting problems are identified below:

- The project member's assumed and actual workload could not be compared and modified as project demands changed. The result was some personnel were over worked, some personnel were under-worked, and there was some confusion about project member responsibilities.
- The project was understaffed to complete the entire project reporting requirements. This lead to misleading information being passed on to project oversight personnel.

The transition from an operating facility to a decommissioning project was one of the most difficult tasks in completing the 779 Closure Project. The greatest challenge in this transition was complying with the project's authorization basis document while completing aggressive dismantlement activities. The ventilation system operational requirements, room differential pressure requirements, and maintenance of the fire protection and alarm systems were the components impacting the project the most. Special attention to these systems need to be considered when modifying the facility's authorization basis document to allow decommissioning activities. Several examples of problems identified during the 779 decommissioning work include the following:

- The fire protection alarm reporting system cable routing was directly below and interfering with piping and duct removal. This condition meant that the alarm cable and conduit should be removed before the pipe and duct. However, based on the facility's authorization basis document, the piping and duct needed to be removed prior to deactivating the alarm circuit. The 779 Closure Project resolution was to reroute the alarm circuit and then remove the other components. Although the condition was corrected the situation caused work delays as the condition was corrected.
- Based on the Facility's authorization basis document the fire suppression system is the last system to be removed from the facility. The 779 Closure Project found that this situation caused two problems. First the fire water piping and sprinklers interfered with removal of other components and second the entire facility had to be clean before the system is removed. The 779 Closure Project ended up sectioning the fire suppression system using freeze plugs as temporary isolation barriers. The project experienced delays while the work was completed. Prior planning in modifying the authorization basis document could facilitate a more workable environment, such as allowing a fire watch in place of the fire system.

Several other points to consider in planning future projects are:

- The processes used in completing the decommissioning work were effective and safety was maintained at a very high level through involvement of the craft in planning the dismantlement tasks. The project also had daily pre-evolution meetings and weekly safety meetings. An informal project safety committee was used to address project safety concerns as quickly as possible.

- The 779 Closure Project under estimated the number of size reduction and component handling tools necessary to complete the project. The large number of tools can be attributed to the large quantity of tools broken and those discarded as contaminated. Better training of the craft in proper use, maintenance and handling could reduce the number of tools required.

- Early in the project the decision was made to minimize the amount of glove box internal decontamination. In place of decontamination fixatives were used to help minimize the transport of contamination during size reduction. This decision lead to project personnel spending additional time in breathing air during the size reduction process. The benefit of this decision should be evaluated on a case by case basis.

- The 779 Closure Project's final survey team was assembled early in the project. This foresight was very beneficial to the project, as many potential hurdles became non-existent. The final survey team wrote the final closure plans, discussed the release process with the regulators, met with and provided immediate response to the independent verification group. The final survey team also classified the buildings and wrote supporting survey documents. The timing of starting the final survey process should be evaluated for each project. The 779 Closure Project benefited by having the final survey contractor start early as there were numerous areas that required pre-final survey characterization and re-work (decontamination). However, there is a tradeoff in costs and starting the process too soon is not advantageous.

14. REFERENCES

Asbestos Characterization Report for the 779 Cluster Project, Rev. 0, October 1997

Building 779 Cluster Closure Project Health and Safety Plan, Rev. XI, Sept. 16, 1999

Lead/Metals in Paint Characterization For Building 779 Cluster, Rev. 0, August 6, 1998

Rocky Flats Cleanup Agreement (RFCA)

Decommissioning Operations Plan for the 779 Cluster Interim Measure/Interim Remedial Action, Rev. 0, February 1998

Closeout Radiological Survey Plan for the Building 779 Cluster, Rev. 3, October 1999, RF/RMRS-97-123.UN

Closeout Radiological Survey Report For Building 729, Rev. 0, April 1999, RF/RMRS-99-358.UN

Closeout Radiological Survey Report For Building 779, Annex B, Rev. 1, October 1999, RF/RMRS-99-437.UN

Closeout Radiological Survey Report For Building 779, Administration Building, Rev. 0, October 1999, RF/RMRS-99-437.UN

Closeout Radiological Survey Report For Building 779, "A" Annex, Rev. 0, November 1999, RF/RMRS-99-431.UN

Closeout Radiological Survey Report For Building 779, Main Building, Rev. 0, December 1999, RF/RMRS-99-476.UN

Closeout Radiological Survey Report For Buildings 727, 782, and 783, Rev. 0, February 2000, RF/RMRS-2000-019.UN

Building 779 Cluster Closure Project, Non-Radiological Closeout Report For Building 779, A-Annex, Rev.0, Sept. 3, 1999

779 Cluster Closure Project, Non-Radiological Closeout Report For The Administrative Area of Building 779, Rev. 0, Sept. 29, 1999

Building 779 Cluster Closure Project, Non-Radiological Closeout Report For Main, Utility Area and B-Annex, Rev. 0, Dec. 13, 1999

Building 779 Cluster Closure Project, Non-Radiological Closeout Report For Buildings 727, 782 and 783, Rev. 0, Feb. 1, 2000

Reconnaissance Level Characterization Plan for the 779 Cluster, Rev. 0, December 17, 1997

Reconnaissance Level Characterization Report for the 779 Cluster, Rev. 0, December 17, 1997

APPENDIX A

MSDSs FOR FIXATIVES

MATERIAL SAFETY DATA SHEET

3M
3M Center
St. Paul, Minnesota
55144-1000
(612) 733-1110

Copyright, 1996, Minnesota Mining and Manufacturing Company. All rights reserved. Copying and/or downloading of this information for the purpose of properly utilizing 3M products is allowed provided that:
1) the information is copied in full with no changes unless prior agreement is obtained from 3M, and
2) neither the copy nor the original is resold or otherwise distributed with the intention of earning a profit thereon.

DIVISION: DO-IT-YOURSELF/CONSTRUCTION MARKETS DIV
TRADE NAME:
FIREDAM(TM) SPRAY
ID NUMBER/U.P.C.:
98-0400-2967-4 00-51115-08310-5 98-0400-2998-9 00-51115-08311-2
98-0400-2999-7 00-51115-08312-9
ISSUED: November 22, 1996
SUPERSEDES: INITIAL ISSUE
DOCUMENT: 07-8899-2

1. INGREDIENT

INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	40.0 - 50.0
POLYCHLOROPRENE	9010-98-4	30.0 - 40.0
GLYCEROL ESTER OF HYDROGENATED ROSIN	65997-13-9	5 - 10.0
Rosin, polymer with phenol	68083-03-4	5 - 10
XYLENE	1330-20-7	1 - 3
ETHYL ALCOHOL	64-17-5	1 - 3
ZINC OXIDE	1314-13-2	1 - 2

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR Part 372:
XYLENE
ZINC OXIDE

2. PHYSICAL DATA

BOILING POINT:	73 - 80 C ethanol
VAPOR PRESSURE:	N/A
VAPOR DENSITY:	1.10 Air=1
EVAPORATION RATE:	> 1.00 Water=1
SOLUBILITY IN WATER:	Good
SPECIFIC GRAVITY:	1.08 Water=1
PERCENT VOLATILE:	ca. 55 % by wt
pH:	ca. 10.00
VISCOSITY:	5000 - 7500 centipoise

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

---

2. PHYSICAL DATA (continued)

MELTING POINT:..... N/D

APPEARANCE AND ODOR:
liquid, green, slight odor of ammonia

---

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... 49 C PMCC
FLAMMABLE LIMITS - LEL:..... N/A
FLAMMABLE LIMITS - UEL:..... N/A
AUTOIGNITION TEMPERATURE:..... N/D

EXTINGUISHING MEDIA:
Water spray, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Not applicable.

NFPA HAZARD CODES: HEALTH: 1 FIRE: 0 REACTIVITY: 0
UNUSUAL REACTION HAZARD: none

---

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS/CONDITIONS TO AVOID:
Not applicable.

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon Monoxide and Carbon Dioxide, Hydrogen Chloride, Aldehydes, Ketones.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:
Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. In the U.S.A., call (612) 733-1110 or (612) 733-6100 for 24-hour spill assistance. Cover with absorbent material. Collect spilled material. Place in a U.S. DOT-approved container.

RECOMMENDED DISPOSAL:
Incinerate in an industrial or commercial facility in the presence of a combustible material. Dispose of completely cured (or polymerized) material in a sanitary landfill.

ENVIRONMENTAL DATA:
Not determined.

REGULATORY INFORMATION:
Volatile Organic Compounds: ca. 46 gms/liter calculated per SCAQMD rule 443.1.
Volatile Organic Compounds: ca. 4.2 %.
Volatile Organic Compounds: ca. .39 lb/gal.
VOC Less H2O & Exempt Solvents: ca. 79 gms/liter calculated per SCAQMD rule 443.1.
Hazardous Air Pollutants: ca. .04 #/# solids calculated.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

EPCRA HAZARD CLASS:
FIRE HAZARD: No PRESSURE: No REACTIVITY: No ACUTE: Yes CHRONIC: No

6. SUGGESTED FIRST AID

EYE CONTACT:
Immediately flush eyes with large amounts of water. Get immediate medical attention.

SKIN CONTACT:
Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:
If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

31

6. SUGGESTED FIRST AID (continued)

IF SWALLOWED:
Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:
Avoid eye contact with vapor, spray, or mist. Wear vented goggles. Wear safety glasses with side shields.

SKIN PROTECTION:
Avoid prolonged or repeated skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: nitrile rubber, polyethylene/ethylene vinyl alcohol, polytetrafluoroethylene (Teflon), fluoroelastomer (Viton).

RECOMMENDED VENTILATION:
Use with functioning spray booth or local exhaust. Use in a well-ventilated area. Provide sufficient ventilation to maintain emissions below recommended exposure limits.

RESPIRATORY PROTECTION:
Avoid breathing of vapors, mists or spray.

PREVENTION OF ACCIDENTAL INGESTION:
Do not ingest.

RECOMMENDED STORAGE:
Keep container closed when not in use. Keep out of the reach of children.

FIRE AND EXPLOSION AVOIDANCE:
Keep container tightly closed.

EXPOSURE LIMITS

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
WATER	NONE	NONE	NONE	NONE	
POLYCHLOROPRENE	NONE	NONE	NONE	NONE	
GLYCEROL ESTER OF HYDROGENATED ROSIN	NONE	NONE	NONE	NONE	
Rosin, polymer with phenol	NONE	NONE	NONE	NONE	
XYLENE	100	PPM	TWA	ACGIH	
XYLENE	150	PPM	STEL	ACGIH	
XYLENE	100	PPM	TWA	OSHA	
XYLENE	150	PPM	STEL	OSHA	

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

EXPOSURE LIMITS (continued)

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
ETHYL ALCOHOL.....	1000	PPM	TWA	ACGIH	
ETHYL ALCOHOL.....	1000	PPM	TWA	OSHA	
ZINC OXIDE.....	10 as dust	MG/M3	TWA	ACGIH	
ZINC OXIDE.....	10 as dust	MG/M3	TWA	OSHA	
ZINC OXIDE.....	5 as FUME	MG/M3	TWA	ACGIH	
ZINC OXIDE.....	10 as FUME	MG/M3	STEL	ACGIH	
ZINC OXIDE.....	5 as FUME	MG/M3	TWA	OSHA	
ZINC OXIDE.....	10 as FUME	MG/M3	STEL	OSHA	

* SKIN NOTATION: Listed substances indicated with 'Y' under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
- ACGIH: American Conference of Governmental Industrial Hygienists
- OSHA: Occupational Safety and Health Administration
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
No adverse health effects are expected from eye contact.

SKIN CONTACT:
No adverse health effects are expected from skin contact.

INHALATION:
Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:
Ingestion may cause:

Irritation of Gastrointestinal Tissues: signs/symptoms can include pain, vomiting, abdominal tenderness, nausea, blood in vomitus, and blood in feces.

The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. 3M MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

3M provides information in electronic form as a service to its customers. Due to the remote possibility that electronic transfer may have resulted in errors, omissions or alterations in this information, 3M makes no representations as to its completeness or accuracy. In addition, information obtained from a database may not be as current as the information in the MSDS available directly from 3M.

MATERIAL SAFETY DATA SHEET

(Essentially similar to OSHA form 174, Sept. 1985 - For Compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200)

Section I - Product Identity:

A-B-C, Asbestos Binding Compound (6421, [illegible])

Manufacturer's Name:
Fiberlock Technologies, Inc.
630 Putnam Avenue
Cambridge, MA
02139-0802
Mail Address:
P.O. Box 390432
Cambridge, MA 02139-0802

Date of Preparation: January 2, 1996
Information Telephone Number:
(617) 876-8020
Emergency Telephone Numbers:
Weekdays: (617) 876-8020
(After hours, weekends & holidays)
(508) 887-5926, or "CHEM-TEL" Emergency
Contact Number: (800) 255-3924

Section II - Hazardous Ingredients/Identity Information

HAZARDOUS COMPONENT	COMMON NAME(S)	%	CAS. NO.	OSHA PEL	OR	ACGIH TLV

None per the limits for reporting set forth in 29CFR 1910.1200 [1]

Section III - Physical/Chemical Characteristics (See reference note(s) No. 1, 2 on Reverse)

Boiling Points of Major Constituent: (Water)	212°F	Specific Gravity (H_2O=1) Wgt./gal.	9.6
Vapor Pressure (mm Hg) @ 68°C	760	Melting Point Water (Ice)	32°F
Vapor Density (AIR=1) Heavier Lighter	 X 	Evaporation Rate (Butyl Acetate=1)	Slower
Solubility in Water	Total	Appearance: liquid Odor: slight odor	Maximum VOC's 250 g/l

Section IV - Fire and Explosion Hazard Data (Non-Flammable)

Flash Point:	Flammable Limits:	DOT Hazard Class:	Marking:
Non-Combustible	LEL: N/A UEL:N/A	Non Regulated	"Keep From Freezing"

Section V - Reactivity Data

Hazardous Polymerization: Will not occur.
Stability: Stable
Incompatibility: Avoid Contact with: Strong oxidizing agents (e.g., nitric acid, permanganates), etc.
Hazardous Decomposition Products: Some carbon monoxide

Section VI - Health Hazard Data, Toxicity Data

Route(s) of Entry: N/A
Carcinogenicity?: No
Health Hazards (Acute and Chronic):

EFFECTS OF OVEREXPOSURE: Inhalation, vapors or spray mists may be slightly irritating to eye, nose, throat, and mucous membranes of respiratory tract producing symptoms of headache, nausea in poorly ventilated areas. Skin Contact: Prolonged or repeated contact with coating may cause slight skin irritation. Eye Contact: Direct contact; inconsequential eye irritation. Ingestion: May cause nausea and intended expectoration.

EMERGENCY AND FIRST AID PROCEDURES: Inhalation: Remove to fresh air. Eye and Skin Contact: Immediately flush eyes with plenty of water for at least 15 minutes and consult physician; wash skin thoroughly with soap and water. If drenched, remove and wash clothing before reuse. Ingestion: If victim is conscious, give 2 glasses of water. Call a physician.

SUPPLEMENTAL INFORMATION
To comply with New Jersey DOH Right-To-Know labeling law (N.J.A.C. 8:59 - 5.1 & 5.2)

CAS. No.:	CHEMICAL INGREDIENTS:
7732-18-5	Water
13463-67-7	Titanium dioxide
25265-77-4	2, 2, 4-trimethyl-1-3, pentanediol monoisobutyrate
Not Available*	Proprietary surfactant
Not Available*	Latex resin solids

*contents partially unknown

HMIS HAZARD RATING			
Health 1	Flammability 0	Reactivity 0	Personal Protection A
HAZARD INDEX			
0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe			
PERSONAL PROTECTION CODE			
A=Safety Glasses			

NOTES: [1]The white version of this product (#6421) contains titanium dioxide pigment classified by ACGIH as a "nuisance dust". Exposure to spray mists or sanding dusts should be controlled to below 2 mg/m³ through usage of NIOSH-approved dust filter respirators.

Section VII: Precautions for Safe Handling and Use

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Keep unnecessary people away. Floor may be slippery; use care to avoid falling. Dike and contain material with inert material (e.g. sand, earth). Transfer liquid to containers for recovery or disposal and solid diking material to separate containers for disposal. Keep spills and run-offs out of municipal sewers and open bodies of water.
WASTE DISPOSAL METHOD: The coating and any contaminated diking material should be thoroughly air dried and collected into drums. The drums should then be sealed and properly labeled with waste designation and landfill or incinerated according to current local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Maximum storage temperature 100°F. Keep closure tight and container upright to prevent leakage. Precautionary Labeling: "Keep from Freezing".
OTHER PRECAUTIONS: Do not get in eyes. Avoid skin contact. Prevent prolonged or repeated breathing of vapors or spray mists. Do not handle until the manufacturer's safety precautions and label instructions have been read and understood. Avoid breathing sanding dust.

Section VIII: Control Measures

RESPIRATORY PROTECTION: None required if good ventilation is maintained. Wear respirator (MSHA/NIOSH-approved or equivalent) suitable for concentrations and types of air contaminants encountered. Use approved chemical/mechanical filters designed to remove particulates in open and restricted ventilation areas. Use MSHA/NIOSH-approved airline type respirators or hood in confined areas.
VENTILATION: Sufficient ventilation, in pattern and volume, should be provided to keep the air contaminant concentration below applicable exposure limits. All application areas should be ventilated in accordance with OSHA regulation 29CFR Part 1910.94.
PROTECTIVE GLOVES: Impervious gloves should be worn if prolonged skin contact is likely. Use neoprene or rubber gloves to prevent prolonged skin contact.
EYE PROTECTION: Use safety eyewear including side shields, face shields, or chemical splash goggles (ANSIZ-87.1 or approved equivalent).
OTHER PROTECTIVE EQUIPMENT: Use disposable or impervious clothing if work clothing contamination is likely. Use protective cream if prolonged skin contact is likely.
HYGIENIC PRACTICES: Wash hands before eating, smoking, or using the washroom. Food or beverages should not be consumed anywhere this product is being applied.

References:

1. Sax, N.I., "Dangerous Properties of Industrial Materials", 8th ed., Van Nostrand Reinhold Company, Inc., NY, 1992.
2. American Conference of Governmental Industrial Hygienists, "TLV's and Biological Exposure Indices" for the current year (published annually).
3. U.S. Code of Federal Regulations (CFR) U.S. Dept. of Labor, No. 29, Parts 1900 to 1910.1200. OSHA Communications Standard 29 CFR 1910.1200.
4. Sax, N.I., R.J. "Hazardous Chemicals Desk Reference", Van Nostrand Reinhold Co., Inc., NY, 1987.
5. Fire Protection Guide to Hazardous Materials, 10 ed., National Fire Protection Association, Quincy, MA, 1991.
6. Title III List of Lists, U.S. Environmental Protection Agency publication EPA 560/4-90-011, January 1990.

APPLICATION PROCEDURES FOR A-B-C ASBESTOS BINDING COMPOUND

PREPARATION

Prior to application, stir thoroughly to achieve a uniform consistency. A-B-C may be diluted with water for different applications.

APPLICATION

Graco Encapsulator II or equivalent airless spray equipment

Bridging:
- Pressure: 2200-2300 PSI
- Hose length: 100 feet
- Hose diameter: 1/4 inch
- Tip size: .017-.019 (orifice size)
- Fan size: 12 inches

Penetrating:
- Pressure: 1300-1400 PSI
- Hose length: 100 feet
- Hose diameter: 1/4 inch
- Tip size: .017-.031 (orifice size)
- Fan size: 12 inches

CLEAN UP

Tools and drippings should be cleaned with soapy water before coating dries.

KEEP OUT OF REACH OF CHILDREN

Cautions: Approved respirators must be used to prevent inhalation of asbestos fibers that may be present in the air. Protective clothing should be worn. Tools and drippings should be cleaned immediately with clean, soapy water before the coating dries. Careful consideration should be given to all EPA, OSHA and state regulations in effect at the time of application of A-B-C. The Environmental Protection Agency (EPA), through the Office of Pesticides and Toxic Substances has issued reports headed "Guidance for Controlling Friable Asbestos-Containing Materials in Buildings," EPA 560/5 85-024, June 1985, and "Managing Asbestos in Place, A Building Owners Guide to Operations and Maintenance Programs for Asbestos-Containing Materials," 20T-2003, July 1990, containing the proper data, cautions, and procedures for asbestos control. Copies available from Environmental Assistance Division, TS-799, TSCA Assistance Information Service, U.S. EPA, 401 M Street SW, Washington, DC 20460, (202) 554-1404.

Keep from freezing. Do not store at temperatures above 100°F.

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use of this product are beyond our control. Neither Fiberlock Technologies, Inc. nor its agents shall be responsible for the use or results of use of this product or any procedures or apparatus mentioned. We recommend that the prospective user should determine the suitability of A-B-C for each specific project and for the health and safety of personnel working in the area.

1541

PEEL-AWAY™ 7

SPECIFICATIONS AND DATA

1. **PRODUCT NAME:**
PEEL-AWAY 7

2. **MANUFACTURER:**
Dumond Chemicals Inc.
1501 Broadway
New York, N.Y. 10036
Phone: 212-869-6350
FAX: 212-398-0815

3. **PRODUCTION DESCRIPTION:**
The PEEL-AWAY 7 System is an environmentally safe, user friendly paint remover that has been specially formulated to remove multiple layers of paint from wood, brick, stone, metal, plaster, marble and fiberglass surfaces. The chemicals contained in PEEL-AWAY 7 have been selected for their very low evaporation rate which means in some cases you will have to give the product more time to work than with some of the more aggressive chemical products, but the end results will be the same. PEEL-AWAY 7 contains no water and will remove multiple layers of paint with one application instead of several that are often needed with other "safe" removers. This product can be used on both interior and exterior surfaces. In addition to removing multiple layers of alkyds and latex paints, in most instances in a single application, it also has the capability of removing almost all industrial coatings i.e. epoxies, urethanes, aluminum paints, etc. The PEEL-AWAY 7 is a paste that is brushed or sprayed over the surface to be stripped. The paste is then covered with a fibrous laminated cloth which controls evaporation and is left on until the paint is dissolved. The laminated cloth is then removed with the bulk of the paste/paint adhering to the cloth and the stripped surface is then washed clean. In some cases where only a few coats of paint/coatings are being removed the product will work without using the laminated cloth. Usually within a twenty to thirty minute time frame you see the bubbling action of the product. PEEL-AWAY 7 is excellent for carved and molded surfaces where a cast of the stripped surface is often seen on the cloth as it is removed. PEEL-AWAY 7 also has the ability to emulsify VAT tile for simple removal and will not allow any fibers in the air. It also can be used to remove asbestos based paint coatings.

Advantages: DOES NOT CONTAIN METHYLENE CHLORIDE OR CAUSTIC. Normal ventilation is required and product will easily cling to a vertical or ceiling surface. Stays effective longer and can be left on the surface if required for 96 hours depending on the paint/coatings being removed. Will work on most epoxy and urethanes plus other industrial coatings. Classified as non-hazardous material.

Limitations: Product efficiency is reduced below a temperature of 40°. It may not work on some epoxy or other industrial coatings and will not work on most cementitious coatings. Test patches should be made on unknown surface coatings.

Composition & Material:
PEEL-AWAY 7 is formulated and blended with "user" friendly chemicals with excellent penetration and adhesive properties. It does not contain any water. It utilizes a fibrous laminated cloth which allows the paste to work in a sealed and safe environment with little or no evaporation taking place.

4. **TECHNICAL DATA:**

FORM: Tan paste
WT/GAL: 11 lb.
FLASH POINT: 266 F
pH: Neutral

5. **PREPARATORY WORK:**
It is often impossible to know the type or condition of the surface before paint is removed. Before a project is started it is important that a small test area be done typical of the surface to be stripped to ensure that the results will be satisfactory.

GENERAL APPLICATION: Apply PEEL-AWAY 7 with a brush, roller or spray equipment about 1/16" to 1/8" thick working well into crevices and detailed areas. (Test patches will make this determination). Cover paste with fibrous laminated cloth printed polyethylene side facing out. Rub gently to create the adhesion between the cloth and the paste. Dwell time can be between 2 and 24/48 hours depending on the thickness and type of coating being removed. Remove by sliding putty knife under paste and easing paste, paint and cloth away from the surface in one piece.

Exterior cleanup can be done with a pressure or steam wash when working on brick, masonry and metal surfaces. When removing from wood surface use a scrub brush and as little water pressure as possible to prevent saturation. For interior surfaces, scrape off any softened paint residue; wipe down with a damp cloth or sponge. If working on fine wood surfaces it is a good idea to use denatured alcohol or mineral spirits in doing the final clean down since this will eliminate any raising of the grain. Allow to dry thoroughly before recoating. Collect PEEL-AWAY cloth complete with paste/paint residue; put into plastic bags and dispose of in compliance with local regulations.

6. AVAILABILITY AND COST:

All PEEL-AWAY products are available through a network of product distributors and paint stores. Call Dumond Chemicals for the nearest distributor.

COST: Cost will vary depending upon type of coating being removed, surface texture, and number of layers to be removed. PEEL-AWAY 7 has an average coverage of about 30 to 40 square ft. per gallon. The average cost can be calculated by dividing the gallon cost (obtain from local distributor) by the average square feet coverage.

7. WARRANTY:

Dumond Chemicals Inc. warrants this product to be free from defects, and makes no other warranties with respect to the product, express or implied, including without limitation the implied warranties of MERCHANTABILITY OF FITNESS FOR PARTICULAR PURPOSE. Dumond Chemicals Inc. liability shall be limited in all events to supplying sufficient product to retreat the specific areas to which defective product had been applied. Dumond Chemicals Inc. will have no other liability for incidental, consequential or resultant damages whether due to breach of warranty or negligence. This warranty may not be modified or extended by representatives of Dumond Chemicals or its distributors and dealers.

8. TECHNICAL SERVICES:

Dumond Chemicals Inc. employs a direct personal assistance staff to answer technical questions to architects, contractors, etc. Also available are trained sales and technical people for on site assistance. For assistance call our New York office.

Material Safety Data Sheet

Date last revised December 10, 1992

I. General Information

Chemical Name & Synonyms Proprietary Mixture	Trade Name & Synonyms [redacted]
Chemical Family Organic solvent mixture	Formula Mixture
Proper DOT Shipping Name Not regulated	DOT Hazard Classification Not regulated
Manufacturer Dumond Chemicals, Inc.	Manufacturer's Phone Number (212) 869-6350
Manufacturer's Address 1501 Broadway, New York, NY 10036	[redacted] Emergency Number: (800) 457-4280

II. Ingredients

Principal Hazardous Components		Percent	PEL / Threshold Limit Value (units)
Dibasic Ester	1119-40-0 627-93-0	10-25	10 mg/m^3 (mfg recommended)
N-Methyl-2-Pyrrolidone	872-50-4	20-50	None Established
Aluminum Silicate	1332-58-7	20-40	10 mg/m^3 (total dust)
Nonylphenol Ethoxylate	68412-54-4	1-5	None Established
Non-hazardous ingredients		10-30	None Established
Sara 313: This product contains no chemicals that are regulated under SARA Title III, Section 313.			

III. Physical Data

Boiling Point (°F) Not available	Specific Gravity (H_2O = 1) >1
Vapor Pressure (mm Hg.) @ 20C : 0.29	Percent Volatile By Volume (%) 85%
Vapor Density (Air = 1) 3.4 (n-methyl-2-pyrrolidone)	Evaporation Rate (_____ = 1) <1
Solubility In Water Partial	pH Not available
Appearance & Odor Light brown paste with a slight, sweet odor.	

IV. Fire & Explosion Hazard Data

Flash Point (Test Method) 266F (Setaflash)	Auto Ignition Temperature Not available	
Flammable Limits	LEL 0.99	UEL 7.9

Extinguishing Media
Water spray or fog, foam, carbon dioxide, dry chemical

Special Fire Fighting Procedures
Wear full protective equipment and NIOSH approved positive pressure SCBA. Cool exposed containers with water.

Unusual Fire & Explosion Hazards
Vapors form explosive mixtures with air. Decomposition products may be hazardous.

© Copyright 1986 & Published by J. J. KELLER & ASSOCIATES, INC. — Neenah, WI 54956-0368

40

Peel Away 7

V. Health Hazard Data

OSHA Permissible Exposure Limit
See Section II

ACGIH Threshold Limit Value
See Section II

Carcinogen - NTP Program
No

Carcinogen - IARC Program
No

Symptoms of Exposure
Eye: Irritation. Skin: Irritation, prolonged contact may cause burns. Inhalation: Mists and vapors may cause eye and respiratory irritation and blurring of vision. Ingestion: gastro-intestinal irritation, vomiting and abdominal pain.

Medical Conditions Aggravated By Exposure
Chronic respiratory and skin diseases

Primary Route(s) of Entry
Eye, skin, ingestion

Emergency First Aid Eye: Flush with water, 15 min., get medical attention. Skin: Wash well with soap and water. Remove contaminated clothing. Inhalation: Remove to fresh air, see physician. Ingestion: If conscious, give 2 glasses of water. Do not induce vomiting. Get immediate medical attention.

VI. Reactivity Data

Stability		Unstable	Conditions To Avoid
	X	Stable	N/A
Incompatability			Materials To Avoid: Strong acids, bases, oxidizers, reducers
Hazardous Polymerization		May Occur	Conditions To Avoid
	X	Will Not Occur	N/A

Hazardous Decomposition Products
Carbon dioxide, carbon monoxide, oxides of nitrogen

VII. Environmental Protection Procedures

Spill Response
Wear appropriate protective equipment. Remove ignition sources. Collect with absorbent. Wash spill area.

Waste Disposal Method
Dispose in accordance with all state, local and federal regulations.

VIII. Special Protection Information

Eye Protection
Chemical goggles

Skin Protection
Butyl rubber gloves

Respiratory Protection (Specific Type) None normally needed. For spraying and large jobs, see below.

Ventilation Recommended Good general ventilation, equivalent to outdoors

Other Protection
Impervious apron, boots, eye wash as needed.

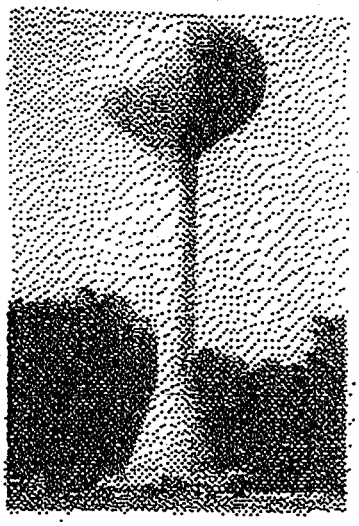
IX. Special Precautions

Hygienic Practices In Handling & Storage
Store in a cool, well ventilated area away from oxidizers and other incompatible substances.

Precautions Work Practices: Avoid eye and skin contact. Avoid breathing vapors. Wash thoroughly after handling. For spray application or where exposures may be excess, a NIOSH approved organic vapor respirator may be used.

Other Precautions
Empty containers retain product residue and may be hazardous.

DUMOND CHEMICALS, INC.
1501 BROADWAY, NEW YORK, N.Y. 10036 • 212 869-6350
FAX 212-398-0815



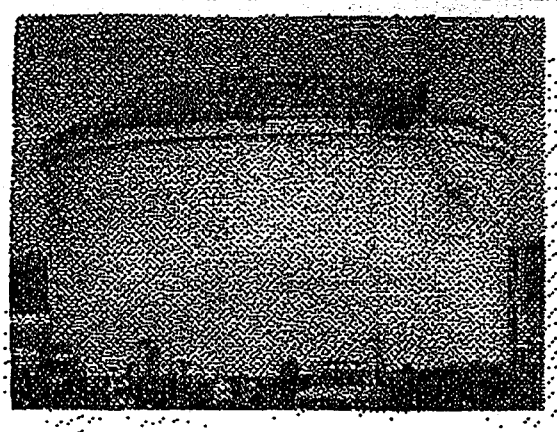
STRIPPING LEAD PAINT FROM A LARGE ELEVATED STORAGE TANK IN OPELOUSAS, LA.

The City of Opelousas awarded a contract to A-WAY Tank Services inc., Baton Rouge, La., for removal of an existing alkyd coating which contained a lead based primer. Initially, the project was to be done using conventional sandblasting with containment. Archie Wilkins, owner of A-WAY, realized that containment costs were going to be so high that he discussed using the PEEL-AWAY ST-1 product with both the City engineer and with Don and Randy Reichle who are water tank engineering specifiers. A-WAY Tank services received approval from the City to use the PEEL-AWAY St-1 product...

The tank was a 750,000 gallon spheroid elevated to 170 feet. Its shape approximates a golf ball atop a tee. The tank is located in a City park and had a few surrounding homes so that containment of sprayed product and rinse water was taken into consideration. The area to be stripped contained 17,000 square feet with 80% of that surface on the raised spheroid section. The job was staged by using a rolling ladder scaffold which allowed one man to do the spraying but could accommodate two men for the removal of the product. The ground area surrounding the tank was covered with poly sheeting and extended out from the tank in all directions to a distance approaching a 100 feet. The PEEL-AWAY product was sprayed from a GRACO king in late afternoon covering around 2000 to 2500 square feet per day, which was quite acceptable given the tank configuration and rigging used. High relative humidity kept the stripper moist and it was easily removed the next morning using rinse water delivered from an airless paint pump, and not requiring any scraping.

Following stripping, the tank was brush blasted using conventional equipment. The contractor indicated that the biggest problem he faced was wind during the spraying and rinsing, but with all of that almost all of the stripper fell onto the containment blanket. What small amount of material fell on the surrounding grassy areas was easily identifiable and was policed by one of the crew following each cycle of stripper removal.

The contractor states that the job generated between 12 to 18 cubic yards of waste and all rinse water either evaporated or was absorbed by the PEEL-AWAY ST-1 on the containment cover. Since the job was bid for blasting, A-WAY realized a substantial profit by using the PEEL-AWAY product. This tank should serve as an indicator to tank owners, engineers and contractors that the PEEL-AWAY Paint Removal System has again proven to be a viable, economic solution to lead paint removal on large structures of any shape.



STRIPPING LEAD PAINT FROM A LARGE GROUND OIL STORAGE TANK IN TULSA, OKLAHOMA

One of the large Pipeline Companies that maintain petroleum storage tanks at various locations throughout their distribution system awarded a contract to Hays Brothers Painting Co.,Moore, Okla. for chemical stripping and repainting one of their tanks at their Tulsa storage complex. Chemical stripping was selected because it was reported to be a low cost paint removal method without the environmental and/or personnel exposure risks associated with dry abrasive blasting under negative air pressure.

The tank chosen for this project was a ground storage tank with geodesic dome having dimensions of 85 ft. diameter and 40 ft. high with a total stripping area of approximately 13,000 sq. feet. Initial tests using PEEL-AWAY ST-1 indicated a coverage rate of 25 sq. feet per gallon as recommended by Dumond Chemicals was sufficient for clean removal of all paint.

Ground containment consisted of four layers beginning with canvas painters' tarpaulins meant to resist any sharp rocks in the area, covered with a single sheet of .006 inch poly and then with a sheet of .020 inch vinyl. All seams were joined using tape and adhesive. The vinyl top cover was affixed to the tank bottom by rolling its edge over two inch diameter foam dowels which were wedged between the tank's lower flange and its concrete footing. Finally, four by eight sheets of 3/8" plywood were placed around the base of the tank so that PEEL-AWAY residues could be easily collected without puncturing the containment system. A dike fabricated from concrete blocks and sand was erected 20 feet from the tank circumference to contain all liquid.

The contractor's swing stage platform was not able to be employed on the tank's windgirder therefore they elected to use a manlift for spraying and removal of the stripper. The PEEL-AWAY ST-1 was sprayed from a Graco pump out of 55 gallon drums. Job scheduling called for spraying approximately one third of the tank surface each afternoon, and removing the stripper the following morning using broad knives and rinse water supplied through an airless paint pump with a # 621 tip. Stripped residues were collected each day and stored in appropriate drums for disposal.

Although the tank had an existing anchor pattern, the contractor and tank owner agreed to sweep blast the surface in one operation rather than apply a prime coat after each days work. The entire job proceeded smoothly. A total of 10 drums of waste were generated and approximately 12 drums of PEEL-AWAY were consumed. The Pipeline Company directed waste disposal in accordance with their corporate guidelines and have indicated that they plan to consider PEEL-AWAY for other lead paint removal projects during the 1992 season. Hays Brothers realized reasonable profit for the job and have indicated that they too will seek to incorporate PEEL-AWAY for many of their future projects.

DUMOND CHEMICALS INC. - 1501 BROADWAY - NEW YORK, N.Y. 10036
PHONE (212) 869-6350 FAX (212) 398-0815

M A T E R I A L S A F E T Y D A T A S H E E T

PRODUCT NAME: E T GLYCERINE SOLUTION HMIS CODES: H F R P
PRODUCT CODE: ETGS

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: ELLIS PAINT CO.
ADDRESS : 3150 E. PICO BLVD.
LOS ANGELES, CA 90023-3683
EMERGENCY PHONE(CHEMTREC) : (800)424-9300 DATE PRINTED : 01/05/98
INFORMATION PHONE : (213)261-8114 NAME OF PREPARER : N/A

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mmHG @TEMP(F)	WEIGHT PERCENT
1,2,3-PROPANETRIOL	56-81-5		18

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: n/a
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 10.51 lb/gl
COATING V.O.C.: 1259 g/l
SOLUBILITY IN WATER: Soluble
APPEARANCE AND ODOR: Green liquid.

SPECIFIC GRAVITY (H2O=1): 1.02
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 0.84 lb/gl
MATERIAL V.O.C.: 100 g/l

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: >200 Deg F. METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY % VOLUME- LOWER: n/a UPPER: n/a

EXTINGUISHING MEDIA: FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
Not required

UNUSUAL FIRE AND EXPLOSION HAZARDS
Material will not sustain combustion unless water has evaporated.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
NOT APPLICABLE

INCOMPATIBILITY (MATERIALS TO AVOID)
None known.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
NONE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

EYE PROTECTION
Normal protection against foreign substances as needed—safety goggles.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
None

WORK/HYGIENIC PRACTICES
Wash hands thoroughly before eating or using the washroom. Smoke in smoking areas only.

SECTION IX - DISCLAIMER

The information contained herein is based on the data available to us and is believed to be correct. However, Ellis Paint Co. makes no warranty expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Ellis Paint Co. assumes no responsibility for injury from the use of the product described herein.

NTP CHEMICAL REPOSITORY
GLYCEROL

-IDENTIFIERS
==========

*CATALOG ID NUMBER: 000006

*CAS NUMBER: 56-81-5

*BASE CHEMICAL NAME: GLYCEROL

*PRIMARY NAME: GLYCEROL

*CHEMICAL FORMULA: C3H8O3

*STRUCTURAL FORMULA: HOCH2CHOHCH2OH

*WLN: Q1YQ1Q

*SYNONYMS:
GLYCERIN
GLYCERIN, ANHYDROUS
GLYCERIN, SYNTHETIC
GLYCERINE
GLYCERITOL
GLYCYL ALCOHOL
1,2,3-PROPANETRIOL
SYNTHETIC GLYCERINE
90 TECHNICAL GLYCERINE
TRIHYDROXYPROPANE
1,2,3-TRIHYDROXYPROPANE

-PHYSICAL CHEMICAL DATA
==========

*PHYSICAL DESCRIPTION: LITERATURE: Clear colorless viscous liquid
REPOSITORY: Clear oily liquid

*MOLECULAR WEIGHT: 92.09

*SPECIFIC GRAVITY: 1.2613 @ 20/4 C [017,047]

*DENSITY: 1.261 g/mL @ 20 C [371]

*MP (DEG C): 17.8 C [025,031,051,421]

*BP (DEG C): 290 C (decomposes) [017,025,205,421]

*SOLUBILITIES:
WATER : >=100 mg/mL @ 18 C (RAD)

DMSO : >=100 mg/mL @ 18 C (RAD)

95% ETHANOL : >=100 mg/mL @ 18 C (RAD)

METHANOL : Not available

ACETONE : >=100 mg/mL @ 18 C (RAD)

TOLUENE : Not available

OTHER SOLVENTS:
Ether: Practically insoluble [295,455]
Benzene: Insoluble [031,062,205]
Alcohol: Miscible [031,205,421,455]
Chloroform: Insoluble [031,062,205]
Fixed and volatile oils: Practically insoluble [295]
Ethyl acetate: 1 part/11 parts [031]
Carbon tetrachloride: Insoluble [031]
Carbon disulfide: Insoluble [031,205]
Petroleum ether: Insoluble [031,205]
Hydrocarbon solvents: Slightly soluble [421]
Propylene glycol: Miscible [295]

*VOLATILITY:
Vapor pressure: 0.0025 mm Hg @ 50 C [043,051,055]; 40 mm Hg @ 198 C [051]
Vapor density : 3.17 [043,051,055]

*FLAMMABILITY(FLASH POINT):
This chemical has a flash point of 160 C (320 F) [043,051,058,371]. It is combustible. Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher. A water spray may also be used [051,058,371,451]. The autoignition temperature is 370 C (698 F) [043,051,371, 451].

*UEL: Not available LEL: Not available

*REACTIVITY:
This compound is incompatible with strong oxidizers [043,058,269,295]. It is also incompatible with hydrogen peroxide, potassium permanganate, nitric acid + sulfuric acid, perchloric acid + lead oxide, acetic anhydride, aniline + nitrobenzene, $Ca(OCl)_2$, CrO_3, F_2 + PbO, $KMnO_4$, K_2O_2, $AgClO_4$ and NaH. A mixture with chlorine explodes if heated to 70-80 C [043]. It reacts with acetic acid, potassium peroxide, sodium peroxide, hydrochloric acid, ($HClO_4$ + PbO) and Na_2O_2 [051]. Contact with potassium chlorate may be explosive [031]. It also reacts with ethylene oxide, perchloric acid, nitric acid + hydrofluoric acid and phosphorus triiodide [066].

*STABILITY:
This compound is hygroscopic [025,275,421,455]. Solutions of this chemical in water, DMSO, 95% ethanol or acetone should be stable for 24 hours under normal lab conditions (RAD).

*OTHER PHYSICAL DATA:
Steam-volatile [025]
Syrupy, sweet and warm taste [031,043,051,455]
Weight per mL @ 20 C: 1.255 to 1.260 g [455]
Neutral to litmus [031]
Solidifies after prolonged cooling at 0 C forming shiny orthorhombic crystals [031,421]
Viscosity (centipoise @ 20 C): 83% solution 111 [031]
Saturation concentration: < 0.5 g/cu m @ 30 C [055]
log P oct: -2.66/2.47 [055]
Sinks and mixes with water [371]
Burning rate: 0.9 mm/min [371]
Latent heat of vaporization: 160 cal/g [371]
Heat of combustion: -4310 cal/g [371]
Heat of solution: -5 cal/g [371]
Heat of fusion: 47.95 cal/g [371]
Crystals do not melt until the temperature is raised to ~20 C [295]
UV Maximum (water < 0.1%): lambda 400-340 nm, 320, 280, 225, 210, 205; A: 0.01, 0.02, 0.05, 0.10, 0.30, 1.0 [275]
Odorless [043,051,062,455]

Refractive index: 1.4746 @ 20 C [017,031,047,205]
Boiling point: 182 C @ 20 mm Hg [017,025,269,275]; 240 C @ 200 mm Hg [031]
Specific gravity: 1.265 @ 15/15 C [025]; 1.26201 @ 25/25 C [031]

-TOXICITY
========

*NIOSH REGISTRY NUMBER: MA8050000

*TOXICITY: (abbreviations)

typ. dose	mode	specie	amount	units	other
TDLo	orl	hmn	1428	mg/kg	
LD50	orl	rat	12600	mg/kg	
LD50	ipr	rat	4420	mg/kg	
LD50	scu	rat	100	mg/kg	
LD50	ivn	rat	5566	mg/kg	
LD50	orl	mus	4090	mg/kg	
LD50	ipr	mus	8700	mg/kg	
LD50	scu	mus	91	mg/kg	
LD50	ivn	mus	4250	mg/kg	
LD50	ivn	rbt	53	gm/kg	
LD50	orl	gpg	7750	mg/kg	

*AQTX/TLM96: over 1000 ppm

*SAX TOXICITY EVALUATION:
THR: Poison by subcutaneous route. Mildly toxic by ingestion. Human systemic effects by ingestion. Experimental reproductive effects. Human mutagenic data. A skin and eye irritant. In the form of mist it is a nuisance particulate and inhalation irritant.

*CARCINOGENICITY: Not available

*MUTATION DATA:

test	lowest dose	test	lowest dose
dni-hmn:lym	200 mmol/L	cyt-rat-orl	1 gm/kg

*TERATOGENICITY:
Reproductive Effects:
TDLo: orl-rat 100 mg/kg (1D male)
TDLo: itt-rat 280 mg/kg (2D male)
TDLo: itt-rat 1600 mg/kg (1D male)

*STANDARDS, REGULATIONS & RECOMMENDATIONS:
OSHA: Federal Register (1/19/89) and 29 CFR 1910.1000 Subpart Z
Transitional Limit: PEL-TWA 15 mg/m3 (total dust) [610]
Transitional Limit: PEL-TWA 5 mg/m3 (respirable fraction) [610]
Final Limit: PEL-TWA 10 mg/m3 (total dust) [610]
Final Limit: PEL-TWA 5 mg/m3 (respirable fraction) [610]
ACGIH: TLV-TWA 10 mg/m3 (for total dust containing no asbestos and less than 1% crystalline silica) [610]
NIOSH Criteria Document: None
NFPA Hazard Rating: Health (H): 1
Flammability (F): 1
Reactivity (R): 0
H1: Materials only slightly hazardous to health (see NFPA for details).
F1: Materials that must be preheated before ignition can occur (see NFPA for details).
R0: Materials which are normally stable even under fire exposure conditions and which are not reactive with water (see NFPA for details).

*OTHER TOXICITY DATA:
Skin and Eye Irritation Data:
skn-rbt 500 mg/24H MLD
eye-rbt 126 mg MLD
eye-rbt 500 mg/24H MLD
Review: Toxicology Review
Status: EPA TSCA Chemical Inventory, 1986
EPA TSCA Test Submission (TSCATS) Data Base, January 1989
NIOSH Analytical Methods: see Nuisance Dust, Total 0500; Nuisance Dust Respirable, 0600
Meets criteria for proposed OSHA Medical Records Rule

-OTHER DATA (Regulatory)

*PROPER SHIPPING NAME (IATA): Not restricted

*UN/ID NUMBER:

*HAZARD CLASS: SUBSIDIARY RISK: PACKING GROUP:

*LABELS REQUIRED:

*PACKAGING: PASSENGER: PKG. INSTR.: MAXIMUM QUANTITY:
CARGO : PKG. INSTR.: MAXIMUM QUANTITY:

*SPECIAL PROVISIONS:

*USES:
This compound is used as a food additive, ingredient of some linctuses and pastilles, sweetening agent, emollient, with dried magnesium sulphate used in the treatment of septic wounds and boils, lubricating gastroscopes, preservative in some pharmaceutical preparations and in certain biological preparations and in non-alcoholic extracts and tinctures. It is used in plasticizer manufacturing, confectionary, dynamite, nitroglycerine, antifreeze, antibiotics, rollers and lectographs, solvent, cosmetics, humectant, liquid soaps, liqueurs, blacking, printing and copying inks, elastic glues, lead oxide cements, to keep fabrics pliable, to preserve printing on cotton, hectographs, to keep frost from windshields, in shock absorber fluids, in fermentation of nutrients, demulcent, an oral osmotic diuretic to manage cerebral edema, reduce cerebrospinal fluid pressure and lower intraocular pressure, raw material for alkyd resins, cellophane, ester gums, perfumery, bacteriostat, penetrant, polyurethane polyols, emulsifying agent, rubber stamp inks, laxative, reducing intracranial pressure and promotes peristalsis evacuation of the lower bowel.
In veterinary medicine, it used in the treatment of bovine ketosis, pregnancy toxaemia in sheep, pharmaceutical aid (humectant, solvent) emollient and emulcent.

*COMMENTS: Not available

-HANDLING PROCEDURES

*ACUTE/CHRONIC HAZARDS:
This compound may cause eye and skin irritation. It may be readily absorbed through the skin [269]. It is an irritant of the mucous membranes [058,151]. It is also a respiratory tract irritant [346]. When heated to decomposition it may emit acrid smoke [043]. It may also emit toxic fumes of carbon monoxide and carbon dioxide [269].

*MINIMUM PROTECTIVE CLOTHING: Not available

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Remove to fresh air.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Immediately wash eyes for at least 15 minutes. Wash skin with soap and water.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
No information found.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Call a physician.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Acute: May cause eye and skin irritation, nausea, headache and dizziness. Chronic: May cause liver abnormalities, kidney damage, lung damage, blood abnormalities, spleen damage and testis damage.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
Irritation potential is eliminated when material is washed out immediately after contact.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: REMOVE TO FRESH AIR. EYE CONTACT: FLUSH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN CONTACT: WASH AFFECTED AREAS WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. INGESTION: GET MEDICAL ATTENTION IMMEDIATELY IF NECESSARY.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

IN CASE OF SPILL, SWEEP/SCOOP UP AND REMOVE. CAUSES SLIPPERY CONDITION WHEN WET.

WASTE DISPOSAL METHOD
Place in tightly closed containers. Incinerate or dispose of in accordance with local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Ensure all equipment (tanks, hoppers, transfer pipes, containers, etc.) is properly grounded to prevent static electricity discharge.

OTHER PRECAUTIONS
None

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION
Where vapor does not exceed TLV limits, use an approved dust respirator. Where TLV is exceeded, the use of an approved NIOSH respirator is recommended.

VENTILATION
Adequate volume and pattern to keep air contaminant concentration below current applicable OSHA or ACGIH's TLV limits.

PROTECTIVE GLOVES
None needed

*RECOMMENDED GLOVE MATERIALS:
GlovES+ Expert System Glove Types For The Neat (Undiluted) Chemical:
This chemical has not been tested for permeation by Radian Corporation; however, the GlovES+ expert system was used to extrapolate permeation test information from compounds in the same chemical class. The GlovES+ system uses permeation data from literature sources; therefore, extra safety margins should be used with the estimated protection time(s). If this chemical makes direct contact with your glove, or if a tear, puncture or hole develops, replace them at once.
The GlovES+ expert system is a tool that can help people better manage protection from chemicals, however this tool cannot replace sound judgment nor make technical decisions. Our GlovES+ expert system is designed to offer initial advice and assistance in glove selection while the final glove selection should be made by knowledgeable individuals based on the specific circumstances involved.

Glove Type	Model Number	Thickness	Estimated Protection Time
Unknown	LRC Marigold Regent Mediglove	0.03 mm	480 min
Natural	LRC Marigold Sensotech	0.28 mm	480 min
Nitrile	LRC Marigold Green Supasolve	0.30 mm	480 min
Natural + Neoprene	Platex Argus	0.91 mm	480 min

*RECOMMENDED RESPIRATOR:
Where the neat test chemical is weighed and diluted, wear a NIOSH-approved half face respirator equipped with an organic vapor/acid gas cartridge (specific for organic vapors, HCl, acid gas and SO2) with a dust/mist filter.

*OTHER: Not available

*STORAGE PRECAUTIONS:
You should store this chemical under refrigerated temperatures, and protect it from moisture. If possible, it would be prudent to store this compound under inert atmosphere.

*SPILLS AND LEAKAGE:
If you should spill this chemical, use absorbent paper to pick up all liquid spill material. Seal the absorbent paper, as well as any of your clothing which may be contaminated, in a vapor-tight plastic bag for eventual disposal. Wash any surfaces you may have contaminated with a soap and water solution. Do not reenter the contaminated area until the Safety Officer (or other responsible person) has verified that the area has been properly cleaned.

*DISPOSAL AND WASTE TREATMENT: Not available

-EMERGENCY PROCEDURES

*SKIN CONTACT:
IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water.
If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

*INHALATION:
IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in

the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital.

Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Respirator Recommendation.

*EYE CONTACT:

First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center.

Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician.

IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

*INGESTION:

DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Be prepared to transport the victim to a hospital if advised by a physician.

If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital.

*SYMPTOMS:

Symptoms of exposure to this compound may include headache, nausea, vomiting and irritation of the skin and eyes [043,269]. Contact with the eyes may cause a strong stinging, burning sensation, with tearing and dilation of the conjunctival vessels. Taken orally it reduces ocular pressure [099]. It may cause dehydration and irritation of the skin and mucous membranes, hemolysis, hemoglobinuria, renal failure, convulsions, paralysis, hyperglycemia, glycosuria, acidosis, death from nonketotic hyperosmolar hyperglycemia, gluconeogenic, antiketogenic, osmodiuretic, dizziness, insomnia, diarrhea and fever [151]. It may be irritating to the respiratory tract [346]. It may also cause rectal discomfort or burning [158]. Other symptoms may include thirst, euphoria, confusion, drowsiness, loss of consciousness, coma, temporary hearing loss, reduced intracranial pressure, allergic reaction, oxalosis, diabetic acidosis and prostration [295].

-SOURCES
=======

*SOURCES:

[015] Lewis, R.J., Sr. and R.L. Tatken, Eds. Registry of Toxic Effects of Chemical Substances. On-line Ed. National Institute for Occupational Safety and Health. Cincinnati, OH. MA8050000. June 30, 1989.

[017] Weast, R.C., M.J. Astle, and W.H. Beyer, Eds. CRC Handbook of Chemistry and Physics. 67th Ed. CRC Press, Inc. Boca Raton, FL. 1986. p. C-289, #7354.

[025] Buckingham, J., Ed. Dictionary of Organic Compounds. 5th Ed. Chapman and Hall. New York. 1982. Vol. 3, p. 2769, #G00307.

[031] Windholz, M., Ed. The Merck Index. 10th Ed. Merck and Co. Rahway, NJ. 1983. p. 644, #4347.

[036] Bretherick, L., Ed. Hazards in the Chemical Laboratory. 4th Ed. The Royal Society of Chemistry. London. 1986. p. 348.

[038] Stull, D.R. Vapor pressure of pure substances: Organic Compounds. Industrial and Engineering Chem. 39(4):517-550. 1947. p. 520.

[039] Boublik, T., V. Fried and E. Hala. The Vapor Pressures of Pure Substances. p. 133.

[043] Sax, N.I. and Richard J. Lewis, Sr. Dangerous Properties of Industrial Materials. 7th Ed. Van Nostrand Reinhold. New York. 1989. Vol. III, pp. 1810-1811, #GGA000.

[047] Weast, R.C. and M.J. Astle, Eds. CRC Handbook of Data on Organic Compounds. CRC Press, Inc. Boca Raton, FL. 1985. Vol. I, p. 667, #G00155.

[051] Sax, N. Irving, Ed. Dangerous Properties of Industrial Materials Report. Bi-monthly Updates. Van Nostrand Reinhold Company, Inc. New York. May/June 1981. Vol. 1, #5, pp. 61-62; July/August 1983. Vol. 3, #4, pp. 58-60.

[055] Verschueren, K. Handbook of Environmental Data on Organic Chemicals. 2nd Ed. Van Nostrand Reinhold. New York. 1983. pp. 694-695.

[058] Information Handling Services. Material Safety Data Sheets Service. Microfiche Ed. Bimonthly Updates. June/July 1989. #9106-141, A-11.

[062] Sax, N.I. and R.J. Lewis Sr., Eds. Hawley's Condensed Chemical Dictionary. 11th Ed. Van Nostrand Reinhold. New York. 1987. pp. 567-568.

[066] Bretherick, L. Handbook of Reactive Chemical Hazards. 3rd Ed. Butterworths. London. 1985. p. 382.

[082] U.S. Environmental Protection Agency, Office of Toxic Substances. Toxic Substances Control Act Chemical Substance Inventory: 1985 Edition. 5 Vols. U.S. Environmental Protection Agency. Washington, D.C. January 1986. Listed.

[099] Grant, W. Morton, M.D. Toxicology of the Eye. 3rd Ed. Charles C. Thomas, Publisher. Springfield, IL. 1986. pp. 463-464.

[105] The Society of Dyers and Colourists. Colour Index. Vols. 1-7. The Society of Dyers and Colourists. Yorkshire, England. American Association of Textile Chemists and Colorists. Research Triangle Park, NC. 1971-1982. p. 4770.

[107] Occupational Health Services, Inc. Hazardline. Occupational Health Services, Inc. New York. Listed.

[110] Oak Ridge National Laboratory. Environmental Mutagen Information Center (EMIC), Bibliographic Data Base. Oak Ridge National Laboratory. Oak Ridge, TN. Listed.

[120] Oak Ridge National Laboratory. Environmental Teratogen Information Center (ETIC), Bibliographic Data Base. Oak Ridge National Laboratory. Oak Ridge, TN. Listed.

[141] Veterinary Medicine Publishing Co. Veterinary Pharmaceuticals and Biologicals. 6th Ed. Veterinary Medicine Publishing Co. Lenexa, KS. 1988. p. 711.

[151] Gosselin, R.E., H.C. Hodge, and R.P. Smith. Clinical Toxicology of Commercial Products. 5th Ed. Williams and Wilkins, Co.

53

Baltimore. 1984. p. II-226, #704.

[158] Huff, B.B., Ed. Physicians' Desk Reference. 43rd Ed. Medical Economics Co. Oradell, NJ. 1989. pp. 941, 2291.

[164] Huff, B.B., Ed. Physicians' Desk Reference for Nonprescription Drugs. 8th Ed. Medical Economics Co. Oradell, NJ. 1987. p. 538.

[195] Estrin, F.E., P.A. Crosley and C.R. Haynes, Eds. CFTA Cosmetic Ingredient Dictionary. 3rd Ed. The Cosmetic, Toiletry and Fragrance Assn. Inc. Washington. 1982. p. 110.

[205] Dean, John A., Ed. Lange's Handbook of Chemistry. 13th Ed. McGraw-Hill Book Company. New York. 1985. p. 7-424, #g28.

[269] Lenga, Robert E. The Sigma-Aldrich Library of Chemical Safety Data. Edition 1. Sigma-Aldrich Corporation. Milwaukee, WI. 1985. p. 993, #A.

[275] Aldrich Chemical Company. Aldrich Catalog/Handbook of Fine Chemical. Aldrich Chemical Co., Inc. Milwaukee, WI. 1988. p. 780, #19,161-2.

[295] Reynolds, James E.F., Ed. Martindale The Extra Pharmacopoeia. 28th Ed. The Pharmaceutical Press. London. 1982. pp. 706-707.

[301] Dreisbach, R.H. Handbook of Poisoning: Prevention, Diagnosis and Treatment. 11th Ed. Lange Medical Publications. Los Altos, CA. 1983. p. 195.

[346] Sittig, M. Handbook of Toxic and Hazardous Chemicals and Carcinogens. 2nd Ed. Noyes, Publications. Park Ridge, NJ. 1985. pp. 473-474.

[371] U.S. Coast Guard, Department of Transportation. CHRIS Hazardous Chemical Data. U.S. Coast Guard. Washington, D.C. 1985. Vol. 2.

[406] Goodman, L.S., A. Gilman, F. Murad and T.W. Rall, Eds. The Pharmacological Basis of Therapeutics. 7th Ed. Macmillan Publishing Co. New York. 1985. pp. 946-957.

[415] American Conference of Governmental Industrial Hygienists. Threshold Limit Values and Biological Exposure Indices for 1988-1989. American Conference of Governmental Industrial Hygienists. Cincinnati, OH. 1988. p. 22.

[421] American Conference of Governmental Industrial Hygienists. Documentation of the Threshold Limit Values. 5th Ed. American Conference of Governmental Industrial Hygienists. Cincinnati, OH. 1986. p. 286.

[451] National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 9th Ed. National Fire Protection Association. Quincy, MA. 1986. p. 325M-56.

[455] The Pharmaceutical Society of Great Britain. The Pharmaceutical Codex. 11th Edition. The Pharmaceutical Press. London. 1979. pp. 393-394.

[545] Office of the Federal Register National Archives and Records Administration. Federal Register, Dept. of Labor, Part III. U.S. Government Printing Office. Washington. January 19, 1989. p. 2939.

[610] Clansky, Kenneth B., Ed. Suspect Chemicals Sourcebook: A Guide to

Industrial Chemicals Covered Under Major Federal Regulatory and Advisory Programs. Roytech Publications, Inc. Burlingame, CA. 1990. Section 3, p. 8.

[620] United States National Toxicology Program. Chemical Status Report. NTP Chemtrack System. Research Triangle Park, NC. November 6, 1990. Not listed.

APPENDIX B

RFCA TIER I AND II LIMITS

(Ground Water Action Levels)

Table 2 - Ground Water Action Levels

Analyte	CAS No.	Tier 1- 100 x MCLs (pCi/L)	Tier 2- MCLs (pCi/L)
RADIOLOGIC PARAMETERS:			
Americium-241	14596-10-2	*1.45E+01*	*1.45E-01*
Cesium-137+D	10045-97-3	*1.51E+02*	*1.51E+00*
Plutonium-239	10-12-8	*1.51E+01*	*1.51E-01*
Plutonium-240	10-12-8	*1.51E+01*	*1.51E-01*
Radium-226+D	13982-63-3	2.00E+03*	2.00E+01*
Radium-228+D	15262-20-1	2.00E+03*	2.00E+01*
Strontium-89	11-10-9	*4.62E+02*	*4.62E+00*
Strontium-90+D	11-10-9	*8.52E+01*	*8.52E-01*
Tritium	10028-17-8	*6.66E+04*	*6.66E+02*
Uranium-233+D	11-08-5	*2.98E+02*	*2.98E+00*
Uranium-234	11-08-5	*1.07E+02*	*1.07E+00*
Uranium-235+D	15117-96-1	*1.01E+02*	*1.01E+00*
Uranium-238+D	7440-61-1	*7.68E+01*	*7.68E-01*

D = Daughters

* Based on proposed MCL

APPENDIX C

CONCRETE RUBBLE DATA

COVER PAGE

Sanford Cohen & Associates
Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code: SCA Subcontract Number: KH700325EP6

RIN: 00A1041
LIC: RC01B004
Laboratory Report Identification Code: 1842

Sample Matrix: Waste

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
00A1041-001.001 B779 Concrete Rubble-Main Bldg	KH100-1842-01	KH100-1842-01	KH100-1842-01B
00A1041-002.001 B779 Concrete Rubble-Main Bldg	KH100-1842-02	KH100-1842-02	KH100-1842-02
00A1041-003.001 B779 Concrete Rubble-Main Bldg	KH100-1842-03	KH100-1842-03	KH100-1842-03B
00A1041-004.001 B779 Concrete Rubble-Main Bldg	KH100-1842-04	KH100-1842-04	KH100-1842-04
Laboratory Control Sample (LC)	SCAQC-1842-LC1	SCAQC-1842-LC1	SCAQC-1842-LC1
Duplicate (LD)	SCAQC-1842-LD1	SCAQC-1842-LD1	SCAQC-1842-LD1
Preparation Blank (PB)	SCAQC-1842-PB	SCAQC-1842-PB	SCAQC-1842-PB

Comments: There were no problems encountered during sample receiving.

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

Joe Stinson
Signature

Joe Stinson
Name

Laboratory Manager
Title

2/23/00
Date

60

MRS

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 0\ 1041#001

Page 1 of 1

llector JEREMY BYBLE	Contact/Requester NIELSEN, SKIP / HORTON, JOHN	Telephone No. 4289 MSIN FAX 2864
N 00A1041	Sampling Origin 779 RUBBLE PILE @ 980 PAD	Purchase Order/Charge Code KT03PMMG
ject Title 779 FINAL SURVEY	Logbook No.	Ice Chest No. Temp.
(Lab) S. Cohen & Associates	Method of Shipment	Bill of Lading/Air Bill No.
otocol	Related COC (if any)	PRE 000203-00779-002

SSIBLE SAMPLE HAZARDS/REMARKS
* **

SCREENING REQUIRED ☐

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐
Weigh sample (Total Weight) to nearest 0.1g. Report weights w/isotopics results.

KH100 1842

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
0A1041-01.001	(#4)	WASTE	2/2/00	1005	B779 Concrete Rubble-Main Bldg.	7-G P/G	RC01B004 (Isotopic Waste) [Rush] - 01	None None
0A1041-02.001	(#5)	WASTE	2/2/00	0950	B779 Concrete Rubble-Main Bldg.	7-G P/G	RC01B004 (Isotopic Waste) [Rush] - 02	None None
0A1041-03.001	(#6)	WASTE	2/2/00	1020	B779 Concrete Rubble-Main Bldg.	7-G P/G	RC01B004 (Isotopic Waste) [Rush] - 03	None None
0A1041-04.001	(#7)	WASTE	2/2/00	1010	B779 Concrete Rubble-Main Bldg.	7-G P/G	RC01B004 (Isotopic Waste) [Rush] - 04	None None

N/A [signature] 2/3/00

007

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	2-7-00 0740	[signature] (J Horton)	2/7/00 0740	[signature] (J Horton)	2/7/00 0945	J Christman	2/7/00 0945
J Christman	2/7/00 0950	Refrig #6 JHC	2/7/00 0950	Refrig #6 JHC	2/7/00 1335	J Christman	2/7/00 1335
J Christman	2/8/00 1500	Fred E				C. Owens SCA	2/9/00 945

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

CASE NARRATIVE
RIN 00A1041
Laboratory Report Identification Number: 1842
PSA Module RC01B.3

February 23, 2000

I. Introduction

On February 9, 2000, four waste samples, (RIN 00A1041), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The chain-of-custody accompanying the samples requested they be analyzed on a "rush" basis. The samples were analyzed in accordance with Kaiser-Hill specifications stated in the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RCO1-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

II. Analytical Methodology

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

III. Analytical Results

Deficiencies

See Reanalysis.

The FWHM of the Am-243 tracer in samples KH100-1842-02 and KH100-1842-03B was 85 keV and 88 keV respectively.

Matrix Interferences

There were no indications of matrix interference.

Dilutions

No dilutions were required.

Detection Limits

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

Reanalysis

The FWHM of the Am-243 tracer in samples KH100-1842-01 and KH100-1842-03 was higher than 100 keV. The samples were reanalyzed beginning with sample preparation and the results were acceptable. The Original and Reanalysis Sample I.D. are listed below.

Original Laboratory Sample I.D.	Reanalysis Laboratory Sample I.D.	Analysis Type
KH100-1842-01	KH100-1842-01B	Am-241
KH100-1842-03	KH100-1842-03B	Am-241

Deviations from Protocols

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

Contacts with the CTR

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

IV. Quality Control

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-1316-LC1	Laboratory Control Sample
00A1041-002.001 B779 Concrete Rubble-Main Bldg.	SCAQC-1316-LD1	Laboratory Duplicate Sample
Laboratory Type II Water	SCAQC-1316-PB	Preparation Blank

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

Sincerely,

Joe Stinson

Joe Stinson
Laboratory Manager

2/23/02
Date

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1041

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1041#001	Matrix:	Waste
Site Sample ID:	001.001				
Other Sample ID:	B779 Concrete Rubble	Collection Date:	2/2/00	Date Received:	2/9/00
		Batch Number:	1842	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH100-1842-01	1.01	0.250	0.322	0.037
ACW03	U-235	KH100-1842-01	0.017	0.033	0.034	0.045
ACW03	U-238	KH100-1842-01	0.955	0.242	0.308	0.036
ACW03	PU-239/240	KH100-1842-01	0.000	0.000	0.000	0.048
ACW03	AM-241	KH100-1842-01B	-0.012	0.023	0.023	0.140

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Pu	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Am	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1041

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1041#001	Matrix:	Waste
Site Sample ID:	002.001				
Other Sample ID:	B779 Concrete Rubble	Collection Date:	2/2/00	Date Received:	2/9/00
		Batch Number:	1842	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH100-1842-02	0.979	0.250	0.318	0.066
ACW03	U-235	KH100-1842-02	0.086	0.077	0.081	0.046
ACW03	U-238	KH100-1842-02	0.829	0.226	0.281	0.037
ACW03	PU-239/240	KH100-1842-02	2.35	0.491	0.680	0.042
ACW03	AM-241	KH100-1842-02	0.582	0.215	0.244	0.046

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Pu	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Am	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1041

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1041#001	Matrix:	Waste
Site Sample ID:	003.001				
Other Sample ID:	B779 Concrete Rubble	Collection Date:	2/2/00	Date Received:	2/9/00
		Batch Number:	1842	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH100-1842-03	1.04	0.252	0.327	0.036
ACW03	U-235	KH100-1842-03	0.076	0.075	0.078	0.079
ACW03	U-238	KH100-1842-03	1.19	0.273	0.362	0.036
ACW03	PU-239/240	KH100-1842-03	0.035	0.048	0.049	0.065
ACW03	AM-241	KH100-1842-03B	0.000	0.000	0.000	0.095

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Pu	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Am	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

65

014

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1041

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1041#001	Matrix:	Waste
Site Sample ID:	004.001				
Other Sample ID:	B779 Concrete Rubble	Collection Date:	2/2/00	Date Received:	2/9/00
		Batch Number:	1842	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH100-1842-04	1.84	0.392	0.538	0.045
ACW03	U-235	KH100-1842-04	0.102	0.092	0.097	0.055
ACW03	U-238	KH100-1842-04	2.14	0.430	0.606	0.079
ACW03	PU-239/240	KH100-1842-04	0.103	0.091	0.093	0.094
ACW03	AM-241	KH100-1842-04	0.069	0.070	0.071	0.047

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Pu	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Am	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A1041

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	None	Matrix:	Water
Site Sample ID:	N/A				
Other Sample ID:	PB	Collection Date:	2/9/00	Date Received:	2/9/00
				Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1842-PB	0.009	0.033	0.033	0.074
ACW03	U-235	SCAQC-1842-PB	-0.008	0.015	0.015	0.091
ACW03	U-238	SCAQC-1842-PB	0.009	0.033	0.033	0.073
ACW03	PU-239/240	SCAQC-1842-PB	0.000	0.000	0.000	0.045
ACW03	AM-241	SCAQC-1842-PB	0.024	0.045	0.045	0.073

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Pu	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB
Am	SCAQC-1842-LC1	SCAQC-1842-LD1	SCAQC-1842-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00A1041

Project Name: Kaiser-Hill | Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (dpm)	(OV) Laboratory Control Sample Activity (dpm)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1842-LC1	4.23 ∓ 0.116	5.24 ∓ 1.41	124	1.13
ACW03	PU-239/240	SCAQC-1842-LC1	4.55 ∓ 0.227	5.00 ∓ 1.35	110	0.516
ACW03	U-233/234	SCAQC-1842-LC1	8.02 ∓ 0.321	7.41 ∓ 1.85	92.3	0.502
ACW03	U-238	SCAQC-1842-LC1	8.02 ∓ 0.321	7.83 ∓ 1.95	97.6	0.151

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1842-LD1	0.979 ∓ 0.318	0.794 ∓ 0.270	0.185	0.444
ACW03	U-235	SCAQC-1842-LD1	0.086 ∓ 0.081	0.050 ∓ 0.060	0.036	0.355
ACW03	U-238	SCAQC-1842-LD1	0.829 ∓ 0.281	1.07 ∓ 0.335	0.238	0.546
ACW03	PU-239/240	SCAQC-1842-LD1	2.35 ∓ 0.680	3.82 ∓ 1.02	1.47	1.20
ACW03	AM-241	SCAQC-1842-LD1	0.582 ∓ 0.244	0.718 ∓ 0.277	0.135	0.367

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

PREPARATION SUMMARY

Sample Volume Received

Sample Prefix: KH106 Sample Matrix: waste SOP No.: 302

Sample Batch Number: 1842

Balance I.D. _____

Sample Number	Approximate Weight or Volume of Sample Received (g-wet of L) g-wet	Initials Date
01	2.24	RG 2-9-00
02	3.88	↓
03	5.18	↓
04	4.41	↓

SC&A - Southeastern Environmental Laboratory

SCA-Form 302-1 Rev. 0

024

69

Waiting for
Remaining data —
will include in
final report.

APPENDIX D

DATA FROM SAMPLING GROUNDWATER AND SEDIMENT

(B779 First Floor Main Building Room 001 and T5 Tank Pit)

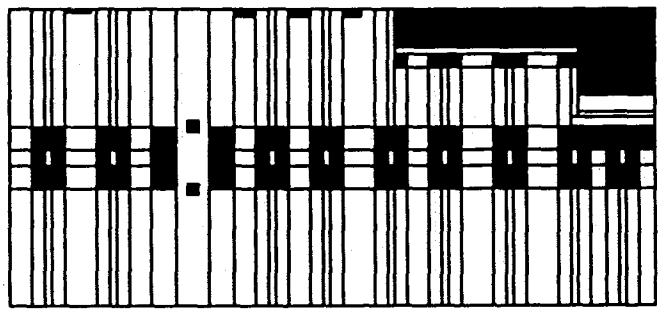
RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

Description: B779 First Floor Main Bldg Room 001 & T5 Tank Pit

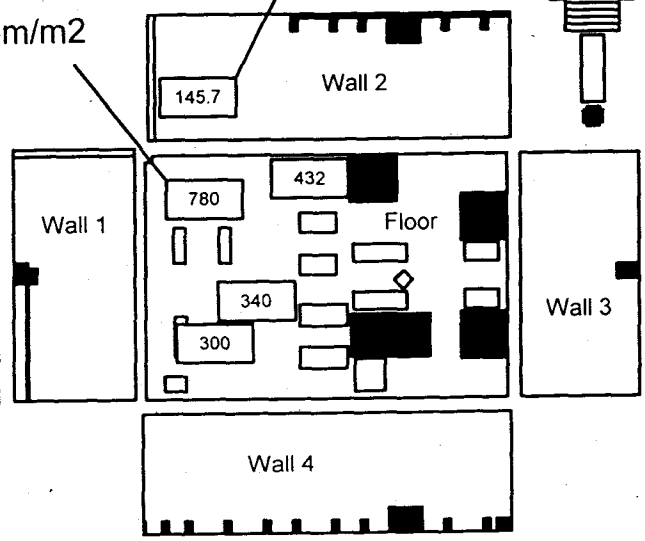
MAP 1 OF 1

all values expressed as dpm/100 cm2 alpha (except as noted)

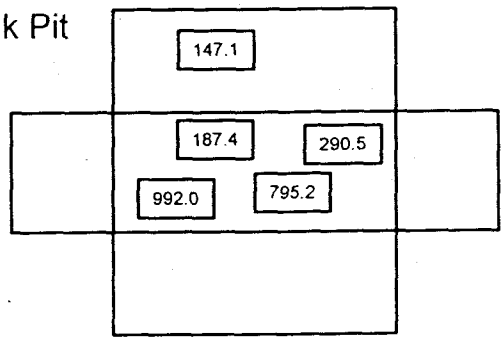
Room 001 & Pits



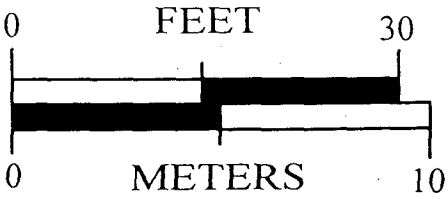
Ceiling (inverted)



T5 Tank Pit



all values expressed as dpm/100 cm2 alpha



N

SURVEY MAP LEGEND

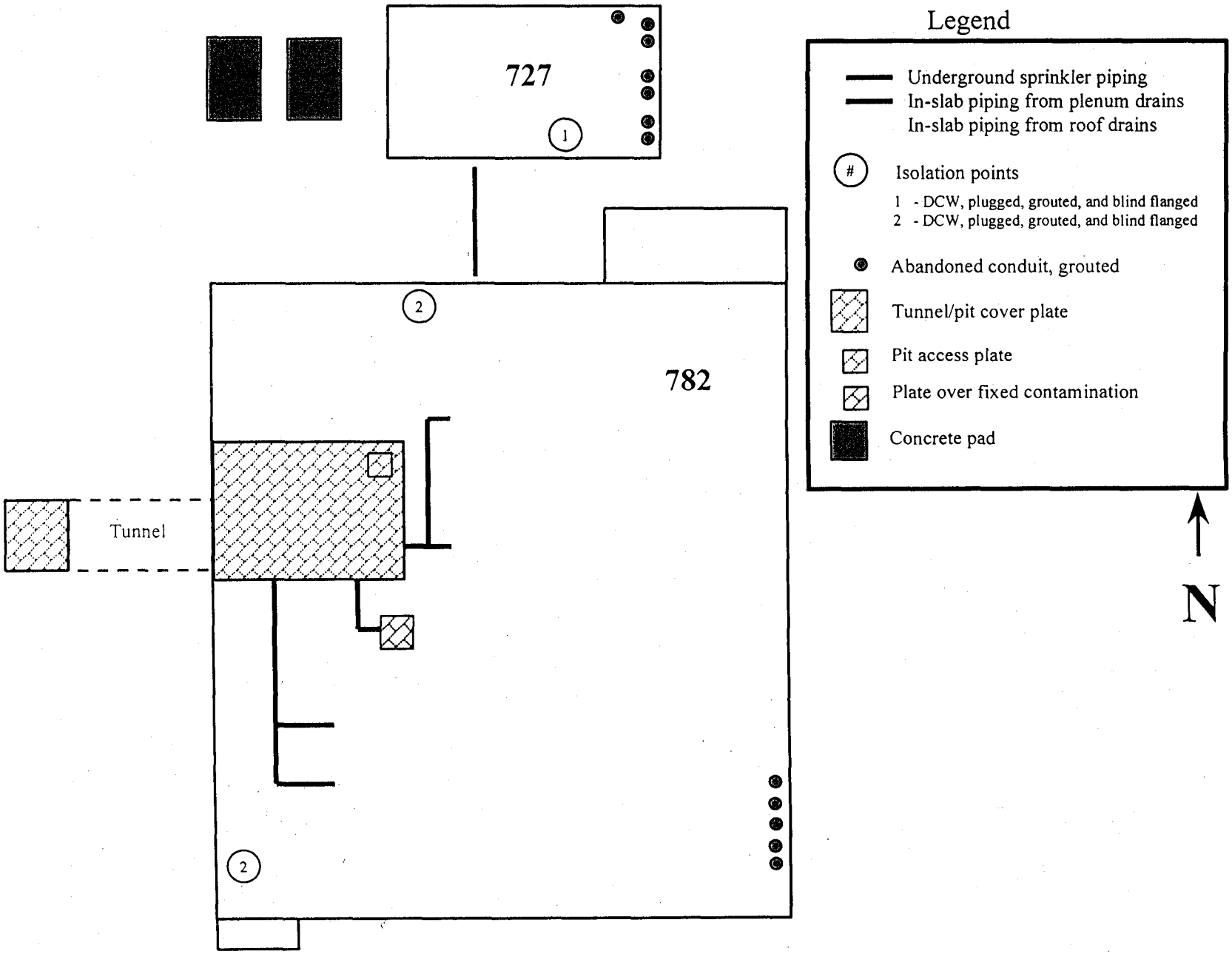
- # Smear & TSC Location
- # Smear, TSC & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

72

APPENDIX E

SLAB DETAILS FOR BUILDINGS 727 AND 782

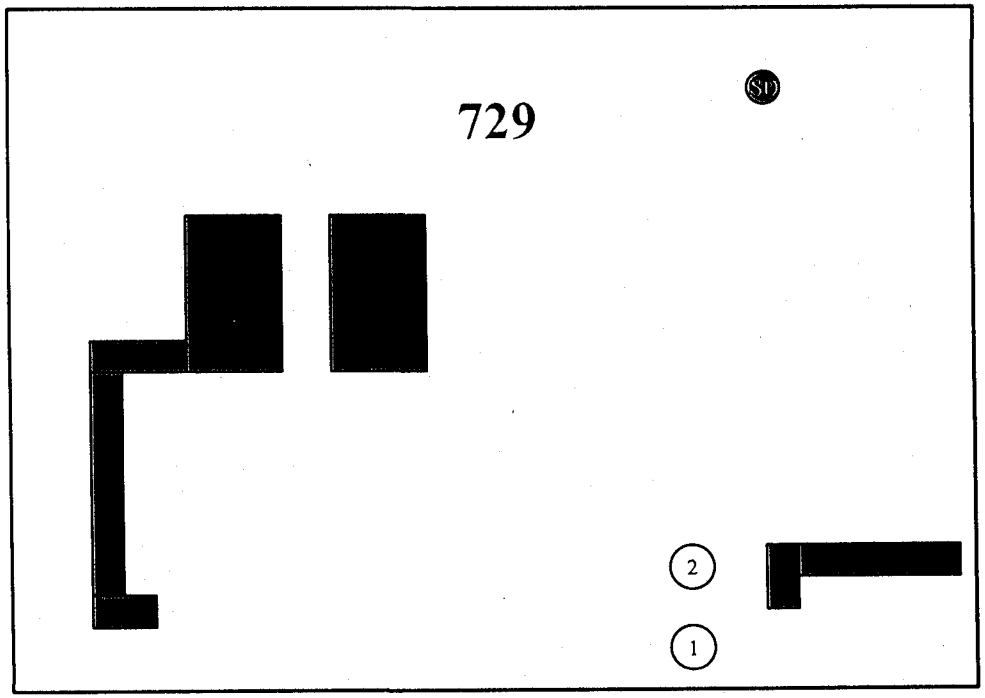
BUILDING 727 and 782 - Slab Details



APPENDIX F

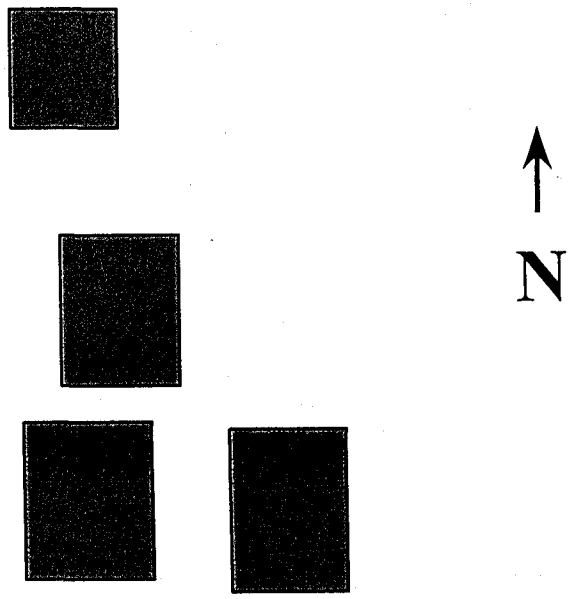
SLAB DETAILS FOR BUILDING 729

BUILDING 729 - Slab Details



Legend

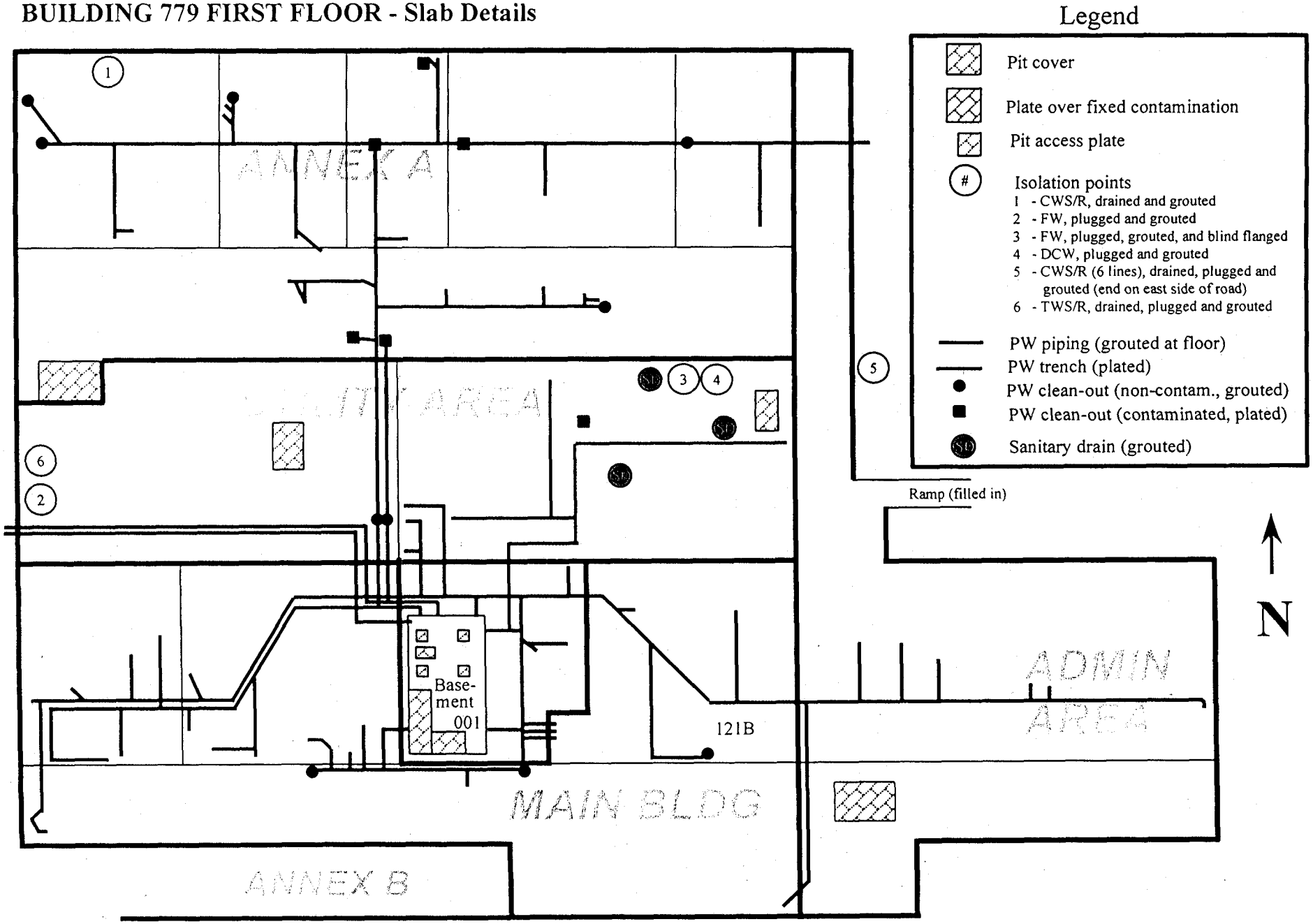
- # Isolation points
  - 1 -DCW, plugged and grouted
  - 2 - FW, plugged, grouted, and blind flanged
- Pit/trench (filled with concrete)
- Plate over fixed contamination
- SD Sanitary drain (grouted)
- Concrete pad



APPENDIX G

SLAB DETAILS FOR BUILDING 779

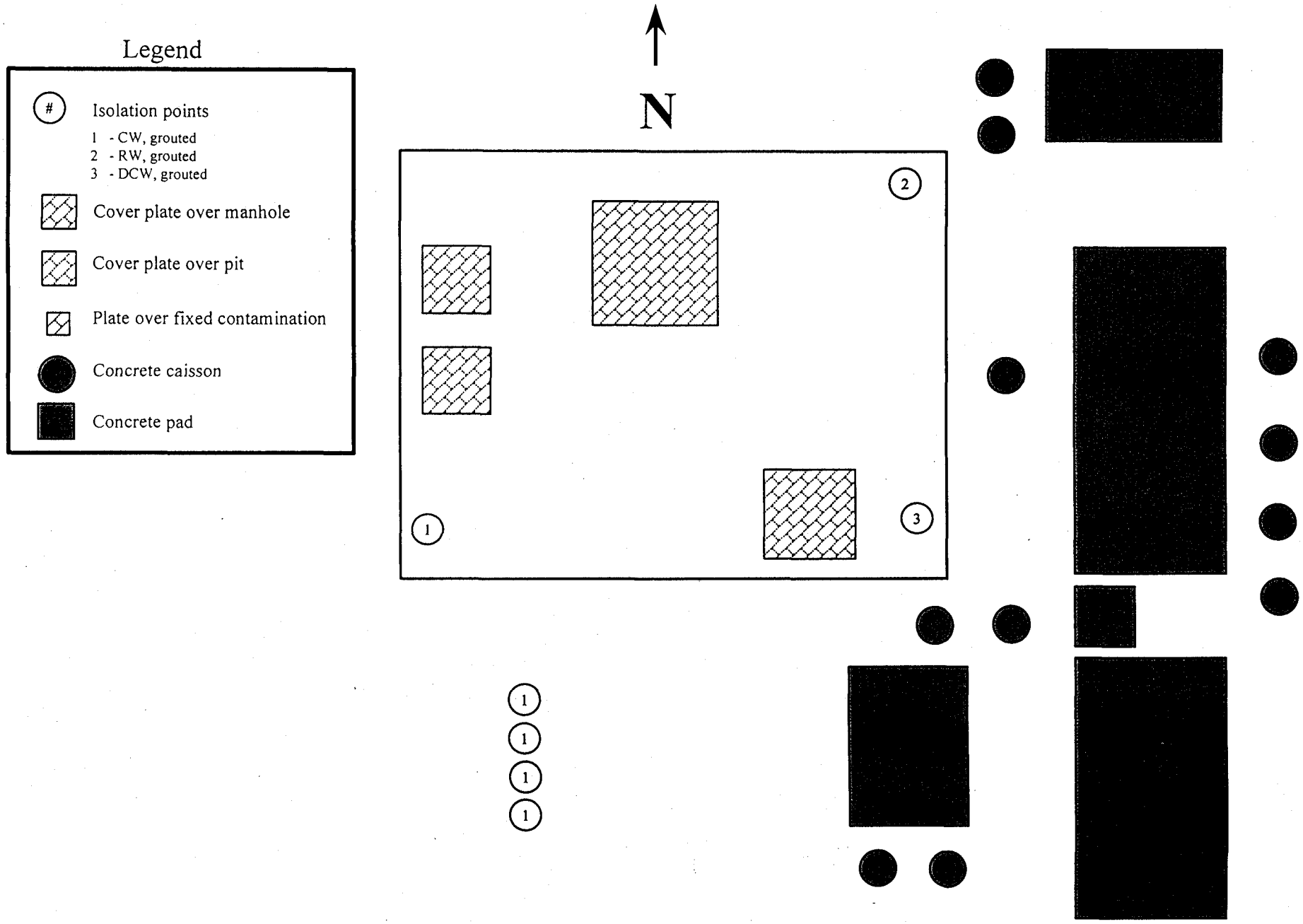
BUILDING 779 FIRST FLOOR - Slab Details



APPENDIX H

SLAB DETAILS FOR BUILDING 783

BUILDING 783 - Slab Details

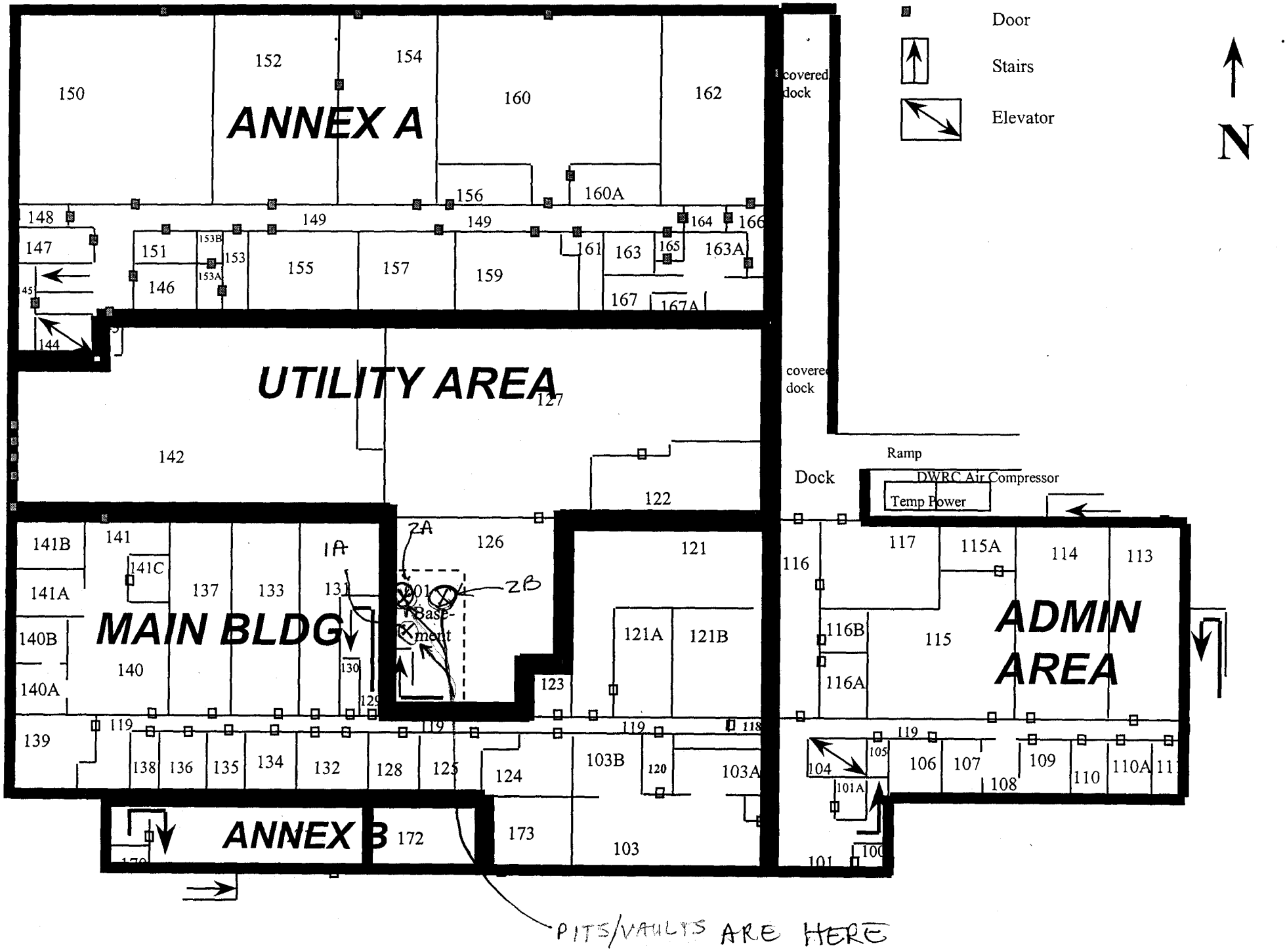


APPENDIX I

DATA FROM SOIL

BUILDING 779 FIRST FLOOR - Area Location Map

October 5, 1999



SAMPLE SUMMARY FOR RIN: 00A0933

RIN Title: SUMP PITS
Project Name: WASTE PROJECTS
Task Name: BLDG 779
Aggregate Area: N/A

Sampling Team: CAS
Sampling Mgr/Coordinator: KATHY ZBRYK
Samplers: CHTG
Field Logbook ID: 94 DODGE
Media: AQUEOUS LIQUID

This sample summary is supplied to waste generators as notification of sample collection. Inquires into the status of this sampling effort may be directed to the Analytical Services Division (ASD).

Bottle Number	Customer Bottle Number	Location	LIC (See Attached)	Laboratory	Date Collected	Date Shipped	Date Returned	Comments
00A0933-001.001	PIT 1A	Bldg 779, Rm 001	1	S. Cohen & Associates	12/02/99			
~~00A0933-001.002~~		~~Bldg 779, Rm 001~~	~~2~~	~~S. Cohen & Associates~~				*
00A0933-002.001	PIT 2A	Bldg 779, Rm 001	1	S. Cohen & Associates	12/02/99			
~~00A0933-002.002~~		~~Bldg 779, Rm 001~~	~~2~~	~~S. Cohen & Associates~~				*
00A0933-003.001	PIT 3B	Bldg 779, Rm 001	1	S. Cohen & Associates	12/02/99			
~~00A0933-003.002~~		~~Bldg 779, Rm 001~~	~~2~~	~~S. Cohen & Associates~~				*

Returning Excess Sample Material:

Unmodified sample material remaining after analysis is generally returned to the generator. The generator must be prepared to receive and dispose of excess sample material for applicable state and federal regulations. Regulatory exclusions for returning excess sample material are specified in the Code of Colorado Regulation (CCR) 1007-3, Part 261.4(d) 'Samples'. If problems with the disposal of excess sample material are encountered, the Environmental Coordinator for the generation area should be contacted for resolution of the issues. Only sample material which has not been modified during analysis will be returned. Material which has been acidified for preservation purposes will not be returned.

Customer Acknowledgement: Kathryn Zbryk
(Sign and Print Name)

* DROPPED PER TOM SYPLOWSKI JL 12/08/99

Comments:

Line Item Codes:

1) RC01B001 (Isotopic Water)
2) RC01B003 (Isotopic (Soil))

NEED TO TIE THIS RIN TO RIN 00A0827 WHICH IS THE RAD. SCR. FOR THESE PITS 11/30/99 ~~12/03/99~~ JL

TITLE:
RIN: 00A0933
Page 1 of 1

Date: 12/8/99 6:52:22 AM

SC&A S. COHEN & ASSOCIATES
AN EMPLOYEE-OWNED COMPANY

January 11, 2000

ENTERED 1/14/00

Mr. Mike Salmans
Contract Technical Representative
Kaiser-Hill Company, L.L.C.
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

Dear Mr. Salmans:

On December 9, 1999, three water samples, (RIN 00A0933) were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory. The chain-of-custody accompanying the samples requested they be analyzed on a "priority" basis. Enclosed is the Sample Data Package containing the items specified in Table B2 of the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RC01-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

If you have any questions please do not hesitate to call.

Sincerely,

Charles Phillips
Vice President

PRELIMINARY INFORMATION

1000 MONTICELLO COURT • MONTGOMERY, ALABAMA • 36117 • 334.272.2234 • FAX 334.213.0407

84

Additional Analyte Request Form

Report Identification Number (RIN) 00A0933

Please filter each sample scheduled for RC01B001 prior to analysis. Save the Solids obtained and analyze each for RC01B003. Assign sample numbers for each solid as follows:

KH199-1782-

Liquid Sample	Solid Sample	~~-01~~ RR
00A0933.001.001	00A0933.001-002	-01
00A0933.002.001	00A0933.002.002	-02
00A0933.003.001	00A0933.003.002	-03

Additions Authorized By: [signature] Date: 12/8/99

Copies of analyte additions and deletions must be sent to both ASD and Lab offices.

002

Commodore Advanced Sciences, Inc.
RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 00A0933#001
Page 1 of 1

Collector: [signature] 513292 [signature]	Contact/Requester: SALMANS, MIKE	Telephone No.: 8163 MSIN FAX
RIN: 00A0933 Jamie Garvey	Sampling Origin: B779 R101	Purchase Order/Charge Code: K0JDT09
Project Title: Sump Pit [illegible]	Logbook No.: 94 DODGE	Ice Chest No.: N/A Temp.: N/A
To (Lab): S. Cohen & Associates	Method of Shipment: SAMPLE TEAM	BIT of Lading/Air Bill No.: 4533 2125 4121
Protocol: CAS SOP. 003		PRE: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
** Each water sample is to be filtered prior to analysis. The liquid and solids are to be analyzed for isotopics. The weight of dried solid collected shall be reported for each event. **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exception: Yes ☐ No ☐
The results for the liquid shall be reported on bottle 001 for each event. The results for the solid shall be reported on the bottle 002 for each event.
IDC 1988 KW99 1780

Bottle No.	Contract Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00A0933-001.001	PIT 1A	AQ LIQ	12/08/99	1024	Bldg 779, Rm 001	4-L P	RC01B001 (Isotopic Water) [Priority] 01	None None
00A0933-002.001	PIT 2A	↓	↓	1045	Bldg 779, Rm 001	4-L P	RC01B001 (Isotopic Water) [Priority] 02	None None
00A0933-003.001	PIT 2B	↓	↓	1058	Bldg 779, Rm 001	4-L P	RC01B001 (Isotopic Water) [Priority] 03	None None

JA 12/07/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	1300 12/08/99	J.H. Christman	12/8/99 1350	J.H. Christman	12/8/99 1500	Fed EX	
						R. Dwiers SCA	12/9/99 0900

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

001

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

PIT 1A

LIQUID

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number:		Matrix: Water
Site Sample ID: 001.001			
Other Sample ID: BLDG 779 RM 001	Collection Date: 12/9/99 Batch Number: 1780	Date Received: 12/9/99 Laboratory Code: SCA	

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	KH199-1780-01C	136	36.2	45.3	2.27
ACW03	U-235	KH199-1780-01C	13.4	5.00	6.36	2.80
ACW03	U-238	KH199-1780-01C	590	197	264	2.26
ACW03	PU-239/240	KH199-1780-01	74.9	11.8	19.1	0.015
ACW03	AM-241	KH199-1780-01C	31.3	6.13	8.75	0.437

ENTERED 1/12/00

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Am	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC

1000 Montgomery Court • Montgomery, Alabama • 36117 • 334.272.2284 • FAX 334.213.0407

PRELIMINARY INFORMATION

87

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

PIT 1A
SOLIPS

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: 00A0933#001		Matrix: Soil
Site Sample ID: 001.002			
Other Sample ID: 00A0933-001.001	Collection Date: 12/8/99	Date Received: 12/9/99	
	Batch Number: 1782	Laboratory Code: SCA	

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1782-01	2.06	0.573	0.708	0.148
ACW03	U-235	KH199-1782-01	0.114	0.139	0.137	0.103
ACW03	U-238	KH199-1782-01	12.8	2.08	3.29	0.083
ACW03	PU-239/240	KH199-1782-01	186	24.4	44.5	0.085
ACW03	AM-241	KH199-1782-01	79.4	11.4	19.6	0.226

ENTERED 1/11/00

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2294 • FAX 334.21[illegible]

PRELIMINARY INFORMATION

88

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

PIT 2A

LIQUID

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number:		Matrix: Water
Site Sample ID: 002.001			
Other Sample ID: BLDG 779 BM 001	Collection Date: 12/8/99	Date Received: 12/9/99	
	Batch Number: 1780	Laboratory Code: SCA	

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	KH199-1780-02	2.02	0.649	0.765	0.149
ACW03	U-235	KH199-1780-02	0.382	0.237	0.263	0.086
ACW03	U-238	KH199-1780-02	9.18	2.50	2.94	0.070
ACW03	PU-239/240	KH199-1780-02	1.06	0.378	0.544	0.017
ACW03	AM-241	KH199-1780-02	1.21	0.266	0.360	0.017

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Am	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB

1000 Montclair Court * Montgomery, Alabama * 36117 * 334.272.2334 * FAX 334.213.0407

PRELIMINARY INFORMATION 009

89

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A0933

PIT 2A
SOLIDS

Project Name: Kaiser-Hill	Chain-of-Custody Number: 00A0933[illegible]001		Matrix: Soil
Site Sample ID: 002.002			
Other Sample ID: 00A0933-002.001	Collection Date: 12/9/99		Date Received: 12/9/99
	Batch Number: 1782		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1782-02	1.03	0.282	0.349	0.046
ACW03	U-235	KH199-1782-02	0.062	0.072	0.075	0.056
ACW03	U-238	KH199-1782-02	3.52	0.601	0.926	0.095
ACW03	PU-239/240	KH199-1782-02	350	48.4	83.9	0.080
ACW03	AM-241	KH199-1782-02	94.6	12.8	22.9	0.166

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1900 Montevallo Court • Montgomery, Alabama • 36117 • 334.272.2284 • FAX 334.213.0407

PRELIMINARY INFORMATION

90

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A0933

PIT 2B
LIQUID

Project Name: Kaiser-Hill	Chain-of-Custody Number:		Matrix: Water
Site Sample ID: 003.001			
Other Sample ID: BLDG.779 RM 001	Collection Date: 12/8/99		Date Received: 12/9/99
	Batch Number: 1780		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	KH199-1780-03B	1.15	0.239	0.331	0.028
ACW03	U-235	KH199-1780-03B	0.209	0.105	0.122	0.038
ACW03	U-238	KH199-1780-03B	3.41	0.472	0.930	0.028
ACW03	PU-239/240	KH199-1780-03B	1.94	0.395	0.554	0.035
ACW03	AM-241	KH199-1780-03B	0.517	0.153	0.185	0.026

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Pu	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Am	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB

7000 Martinelle Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0467

PRELIMINARY INFORMATION

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A0933

PIT 3A
SOLIDS

Project Name: Kaiser-Hill
Chain-of-Custody Number: 00A0933001
Matrix: Soil
Site Sample ID: 003.002
Other Sample ID: 00A0933-003.001
Collection Date: 12/8/99
Date Received: 12/8/99
Batch Number: 1782
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1782-03	1.46	0.337	0.447	0.044
ACW03	U-235	KH199-1782-03	0.120	0.099	0.105	0.064
ACW03	U-238	KH199-1782-03	5.35	0.770	1.32	0.044
ACW03	PU-239/240	KH199-1782-03	318	40.0	75.3	0.097
ACW03	AM-241	KH199-1782-03	61.5	11.8	20.1	0.191

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2254 • FAX 334.213.0400

PRELIMINARY INFORMATION

92

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: Blank 2		
Other Sample ID: PB	Collection Date: 12/9/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-PBC	0.025	0.025	0.025	0.028
ACW03	U-235	SCAQC-1780-PBC	0.000	0.000	0.000	0.016
ACW03	U-238	SCAQC-1780-PBC	0.005	0.011	0.011	0.015
ACW03	AM-241	SCAQC-1780-PBC	0.014	0.020	0.020	0.019

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC
Am	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC

PRELIMINARY INFORMATION

1005 Monticello Court * Montgomery, Alabama * 30117 * 334.272.2234 * FAX 334.213.0497

014

93

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: Blank 1		
Other Sample ID: PB	Collection Date: 12/8/99	Date Received: 12/8/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	PU-239/240	SCAQC-1780-PB	0.000	0.000	0.000	0.015

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB

1000 Meridian Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

PRELIMINARY INFORMATION

94

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number:		Matrix: Water
Site Sample ID: 001.001			
Other Sample ID: BLDG 779 RM 001	Collection Date: 12/8/99	Date Received: 12/9/99	
		Laboratory Code: SCA	

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-LD1C	110	32.4	39.2	2.86
ACW03	U-235	SCAQC-1780-LD1C	16.3	9.47	10.7	3.15
ACW03	U-238	SCAQC-1780-LD1C	791	188	246	2.54
ACW03	AM-241	SCAQC-1780-LD1C	33.2	6.70	9.43	0.481

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
U-233/234	SCAQC-1780-LD1C	KH199-1780-01C
U-235	SCAQC-1780-LD1C	KH199-1780-01C
U-238	SCAQC-1780-LD1C	KH199-1780-01C
AM-241	SCAQC-1780-LD1C	KH199-1780-01C

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC
Am	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC

PRELIMINARY INFORMATION

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0487

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number:	Matrix: Water
Site Sample ID: 003.001		
Other Sample ID: BLDG 779 RM 001	Collection Date: 12/8/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	PU-239/240	SCAQC-1780-LD1	2.62	0.544	0.756	0.022

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
PU-239/240	SCAQC-1780-LD1	KH199-1780-03B

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB

PRELIMINARY INFORMATION

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Laboratory Control (LC1)

Report Identification Number: 00A0933

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	None	Matrix:	Water
Site Sample ID:	Control 2				
Other Sample ID:	Control 2	Collection Date:	12/9/99	Date Received:	12/9/99
				Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-LC1C	3.28	0.495	0.823	0.028
ACW03	U-238	SCAQC-1780-LC1C	3.19	0.484	0.801	0.052
ACW03	PU-239/240	SCAQC-1780-LC1	1.90	0.378	0.536	0.024
ACW03	AM-241	SCAQC-1780-LC1C	2.08	0.410	0.583	0.028

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Am	SCAQC-1780-LC1C	SCAQC-1780-LD1C	SCAQC-1780-PBC

PRELIMINARY INFORMATION

1000 Montclair Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: Blank 3		
Other Sample ID: PB	Collection Date: 12/9/99	Date Received: 12/8/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-PB	0.003	0.009	0.009	0.020
ACW03	U-235	SCAQC-1780-PB	0.000	0.000	0.000	0.014
ACW03	U-238	SCAQC-1780-PB	-0.003	0.005	0.005	0.024
ACW03	PU-239/240	SCAQC-1780-PB	0.000	0.000	0.000	0.018
ACW03	AM-241	SCAQC-1780-PB	0.032	0.032	0.033	0.022

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Am	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB

PRELIMINARY INFORMATION

1000 Montclair Court * Montgomery, Alabama * 36117 * 334.272.2284 * FAX 334.213.0407

019

98

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number:	Matrix: Water
Site Sample ID: 002.001		
Other Sample ID: BLDG 779 RM 001	Collection Date: 12/8/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-LD1	1.92	0.679	0.696	0.135
ACW03	U-235	SCAQC-1780-LD1	0.152	0.139	0.148	0.130
ACW03	U-238	SCAQC-1780-LD1	7.98	1.87	2.46	0.080
ACW03	PU-239/240	SCAQC-1780-LD1	2.82	0.544	0.756	0.022
ACW03	AM-241	SCAQC-1780-LD1	1.14	0.268	0.351	0.020

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
U-233/234	SCAQC-1780-LD1	KH199-1780-02
U-235	SCAQC-1780-LD1	KH199-1780-02
U-238	SCAQC-1780-LD1	KH199-1780-02
PU-239/240	SCAQC-1780-LD1	KH199-1780-02
AM-241	SCAQC-1780-LD1	KH199-1780-02

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Am	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB

PRELIMINARY INFORMATION

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Laboratory Control (LC1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: Control 3		
Other Sample ID: Control 3	Collection Date: 12/9/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-LC1	3.60	0.599	0.936	0.059
ACW03	U-238	SCAQC-1780-LC1	3.66	0.606	0.950	0.033
ACW03	PU-239/240	SCAQC-1780-LC1	1.90	0.376	0.535	0.024
ACW03	AM-241	SCAQC-1780-LC1	2.11	0.449	0.616	0.029

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Pu	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB
Am	SCAQC-1780-LC1	SCAQC-1780-LD1	SCAQC-1780-PB

PRELIMINARY INFORMATION

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.215.9407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill
Site Sample ID: Blank 4
Other Sample ID: PB
Chain-of-Custody Number: None
Collection Date: 12/9/99
Matrix: Water
Date Received: 12/9/99
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-PBB	0.002	0.007	0.007	0.012
ACW03	U-238	SCAQC-1780-PBB	0.025	0.016	0.016	0.007
ACW03	U-238	SCAQC-1780-PBB	0.028	0.015	0.016	0.005
ACW03	PU-239/240	SCAQC-1780-PBB	0.003	0.005	0.005	0.007
ACW03	AM-241	SCAQC-1780-PBB	0.000	0.000	0.000	0.161

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Pu	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Am	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB

PRELIMINARY INFORMATION

1600 Montcalm Court * Montgomery, Alabama * 36117 * 334.272.2238 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number:		Matrix: Water
Site Sample ID: 003.001			
Other Sample ID: BLDG 779 PBL001	Collection Date: 12/8/99	Date Received: 12/9/99 Laboratory Code: SCA	

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-LD1B	1.23	0.262	0.360	0.032
ACW03	U-235	SCAQC-1780-LD1B	0.115	0.062	0.089	0.036
ACW03	U-238	SCAQC-1780-LD1B	3.62	0.515	0.666	0.061
ACW03	PU-239/240	SCAQC-1780-LD1B	2.20	0.408	0.558	0.031
ACW03	AM-241	SCAQC-1780-LD1B	0.563	0.161	0.199	0.025

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
U-233/234	SCAQC-1780-LD1B	KH199-1780-03B
U-235	SCAQC-1780-LD1B	KH199-1780-03B
U-238	SCAQC-1780-LD1B	KH199-1780-03B
PU-239/240	SCAQC-1780-LD1B	KH199-1780-03B
AM-241	SCAQC-1780-LD1B	KH199-1780-03B

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Pu	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Am	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB

PRELIMINARY INFORMATION

1000 Montgomery Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Laboratory Control (LC1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: Control 4		
Other Sample ID: Control 3	Collection Date: 12/9/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1780-LC1B	3.19	0.369	0.732	0.031
ACW03	U-238	SCAQC-1780-LC1B	3.54	0.402	0.814	0.016
ACW03	PU-239/240	SCAQC-1780-LC1B	1.86	0.256	0.452	0.011
ACW03	AM-241	SCAQC-1780-LC1B	1.97	0.300	0.495	0.014

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Pu	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB
Am	SCAQC-1780-LC1B	SCAQC-1780-LD1B	SCAQC-1780-PBB

PRELIMINARY INFORMATION

1900 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0497

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A0833

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: N/A		
Other Sample ID: PB	Collection Date: 12/9/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1782-PB	0.013	0.052	0.053	0.105
ACW03	U-235	SCAQC-1782-PB	-0.008	0.016	0.017	0.098
ACW03	U-238	SCAQC-1782-PB	0.043	0.059	0.060	0.079
ACW03	PU-239/240	SCAQC-1782-PB	0.019	0.048	0.048	0.088
ACW03	AM-241	SCAQC-1782-PB	0.176	0.179	0.183	0.259

Quality Control Samples:			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2204 • FAX 334.213.0407

PRELIMINARY INFORMATION

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Laboratory Control (LC1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill
Site Sample ID: N/A
Other Sample ID: LC1
Chain-of-Custody Number: None
Collection Date: 12/9/99
Matrix: Water
Date Received: 12/9/99
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1782-LC1	6.99	1.10	1.78	0.108
ACW03	U-238	SCAQC-1782-LC1	7.86	1.20	1.97	0.061
ACW03	PU-239/240	SCAQC-1782-LC1	4.97	0.918	1.35	0.154
ACW03	AM-241	SCAQC-1782-LC1	4.24	0.791	1.18	0.201

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Montreal Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

PRELIMINARY INFORMATION

105

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: 00A0933

Project Name: Kaiser-Hill	Chain-of-Custody Number: 00A0933B001	Matrix: Soil
Site Sample ID: 001.002		
Other Sample ID: 00A0933-001.002	Collection Date: 12/8/99	Date Received: 12/9/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	SCAQC-1782-LD1	2.67	0.557	0.794	0.112
ACW03	U-235	SCAQC-1782-LD1	0.230	0.165	0.179	0.076
ACW03	U-238	SCAQC-1782-LD1	13.8	1.92	3.33	0.093
ACW03	PU-239/240	SCAQC-1782-LD1	170	22.0	40.5	0.082
ACW03	AM-241	SCAQC-1782-LD1	88.4	13.0	21.6	0.191

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
U-233/234	SCAQC-1782-LD1	KH199-1782-01
U-235	SCAQC-1782-LD1	KH199-1782-01
U-238	SCAQC-1782-LD1	KH199-1782-01
PU-239/240	SCAQC-1782-LD1	KH199-1782-01
AM-241	SCAQC-1782-LD1	KH199-1782-01

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

PRELIMINARY INFORMATION

1000 Montibello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00A0933

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Control Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/L)	(OV) Laboratory Control Sample Activity (pCi/L)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	PU-239/240	SCAQC-1780-LC1	1.97 ± 0.098	1.90 ± 0.535	96.7	0.189
ACW03	AM-241	SCAQC-1780-LC1C	1.91 ± 0.052	2.08 ± 0.563	109	0.470
ACW03	U-233/234	SCAQC-1780-LC1C	3.61 ± 0.145	3.28 ± 0.823	90.9	0.604
ACW03	U-238	SCAQC-1780-LC1C	3.61 ± 0.145	3.19 ± 0.801	88.2	0.799

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/L)	Duplicate Sample Activity (pCi/L)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1780-LD1C	136 ± 45.3	110 ± 39.2	25.5	0.426
ACW03	U-235	SCAQC-1780-LD1C	13.4 ± 8.96	16.3 ± 10.7	2.84	0.204
ACW03	U-238	SCAQC-1780-LD1C	880 ± 254	791 ± 246	89.3	0.247
ACW03	AM-241	SCAQC-1780-LD1C	31.3 ± 8.76	33.2 ± 9.43	1.90	0.148
ACW03	PU-239/240	SCAQC-1780-LD1	1.94 ± 0.554	2.62 ± 0.756	0.684	0.730

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

PRELIMINARY INFORMATION 028

107

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00A0933

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Control Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/L)	(OV) Laboratory Control Sample Activity (pCi/L)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1780-LC1	1.91 ∓ 0.052	2.11 ∓ 0.516	111	0.544
ACW03	PU-239/240	SCAQC-1780-LC1	1.97 ∓ 0.098	1.90 ∓ 0.535	96.7	0.169
ACW03	U-233/234	SCAQC-1780-LC1	3.61 ∓ 0.145	3.60 ∓ 0.936	99.5	0.031
ACW03	U-238	SCAQC-1780-LC1	3.61 ∓ 0.145	3.65 ∓ 0.960	101	0.073

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/L)	Duplicate Sample Activity (pCi/L)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1780-LD1	2.02 ∓ 0.765	1.92 ∓ 0.695	0.094	0.091
ACW03	U-238	SCAQC-1780-LD1	0.382 ∓ 0.203	0.152 ∓ 0.146	0.230	0.762
ACW03	U-238	SCAQC-1780-LD1	9.18 ∓ 2.94	7.98 ∓ 2.46	1.20	0.312
ACW03	PU-239/240	SCAQC-1780-LD1	1.96 ∓ 0.644	2.62 ∓ 0.758	0.661	0.710
ACW03	AM-241	SCAQC-1780-LD1	1.21 ∓ 0.360	1.14 ∓ 0.351	0.076	0.161

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0487

PRELIMINARY INFORMATION

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00A0933

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Control Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/L)	(OV) Laboratory Control Sample Activity (pCi/L)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1780-LC1B	1.91 ∓ 0.052	1.97 ∓ 0.486	103	0.194
ACW03	PU-239/240	SCAQC-1780-LC1B	1.97 ∓ 0.098	1.86 ∓ 0.452	94.6	0.346
ACW03	U-233/234	SCAQC-1780-LC1B	3.61 ∓ 0.145	3.16 ∓ 0.732	87.4	0.903
ACW03	U-238	SCAQC-1780-LC1B	3.61 ∓ 0.145	3.54 ∓ 0.814	97.9	0.136

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/L)	Duplicate Sample Activity (pCi/L)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/R)
ACW03	U-233/234	SCAQC-1780-LD1B	1.15 ∓ 0.331	1.23 ∓ 0.350	0.067	0.178
ACW03	U-238	SCAQC-1780-LD1B	0.209 ∓ 0.122	0.115 ∓ 0.069	0.093	0.614
ACW03	U-238	SCAQC-1780-LD1B	3.41 ∓ 0.830	3.62 ∓ 0.866	0.203	0.167
ACW03	PU-239/240	SCAQC-1780-LD1B	1.94 ∓ 0.554	2.20 ∓ 0.598	0.259	0.318
ACW03	AM-241	SCAQC-1780-LD1B	0.517 ∓ 0.185	0.583 ∓ 0.199	0.066	0.243

PRELIMINARY INFORMATION 030

109

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00A0933

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Control Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (dpm)	(OV) Laboratory Control Sample Activity (dpm)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1782-LC1	4.24 ∓ 0.116	4.24 ∓ 1.16	100	0.011
ACW03	PU-239/240	SCAQC-1782-LC1	4.37 ∓ 0.219	4.97 ∓ 1.35	114	0.686
ACW03	U-233/234	SCAQC-1782-LC1	6.02 ∓ 0.321	6.99 ∓ 1.76	97.1	0.686
ACW03	U-238	SCAQC-1782-LC1	6.02 ∓ 0.321	7.86 ∓ 1.97	98.0	0.126

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1782-LD1	2.06 ∓ 0.706	2.67 ∓ 0.794	0.611	0.575
ACW03	U-235	SCAQC-1782-LD1	0.114 ∓ 0.137	0.230 ∓ 0.179	0.116	0.513
ACW03	U-238	SCAQC-1782-LD1	12.8 ∓ 3.29	13.6 ∓ 3.33	0.820	0.175
ACW03	PU-239/240	SCAQC-1782-LD1	186 ∓ 44.5	170 ∓ 40.8	18.2	0.269
ACW03	AM-241	SCAQC-1782-LD1	79.4 ∓ 19.5	85.4 ∓ 21.9	5.97	0.305

1000 Montclair Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

PRELIMINARY INFORMATION

110

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Tracer Yield

Report Identification Number: 00A0933

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Sample ID	Am-243	Pu-242	U-232
KH199-1780-01		60.12	
KH199-1780-01C	82.63		14.46
KH199-1780-02	55.05	60.04	13.28
KH199-1780-03B	66.6	49.42	55.37
SCAQC-1780-LC1	63.78	75.41	47.98
SCAQC-1780-LC1B	64.5	77.75	45.51
SCAQC-1780-LC1C	71.34		63.68
SCAQC-1780-LD1	51.67	45.47	15.34
SCAQC-1780-LD1B	67.62	53.03	48.8
SCAQC-1780-LD1C	75.83		12.24
SCAQC-1780-PB	42.35	65.42	73.74
SCAQC-1780-PBB	61.05	65.21	73.69
SCAQC-1780-PBC	59.84		64.12

PRELIMINARY INFORMATION 032

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.[illegible]

///

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Tracer Yield

Report Identification Number: 00A0933

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Sample ID	Am-243	Pu-242	U-232
KH199-1782-01	71.53	82.11	33.73
KH199-1782-02	79.02	72.35	70.22
KH199-1782-03	71.72	91.25	80.62
SCAQC-1782-LC1	78.71	72.19	58.52
SCAQC-1782-LD1	58.81	89.66	50.9
SCAQC-1782-PB	68.67	83.97	82.59

PRELIMINARY INFORMATION

1000 Montclair Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

112

Total Metals
BUILDING 779
PITS/VAULTS

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia

SAMPLE DATA PACKAGE COVER PAGE

RIN# : 00A0884 **Subcontract #:** KH700327EP6
Laboratory Code: Recra

Sample Number	Lab Sample ID
00A0884-001.001	9912L922-001
00A0884-002.001	9912L922-002
00A0884-003.001	9912L922-003

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

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

1-4-00
Date

pcf/cp12-922

001

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

114

Isotopics
BUILDING 779
PITS/VAULTS

115

Commodore Advanced Sciences, Inc.
RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A0884#0

Page 1 of 1

Collector: Jhingard	Contact/Requester: GRAVES, MATT / ZBRYK, KATHY	Telephone No.: 3054	MSIN / FAX
RIN: 00A0884 Tom Lindsay	Sampling Origin: Building 779 R 126 Basement	Purchase Order/Charge Code: KT03DT09	
Project Title: Sump Pits 122232	Logbook No.: 94 DODGE	Ice Chest No.: N/A	Temp.
To (Lab): RECRA Labnet-PA (L)	Method of Shipment: SAMPLE TEAM	Bill of Lading/Air Bill No.: 4533 2125 3890	-3.4
Protocol: CLEANUP CAS Sol-003		PRE: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS: IDC 1988 Hold Time: 922 Total Activity Exemption: Yes ☐ No ☐

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00A0884-001.001	1A	AQUEOUS	12/3/99	0943	Building 779 Sumps	1-L P/G	SS05C016 (Total 600 Metals wo/Hg RDL-2) [Rush]	HN03 4 degrees C
00A0884-002.001	2A	AQUEOUS		0952	Building 779 Sumps	1-L P/G	SS05C016 (Total 600 Metals wo/Hg RDL-2) [Rush]	HN03 4 degrees C
00A0884-003.001	2B	AQUEOUS		1000	Building 779 Sumps	1-L P/G	SS05C016 (Total 600 Metals wo/Hg RDL-2) [Rush]	HN03 4 degrees C

JSW 12/3/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	1110 12/03/99	T89R Trailer #2	1110 12/03/99	T691R Judy Hz	12/3/99 1025	JH Chushman	12/3/99 1225
JH Chushman	12/3/99 1300	Fed EX					
FedEx		Jansen	12/4/99 1000				

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time

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

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : K-H RIN#00A0884
RFW# : 9912L922

W.O.# : 11830-001-001-9999-00
Date Received: 12-04-99

METALS CASE NARRATIVE

1. This narrative covers the analyses of 3 water samples.

2. The samples were prepared and analyzed in accordance with 200 Series protocol. The field samples have been concentrated 4 fold during digestion so that the contract required detection limits (CRDL) for target analytes could be met. The resultant preconcentration factors were applied to the field sample concentrations, the preparation blank (MB), matrix spike (MS), duplicate, and laboratory control samples (LCS) only. Preconcentration factors were not applied to instrument quality control (QC) measures, such as ICV, ICB, CCV, CCB, ICSA, ICSAB, CRI and serial dilution. By method design and functionally, these QC measures were not prepared in the same manner as the field samples, ie., hot plate digestion. Consequently, forms 2A, 2B, 3 (excluding preparation blank), 4, 9, and 10 reflect instrument response without application of preconcentration factors. Due to data processing limitations, the application of these factors cannot be adapted to the instrument or report softwares. The data user is cautioned to consider the preconcentration factors when evaluating the above QC measures.

   Sample 00A0884-001.001 was received with a pH greater than 7. An aliquot was preserved prior to digestion and analysis. With the addition of acid to adjust the pH, the sample bubbled and smoked. Therefore, it was prepped at a five fold dilution due to the sample matrix. Additional dilutions were required for some analytes during analysis. Potassium (twenty fold), Sodium (one hundred fold), and Zinc (ten fold) were reported with dilutions due to the high concentration of these analytes. High indigenous Sodium concentration levels in all three samples precluded the proper application of interelement correction factors. Consequently, sample 00A0884-001.001 required a twenty fold dilution for Antimony, Selenium, and Tin. Sample 00A0884-002.001 required a ten fold dilution for Lead and Antimony. Sample 00A0884-003.001 was diluted ten fold for Antimony and Thallium. The remaining dilutions for Potassium, Lithium, Sodium, and Zinc were performed due to the high concentrations of these analytes. Calcium and Magnesium were also reported with dilutions from the rerun file.

   The preparation and the analysis dilutions elevated the reporting limit above the client requested limits for sample 00A0884-001.001. In most cases, the sample concentrations were greater than ten times the IDL with the exception of Arsenic, Antimony, Selenium, Tin, and Thallium. The dilutions were unavoidable due to the sample matrix.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 381 pages.

3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures and High Purity.

4. All analyses were performed within the required holding times.

5. The cooler temperature (3.4°C) has been recorded on the Recra Chain of Custody.

6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits with several exceptions. The last three CCVs for Cadmium were out high at 110.7%, 110.9%, and 111.0% in data file TA1214A. All of the sample results for Cadmium were bracketed by CCVs within the control limits. The CCVs that are out are contained within the file where the dilutions and the ending check solutions were run. There should be no significant impact as the check solutions are well within the control limits. In the rerun file, TA1216C, the ICV is just outside the 5% control limit at 94.5% for Calcium and 94.2% for Magnesium. Again, there should be no significant impact as the samples were all bracketed by CCVs within the control limits and the sample concentrations were above the client limits.

7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits.

8. All preparation/method blanks were below the client requested limits found in RDL 2 with the exception of Silver. The MB result is just slightly above the client requested limit of 0.3 µg/L at 0.364µg/L. There should be no significant impact as all sample results are greater than ten times the MB concentration. Refer to form 3.

9. All ICP Interference Check Samples (ICSA and ICSAB) were within control limits with two exceptions. The ISCAB solution was not prepared properly, therefore, Uranium is in the initial ISCAB at 400µg/L and in the final ISCAB at 1000µg/L in file TA1214A. Within file TA1216C, the Selenium ICSABs were high at 128.4% and 135.4%. Only Selenium on sample 00A08840-001.001 was reported from this run and the result was non-detect. There should be no significant bias to the result. Although not required, Sodium was spiked into the ICSAB solution at 2000µg/L. The recovery was within the control limits. Refer to form 4.

10. The laboratory control sample (LCS) was within the 80-120% control limits. Refer to form 7.

11. The serial dilution percent differences for 2 analytes were outside method control limits. Refer to form 9.

12. All matrix spike (MS) recoveries were within the 75-125% control limits (exception allowed when sample concentration exceeds the spike added concentration by a factor of 4 or more). MS analyses are not required for Calcium, Magnesium, Sodium and Potassium in waters and soils. Also, not required for Aluminum and Iron in soils. Refer to form 5A.

13. All duplicate analyses were within the method criteria. Refer to form 6.

14. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.

15. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

1-4-00
Date

alm\m12-9722

119

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
K-H RIN#00A0884

DATE RECEIVED: 12/04/99 RFW LOT # :9912L922

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
00A0884-001.001						
SILVER, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
ALUMINUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
ARSENIC, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
BARIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
BERYLLIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
CALCIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
CADMIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
COBALT, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
CHROMIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
COPPER, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
IRON, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
POTASSIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
LITHIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
MAGNESIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
MANGANESE, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
MOLYBDENUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
SODIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
NICKEL, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
LEAD, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
ANTIMONY, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
SELENIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
TIN, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/16/99
STRONTIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
THALLIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
URANIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
VANADIUM, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
ZINC, TOTAL	001	W	99L0816	12/03/99	12/06/99	12/14/99
00A0884-002.001						
SILVER, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
SILVER, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
SILVER, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
ALUMINUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
ALUMINUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99

120

Racra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
K-H RIN#00A0884

DATE RECEIVED: 12/04/99 RFW LOT # :9912L922

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
ALUMINUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
ARSENIC, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
ARSENIC, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
ARSENIC, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
BARIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
BARIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
BARIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
BERYLLIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
BERYLLIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
BERYLLIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
CALCIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/16/99
CALCIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/16/99
CALCIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/16/99
CADMIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
CADMIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
CADMIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
COBALT, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
COBALT, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
COBALT, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
CHROMIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
CHROMIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
CHROMIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
COPPER, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
COPPER, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
COPPER, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
IRON, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
IRON, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
IRON, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
POTASSIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
POTASSIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
POTASSIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
LITHIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
LITHIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
LITHIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
MAGNESIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/16/99
MAGNESIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/16/99
MAGNESIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/16/99
MANGANESE, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
K-H RIN#00A0884

DATE RECEIVED: 12/04/99 RFW LOT # :9912L922

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANGANESE, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
MANGANESE, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
MOLYBDENUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
MOLYBDENUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
MOLYBDENUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
SODIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
SODIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
SODIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
NICKEL, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
NICKEL, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
NICKEL, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
LEAD, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
LEAD, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
LEAD, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
ANTIMONY, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
ANTIMONY, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
ANTIMONY, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
SELENIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
SELENIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
SELENIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
TIN, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
TIN, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
TIN, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
STRONTIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
STRONTIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
STRONTIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
THALLIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
THALLIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
THALLIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
URANIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
URANIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
URANIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
VANADIUM, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
VANADIUM, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
VANADIUM, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99
ZINC, TOTAL	002	W	99L0816	12/03/99	12/06/99	12/14/99
ZINC, TOTAL	002 REP	W	99L0816	12/03/99	12/06/99	12/14/99
ZINC, TOTAL	002 MS	W	99L0816	12/03/99	12/06/99	12/14/99

122

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
K-H RIN#00A0884

DATE RECEIVED: 12/04/99 RFW LOT # :9912L922

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
00A0884-003.001						
SILVER, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
ALUMINUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
ARSENIC, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
BARIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
BERYLLIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
CALCIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/16/99
CADMIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
COBALT, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
CHROMIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
COPPER, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
IRON, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
POTASSIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
LITHIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
MAGNESIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/16/99
MANGANESE, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
MOLYBDENUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
SODIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/16/99
NICKEL, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
LEAD, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
ANTIMONY, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
SELENIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
TIN, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
STRONTIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
THALLIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
URANIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
VANADIUM, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99
ZINC, TOTAL	003	W	99L0816	12/03/99	12/06/99	12/14/99

LAB QC:

SILVER LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
SILVER, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
ALUMINUM LABORTORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
ALUMINUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
ARSENIC LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99

123

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
K-H RIN#00A0884

DATE RECEIVED: 12/04/99 **RFW LOT # :9912L922**

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
ARSENIC, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
BARIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
BARIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
BERYLLIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
BERYLLIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
CALCIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
CALCIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
CADMIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
CADMIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
COBALT LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
COBALT, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
CHROMIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
CHROMIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
COPPER LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
COPPER, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
IRON LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
IRON, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
POTASSIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
POTASSIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
LITHIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
LITHIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
MAGNESIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
MAGNESIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
MANGANESE LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
MANGANESE, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
MOLYBDENUM LABORATOR	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
MOLYBDENUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
SODIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
SODIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
NICKEL LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
NICKEL, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
LEAD LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
LEAD, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
ANTIMONY LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
ANTIMONY, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
SELENIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
SELENIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
TIN LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99

124

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
K-H RIN#00A0884

DATE RECEIVED: 12/04/99 **RFW LOT # :9912L922**

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TIN, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
STRONTIUM LCS STANDA	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
STRONTIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
THALLIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
THALLIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
URANIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
URANIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
VANADIUM LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
VANADIUM, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99
ZINC LABORATORY	LC1 BS	W	99L0816	N/A	12/06/99	12/14/99
ZINC, TOTAL	MB1	W	99L0816	N/A	12/06/99	12/14/99

125

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.:001001

SOW No.: 200 SERIES

EPA Sample No.	Lab Sample ID
001001	9912L922-001
002001	9912L922-002
002001D	9912L922-002D
002001S	9912L922-002S
003001	9912L922-003

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO

Comments: RIN#00A0884

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

Signature: Pat E. C Name: Patricia E Feldman

Date: 1-4-00 Title: Data Mgt Supervisor

COVER PAGE - IN

126

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001001

Lab Name: RECRA_LABNET Contract: 11830-1
Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001
Matrix (soil/water): WATER Lab Sample ID: 9912L922-001
Level (low/med): LOW Date Received: 12/04/99
% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8890			P
7440-36-0	Antimony	254	B		P
7440-38-2	Arsenic	58.6	B		P
7440-39-3	Barium	771	B		P
7440-41-7	Beryllium	8.7	B		P
7440-43-9	Cadmium	401			P
7440-70-2	Calcium	304000		E	P
7440-47-3	Chromium	1370			P
7440-48-4	Cobalt	242	B	E	P
7440-50-8	Copper	9700			P
7439-89-6	Iron	285000			P
7439-92-1	Lead	5450			P
7439-95-4	Magnesium	9340	B		P
7439-96-5	Manganese	5730			P
7440-02-0	Nickel	2770			P
7440-09-7	Potassium	5190000			P
7782-49-2	Selenium	410	U		P
7440-22-4	Silver	227			P
7440-23-5	Sodium	12500000			P
7440-28-0	Thallium	21.5	U		P
7440-62-2	Vanadium	153	B		P
7440-66-6	Zinc	313000			P
7439-98-7	Molybdenu	715			P
7440-24-6	Strontium	2340	B		P
7440-31-5	Tin	260	U		P
7439-93-2	Lithium	3960			P
11-09-6	Uranium	2600	B		P

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:
00A0884-001.001

FORM I - IN

127

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

002001

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Matrix (soil/water): WATER Lab Sample ID: 9912L922-002

Level (low/med): LOW Date Received: 12/04/99

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4890			P
7440-36-0	Antimony	19.1	B		P
7440-38-2	Arsenic	27.3			P
7440-39-3	Barium	633			P
7440-41-7	Beryllium	20.1			P
7440-43-9	Cadmium	77.2			P
7440-70-2	Calcium	107000		E	P
7440-47-3	Chromium	282			P
7440-48-4	Cobalt	19.8	B	E	P
7440-50-8	Copper	1160			P
7439-89-6	Iron	26200			P
7439-92-1	Lead	635			P
7439-95-4	Magnesium	11800	B		P
7439-96-5	Manganese	2450			P
7440-02-0	Nickel	238			P
7440-09-7	Potassium	128000			P
7782-49-2	Selenium	5.4			P
7440-22-4	Silver	172			P
7440-23-5	Sodium	184000			P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	17.5	B		P
7440-66-6	Zinc	12400			P
7439-98-7	Molybdenu	38.6			P
7440-24-6	Strontium	362			P
7440-31-5	Tin	38.9	B		P
7439-93-2	Lithium	5360			P
11-09-6	Uranium	36.4	B		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

00A0884-002.001

FORM I - IN

128

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

003001

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Matrix (soil/water): WATER Lab Sample ID: 9912L922-003

Level (low/med): LOW Date Received: 12/04/99

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4070			P
7440-36-0	Antimony	26.0	B		P
7440-38-2	Arsenic	6.4	B		P
7440-39-3	Barium	394			P
7440-41-7	Beryllium	5.1			P
7440-43-9	Cadmium	74.6			P
7440-70-2	Calcium	56000	B	E	P
7440-47-3	Chromium	207			P
7440-48-4	Cobalt	15.7	B	E	P
7440-50-8	Copper	1420			P
7439-89-6	Iron	13800			P
7439-92-1	Lead	493			P
7439-95-4	Magnesium	8460	B		P
7439-96-5	Manganese	281			P
7440-02-0	Nickel	225			P
7440-09-7	Potassium	202000			P
7782-49-2	Selenium	4.8	B		P
7440-22-4	Silver	48.7			P
7440-23-5	Sodium	270000			P
7440-28-0	Thallium	10.8	U		P
7440-62-2	Vanadium	22.3	B		P
7440-66-6	Zinc	8370			P
7439-98-7	Molybdenu	36.6			P
7440-24-6	Strontium	254			P
7440-31-5	Tin	40.4	B		P
7439-93-2	Lithium	6340			P
11-09-6	Uranium	16.9	B		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

00A0884-003.001

FORM I - IN

129

U.S. EPA

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Initial Calibration Source: IV

Continuing Calibration Source: IV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	3750.0	3653.62	97.4	5000.0	4962.06	99.2	4995.13	99.9	P
Antimony	375.0	372.47	99.3	500.0	503.44	100.7	497.78	99.6	P
Arsenic	375.0	375.30	100.1	500.0	515.87	103.2	510.50	102.1	P
Barium	375.0	366.35	97.7	500.0	481.58	96.3	484.62	96.9	P
Beryllium	375.0	377.28	100.6	500.0	508.26	101.7	505.95	101.2	P
Cadmium	375.0	385.40	102.8	500.0	524.76	105.0	520.92	104.2	P
Calcium	1500.0	1477.60	98.5	2000.0	2014.81	100.7	2006.18	100.3	P
Chromium	375.0	382.80	102.1	500.0	514.52	102.9	511.84	102.4	P
Cobalt	375.0	380.47	101.5	500.0	512.83	102.6	511.35	102.3	P
Copper	375.0	370.88	98.9	500.0	487.81	97.6	490.09	98.0	P
Iron	3750.0	3822.81	101.9	5000.0	5126.54	102.5	5116.17	102.3	P
Lead	375.0	385.34	102.8	500.0	521.47	104.3	516.70	103.3	P
Magnesium	3000.0	2933.48	97.8	4000.0	4019.15	100.5	4022.34	100.6	P
Manganese	3750.0	3864.66	103.1	5000.0	5176.18	103.5	5154.98	103.1	P
Nickel	375.0	381.77	101.8	500.0	512.16	102.4	512.03	102.4	P
Potassium	3750.0	3727.96	99.4	5000.0	5089.56	101.8	5173.49	103.5	P
Selenium	375.0	386.28	103.0	500.0	525.95	105.2	523.28	104.7	P
Silver	375.0	372.38	99.3	500.0	494.17	98.8	494.63	98.9	P
Sodium	3750.0	3664.13	97.7	5000.0	4993.08	99.9	5051.29	101.0	P
Thallium	375.0	385.60	102.8	500.0	521.78	104.4	519.55	103.9	P
Vanadium	3750.0	3807.00	101.5	5000.0	5088.10	101.8	5081.77	101.6	P
Zinc	375.0	376.99	100.5	500.0	508.28	101.7	507.53	101.5	P
Molybdenu	375.0	387.69	103.4	500.0	516.58	103.3	515.14	103.0	P
Strontium	375.0	370.34	98.8	500.0	488.74	97.7	489.64	97.9	P
Tin	375.0	384.15	102.4	500.0	522.44	104.5	519.34	103.9	P
Lithium	3000.0	3000.18	100.0	4000.0	4110.67	102.8	4123.12	103.1	P
Uranium	375.0	369.33	98.5	500.0	487.28	97.5	496.96	99.4	P

FORM II (PART 1) - IN

130

U.S. EPA

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA_ Case No.: 00A08 SAS No.: _____ SDG No.: 001001

Initial Calibration Source: IV

Continuing Calibration Source: IV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				5000.0	5059.70	101.2	5049.76	101.0	P
Antimony				500.0	512.82	102.6	517.62	103.5	P
Arsenic				500.0	523.84	104.8	539.70	107.9	P
Barium				500.0	487.89	97.6	485.70	97.1	P
Beryllium				500.0	522.01	104.4	528.00	105.6	P
Cadmium				500.0	542.88	108.6	553.26	110.7	P
Calcium				2000.0	2048.93	102.4			P
Chromium				500.0	528.13	105.6	531.48	106.3	P
Cobalt				500.0	529.05	105.8	532.18	106.4	P
Copper				500.0	495.18	99.0	490.70	98.1	P
Iron				5000.0	5248.95	105.0	5235.57	104.7	P
Lead				500.0	537.16	107.4	546.29	109.3	P
Magnesium				4000.0	4128.37	103.2			P
Manganese				5000.0	5299.93	106.0	5341.88	106.8	P
Nickel				500.0	530.99	106.2	543.75	108.8	P
Potassium				5000.0	5176.21	103.5	5191.71	103.8	P
Selenium				500.0	541.66	108.3	545.90	109.2	P
Silver				500.0	501.53	100.3	498.26	99.7	P
Sodium				5000.0	5123.55	102.5	5097.44	101.9	P
Thallium				500.0	539.22	107.8	527.99	105.6	P
Vanadium				5000.0	5206.32	104.1	5193.34	103.9	P
Zinc				500.0	521.19	104.2	528.02	105.6	P
Molybdenu				500.0	530.42	106.1	533.82	106.8	P
Strontium				500.0	493.66	98.7	493.35	98.7	P
Tin				500.0	538.56	107.7	541.76	108.4	P
Lithium				4000.0	4239.65	106.0	4293.44	107.3	P
Uranium				500.0	490.36	98.1	476.94	95.4	P

FORM II (PART 1) - IN

U.S. EPA

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Initial Calibration Source: IV

Continuing Calibration Source: IV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				5000.0	4998.18	100.0	4981.56	99.6	P
Antimony				500.0	514.24	102.8	513.75	102.8	P
Arsenic				500.0	534.66	106.9	535.00	107.0	P
Barium				500.0	477.79	95.6	475.82	95.2	P
Beryllium				500.0	525.75	105.2	526.39	105.3	P
Cadmium				500.0	554.40	110.9	555.22	111.0	P
Calcium	1500.0	1417.78	94.5	2000.0	1955.92	97.8	1894.21	94.7	P
Chromium				500.0	528.29	105.7	529.90	106.0	P
Cobalt				500.0	531.20	106.2	530.94	106.2	P
Copper				500.0	482.93	96.6	479.62	95.9	P
Iron				5000.0	5213.94	104.3	5193.86	103.9	P
Lead				500.0	548.08	109.6	545.52	109.1	P
Magnesium	3000.0	2825.61	94.2	4000.0	3912.15	97.8	3896.37	97.4	P
Manganese				5000.0	5313.88	106.3	5311.98	106.2	P
Nickel				500.0	541.84	108.4	543.20	108.6	P
Potassium				5000.0	5118.34	102.4	5101.27	102.0	P
Selenium				500.0	547.94	109.6	543.45	108.7	P
Silver				500.0	493.43	98.7	492.65	98.5	P
Sodium				5000.0	5032.35	100.6	4981.43	99.6	P
Thallium				500.0	527.54	105.5	524.62	104.9	P
Vanadium				5000.0	5159.77	103.2	5157.82	103.2	P
Zinc				500.0	525.60	105.1	524.92	105.0	P
Molybdenu				500.0	529.50	105.9	530.92	106.2	P
Strontium				500.0	486.78	97.4	485.41	97.1	P
Tin				500.0	540.80	108.2	544.61	108.9	P
Lithium				4000.0	4294.99	107.4	4264.33	106.6	P
Uranium				500.0	490.27	98.1	498.52	99.7	P

FORM II (PART 1) - IN

132

U.S. EPA

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Initial Calibration Source: IV

Continuing Calibration Source: IV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony	375.0	367.03	97.9	500.0	488.17	97.6	486.54	97.3	P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium				2000.0	1939.98	97.0			P
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium				4000.0	3935.27	98.4			P
Manganese									NR
Nickel									NR
Potassium	3750.0	3612.14	96.3	5000.0	4858.53	97.2	4983.11	99.7	P
Selenium	375.0	372.66	99.4	500.0	500.70	100.1	503.04	100.6	P
Silver									NR
Sodium	3750.0	3661.86	97.6	5000.0	4895.94	97.9	5036.51	100.7	P
Thallium									NR
Vanadium									NR
Zinc									NR
Molybdenu									NR
Strontium									NR
Tin	375.0	376.37	100.4	500.0	503.22	100.6	516.36	103.3	P
Lithium									NR
Uranium									NR

FORM II (PART 1) - IN

133

U.S. EPA

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Initial Calibration Source: IV

Continuing Calibration Source: IV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony				500.0	484.40	96.9			P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Nickel									NR
Potassium				5000.0	4861.12	97.2			P
Selenium				500.0	499.61	99.9			P
Silver									NR
Sodium				5000.0	4945.10	98.9			P
Thallium									NR
Vanadium									NR
Zinc									NR
Molybdenu									NR
Strontium									NR
Tin				500.0	503.78	100.8			P
Lithium									NR
Uranium									NR

FORM II (PART 1) - IN

U.S. EPA

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA_ Case No.: 00A08 SAS No.: _____ SDG No.: 001001

AA CRDL Standard Source: HIGH PURITY_

ICP CRDL Standard Source: HIGH PURITY_

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum				200.0	198.54	99.3	203.11	101.6
Antimony				120.0	121.24	101.0	124.90	104.1
Arsenic				20.0	9.83	49.2	11.80	59.0
Barium				200.0	195.72	97.9	190.48	95.2
Beryllium				10.0	10.14	101.4	10.62	106.2
Cadmium				10.0	10.50	105.0	11.15	111.5
Calcium								
Chromium				20.0	22.02	110.1	22.52	112.6
Cobalt				100.0	102.44	102.4	108.49	108.5
Copper				50.0	50.42	100.8	48.91	97.8
Iron				200.0	206.18	103.1	210.63	105.3
Lead				6.0	8.76	146.0	9.03	150.5
Magnesium								
Manganese				30.0	31.49	105.0	32.61	108.7
Nickel				80.0	82.40	103.0	88.34	110.4
Potassium								
Selenium				10.0	13.26	132.6	12.21	122.1
Silver				20.0	20.89	104.4	19.74	98.7
Sodium								
Thallium				20.0	23.10	115.5	23.30	116.5
Vanadium				100.0	101.60	101.6	104.32	104.3
Zinc				40.0	40.23	100.6	42.15	105.4
Molybdenu				200.0	207.49	103.7	213.73	106.9
Strontium				200.0	197.04	98.5	193.08	96.5
Tin				200.0	205.46	102.7	216.86	108.4
Lithium				200.0	197.20	98.6	209.90	105.0
Uranium				100.0	121.38	121.4	88.83	88.8

FORM II (PART 2) - IN

135

U.S. EPA

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

AA CRDL Standard Source: HIGH PURITY

ICP CRDL Standard Source: HIGH PURITY

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0	116.79	97.3	114.92	95.8
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Nickel								
Potassium								
Selenium				10.0	10.68	106.8	10.16	101.6
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Molybdenu								
Strontium								
Tin				200.0	199.14	99.6	198.77	99.4
Lithium								
Uranium								

FORM II (PART 2) - IN

U.S. EPA

3
BLANKS

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	10.1	U	10.1	U	10.1	U	10.1	U	2.525	U	P
Antimony	2.1	U	2.1	U	2.1	U	2.1	U	0.525	U	P
Arsenic	-11.1	B	-12.4	B	-12.3	B	-13.6	B	-2.290	B	P
Barium	0.2	U	0.2	U	0.4	B	0.2	U	0.298	B	P
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.025	U	P
Cadmium	0.4	U	0.4	U	0.4	U	0.4	U	0.100	U	P
Calcium	8.6	U	8.6	U	8.6	U	8.6	U	16.475	B	P
Chromium	1.1	B	1.1	B	0.9	B	1.5	B	0.567	B	P
Cobalt	1.0	B	0.7	U	1.6	B	0.7	U	0.326	B	P
Copper	0.6	B	0.5	U	1.2	B	0.5	U	0.281	B	P
Iron	13.6	U	13.6	U	13.6	U	13.6	U	3.400	U	P
Lead	-2.5	B	2.1	U	2.1	U	2.1	U	0.525	U	P
Magnesium	6.3	U	6.3	U	6.3	U	6.3	U	7.625	B	P
Manganese	0.3	B	0.2	B	0.2	B	0.3	B	0.210	B	P
Nickel	1.0	U	1.0	U	1.2	B	1.0	U	0.414	B	P
Potassium	-27.6	B	17.8	U	17.8	U	24.5	B	12.972	B	P
Selenium	4.1	U	4.1	U	4.1	U	4.1	U	1.025	U	P
Silver	1.2		0.8	U	0.8	U	0.8	U	0.364		P
Sodium	4.8	U	4.8	U	14.0	B	5.7	B	100.560	B	P
Thallium	4.3	U	4.3	U	4.3	U	4.3	U	1.075	U	P
Vanadium	0.6	U	0.6	U	1.1	B	0.6	U	0.188	B	P
Zinc	0.5	U	0.5	U	0.7	B	0.5	U	0.956	B	P
Molybdenu	1.1	U	1.1	U	1.1	U	1.1	U	0.275	U	P
Strontium	0.1	U	0.1	U	0.1	U	0.1	U	0.093	B	P
Tin	2.6	U	2.6	U	2.6	U	2.6	U	0.680	B	P
Lithium	0.1	U	-0.1	B	-0.1	B	0.1	U	-0.043	B	P
Uranium	13.7	U	13.7	U	13.7	U	13.7	U	5.341	B	P

FORM III - IN

U.S. EPA

3
BLANKS

Lab Name: RECRA_LABNET_____ Contract: 11830-1___

Lab Code: RECRA_ Case No.: 00A08 SAS No.: _____ SDG No.: 001001

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			14.3	B	10.1	U	10.1	U			P
Antimony			2.1	U	2.1	U	2.1	U			P
Arsenic			-10.9	B	-10.9	B	-13.8	B			P
Barium			0.2	U	0.2	B	0.2	U			P
Beryllium			0.1	U	0.1	U	0.1	U			P
Cadmium			0.4	U	0.4	U	0.4	U			P
Calcium	-64.5	B	-55.0	B	-61.0	B	-58.7	B			P
Chromium			1.2	B	1.5	B	1.5	B			P
Cobalt			0.7	U	1.5	B	0.8	B			P
Copper			0.5	U	0.5	B	0.5	U			P
Iron			13.6	U	13.6	U	13.6	U			P
Lead			2.1	U	2.1	U	2.1	U			P
Magnesium	-62.5	B	-55.1	B	-62.1	B	-56.7	B			P
Manganese			0.3	B	0.3	B	0.4	B			P
Nickel			1.0	U	1.4	B	1.0	U			P
Potassium			17.8	U	17.8	U	17.8	U			P
Selenium			4.1	U	4.1	U	4.1	U			P
Silver			0.8	B	0.8	U	1.2				P
Sodium			4.8	U	4.8	U	4.8	U			P
Thallium			4.3	U	4.3	U	4.3	U			P
Vanadium			0.6	U	1.2	B	0.6	U			P
Zinc			0.5	U	0.6	B	0.5	U			P
Molybdenu			1.1	U	1.1	U	1.1	U			P
Strontium			0.1	U	0.1	U	0.1	U			P
Tin			2.6	U	2.6	U	2.6	U			P
Lithium			-0.1	B	-0.1	B	-0.1	B			P
Uranium			14.6	B	13.7	U	13.7	U			P

FORM III - IN

138

U.S. EPA

3
BLANKS

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA_ Case No.: 00A08 SAS No.: _____ SDG No.: 001001

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony	2.1	U	2.1	U	2.1	U	2.1	U			P
Arsenic											NR
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Nickel											NR
Potassium	-23.0	B	17.8	U	-25.2	B	17.8	U			P
Selenium	4.1	U	4.1	U	4.1	U	4.1	U			P
Silver											NR
Sodium	4.8	U	4.8	U	6.0	B	4.8	U			P
Thallium											NR
Vanadium											NR
Zinc											NR
Molybdenu											NR
Strontium											NR
Tin	2.6	U	2.6	U	2.6	U	2.6	U			P
Lithium											NR
Uranium											NR

FORM III - IN

U.S. EPA

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No: SDG No.: 001001

ICP ID Number: TR ICS Source: IV

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	505666	516887.5	103.4	507900	507759.9	101.6
Antimony	0	600	-2	626.2	104.4	-1	629.6	104.9
Arsenic	0	100	-9	96.1	96.1	-1	110.9	110.9
Barium	0	500	0	513.8	102.8	0	499.2	99.8
Beryllium	0	500	0	528.2	105.6	0	536.6	107.3
Cadmium	0	1000	0	992.3	99.2	-1	1026.7	102.7
Calcium	500000	500000	487032	494281.6	98.9	492440	503512.9	100.7
Chromium	0	500	0	509.9	102.0	0	512.6	102.5
Cobalt	0	500	-2	487.8	97.6	-2	493.0	98.6
Copper	0	500	-1	522.0	104.4	-2	502.3	100.5
Iron	200000	200000	196637	200478.4	100.2	203682	203582.0	101.8
Lead	0	50	3	51.9	103.8	-2	51.3	102.6
Magnesium	500000	500000	537267	546673.3	109.3	543527	556072.1	111.2
Manganese	0	500	4	524.7	104.9	4	527.4	105.5
Nickel	0	1000	0	954.8	95.5	1	995.3	99.5
Potassium	0		22			35		
Selenium	0	50	0	57.4	114.8	-1	55.7	111.4
Silver	0	200	1	217.1	108.6	1	211.8	105.9
Sodium	0	2000	18	2148.0	107.4	21	2081.4	104.1
Thallium	0	100	-4	102.7	102.7	1	100.0	100.0
Vanadium	0	500	-3	515.9	103.2	-3	511.0	102.2
Zinc	0	1000	5	1028.7	102.9	4	1038.8	103.9
Molybdenu	0	1000	0	1035.9	103.6	0	1045.0	104.5
Strontium	0	1000	0	992.6	99.3	-2	972.3	97.2
Tin	0	1000	-1	1006.9	100.7	-4	1027.8	102.8
Lithium	0	1000	2	1185.5	118.6	2	1187.6	118.8
Uranium	0	400	55	347.3	86.8	33	1011.1	101.1

* Corrections to Sodium MD 12/28/99

FORM IV - IN

140

U.S. EPA

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA_ Case No.: 00A08 SAS No: _____ SDG No.: 001001

ICP ID Number: TR_____ ICS Source: IV_____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony	0	600	0	599.1	99.8	-1	593.4	98.9
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium	500000	500000	466041	474052.6	94.8	466059	471390.4	94.3
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium	500000	500000	510107	518947.6	103.8	512839	518527.7	103.7
Manganese								
Nickel								
Potassium	0		9			-9		
Selenium	0	50	9	64.2	128.4	10	67.7	135.4
Silver								
Sodium	0	* 2000	14	1945.9	97.3	20	1943.4	97.2
Thallium								
Vanadium								
Zinc								
Molybdenu								
Strontium								
Tin	0	1000	-5	964.7	96.5	-6	962.9	96.3
Lithium								
Uranium								

* Correction to Sodium AD 12/28/99

FORM IV - IN

141

U.S. EPA

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

002001S

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001
Matrix: WATER Level (low/med): LOW
% Solids for Sample: 0.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		5634.6775		4885.5100		500.00	149.8		P
Antimony	75-125	147.3025	B	19.0575	B	125.00	102.6		P
Arsenic	75-125	564.3525		27.2988		500.00	107.4		P
Barium	75-125	1125.2502		633.0688		500.00	98.4		P
Beryllium	75-125	33.0240		20.0718		12.50	103.6		P
Cadmium		90.4638		77.2280		12.50	105.9		P
Calcium									NR
Chromium		340.1290		282.0942		50.00	116.1		P
Cobalt	75-125	141.0948		19.7928	B	125.00	97.0		P
Copper		1229.1192		1158.2315		62.50	113.4		P
Iron		27409.2150		26190.7500		250.00	487.4		P
Lead		747.8650		634.6925		125.00	90.5		P
Magnesium									NR
Manganese		2594.9475		2452.8000		125.00	113.7		P
Nickel	75-125	360.4980		237.8552		125.00	98.1		P
Potassium									NR
Selenium	75-125	543.6675		5.4145		500.00	107.7		P
Silver		203.8898		171.9525		12.50	255.5		P
Sodium									NR
Thallium	75-125	404.0300		1.0750	U	500.00	80.8		P
Vanadium	75-125	142.5450		17.4900	B	125.00	100.0		P
Zinc		12237.4375		12401.3625		125.00	-131.1		P
Molybdenu	75-125	283.0568		38.5585		250.00	97.8		P
Strontium	75-125	594.7110		362.3225		250.00	93.0		P
Tin	75-125	292.4625		38.9468	B	250.00	101.4		P
Lithium		5505.3100		5360.2175		250.00	58.0		P
Uranium	75-125	1200.8025		36.3518	B	1250.00	93.2		P

Comments:
00A0884-002.001

FORM V (Part 1) - IN

142

U.S. EPA

6
DUPLICATES

EPA SAMPLE NO.

002001D

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA_ Case No.: 00A08 SAS No.: _____ SDG No.: 001001

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		4885.5100		4826.8475		1.2		P
Antimony		19.0575	B	20.0625	B	5.1		P
Arsenic	10.0	27.2988		26.5398		2.8		P
Barium		633.0688		627.9212		0.8		P
Beryllium		20.0718		19.8740		1.0		P
Cadmium		77.2280		76.4612		1.0		P
Calcium	50000.0	106816.2500		98841.8250		7.8		P
Chromium		282.0942		280.4970		0.6		P
Cobalt		19.7928	B	19.6952	B	0.5		P
Copper		1158.2315		1139.7398		1.6		P
Iron		26190.7500		25970.0450		0.8		P
Lead		634.6925		613.1850		3.4		P
Magnesium		11807.0000	B	10836.7500	B	8.6		P
Manganese		2452.8000		2422.3375		1.2		P
Nickel		237.8552		236.8130		0.4		P
Potassium	50000.0	127514.4500		125235.4750		1.8		P
Selenium	5.0	5.4145		5.4240		0.2		P
Silver		171.9525		164.7068		4.3		P
Sodium	50000.0	183913.9750		178670.7750		2.9		P
Thallium		1.0750	U	1.0750	U			P
Vanadium		17.4900	B	17.3625	B	0.7		P
Zinc		12401.3625		11988.9775		3.4		P
Molybdenu	30.0	38.5585		38.4695		0.2		P
Strontium	200.0	362.3225		356.9405		1.5		P
Tin		38.9468	B	38.0888	B	2.2		P
Lithium		5360.2175		5172.3775		3.6		P
Uranium		36.3518	B	37.4362	B	2.9		P

FORM VI - IN

143

U.S. EPA

7

LABORATORY CONTROL SAMPLE

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA Case No.: 00A08 SAS No.: SDG No.: 001001

Solid LCS Source:

Aqueous LCS Source: IV

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	1250.0	1303.78	104.3						
Antimony	750.0	760.20	101.4						
Arsenic	2500.0	2666.91	106.7						
Barium	1250.0	1234.17	98.7						
Beryllium	62.5	65.53	104.8						
Cadmium	62.5	65.89	105.4						
Calcium	6250.0	6672.39	106.8						
Chromium	125.0	129.46	103.6						
Cobalt	625.0	645.74	103.3						
Copper	312.5	308.51	98.7						
Iron	1250.0	1302.18	104.2						
Lead	625.0	646.55	103.4						
Magnesium	6250.0	6609.69	105.8						
Manganese	187.5	198.41	105.8						
Nickel	500.0	510.74	102.1						
Potassium	6250.0	6528.02	104.4						
Selenium	2500.0	2648.61	105.9						
Silver	125.0	125.51	100.4						
Sodium	6250.0	6401.96	102.4						
Thallium	2500.0	2661.23	106.4						
Vanadium	625.0	649.50	103.9						
Zinc	250.0	257.68	103.1						
Molybdenu	1250.0	1304.03	104.3						
Strontium	1250.0	1246.24	99.7						
Tin	1250.0	1293.97	103.5						
Lithium	1250.0	1361.54	108.9						
Uranium	1250.0	1210.69	96.9						

FORM VII - IN

144

U.S. EPA

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

002001L

Lab Name: RECRA_LABNET Contract: 11830-1

Lab Code: RECRA_ Case No.: 00A08 SAS No.: _____ SDG No.: 001001

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	19542.04		19582.30		0.2		P
Antimony	7.62	B	10.50	U	100.0		P
Arsenic	109.20		50.80	B	53.5		P
Barium	2532.28		2589.00		2.2		P
Beryllium	80.29		82.13		2.3		P
Cadmium	308.91		324.78		5.1		P
Calcium	42726.50		49451.90	B	15.7	E	P
Chromium	1128.38		1166.64		3.4		P
Cobalt	79.17	B	88.54	B	11.8	E	P
Copper	4632.93		4646.16		0.3		P
Iron	104763.00		106840.60		2.0		P
Lead	253.88		278.04		9.5		P
Magnesium	4722.80	B	4953.45	B	4.9		P
Manganese	9811.20		10237.35		4.3		P
Nickel	951.42		1017.96		7.0		P
Potassium	51005.78		51638.68	B	1.2		P
Selenium	21.66		22.16	B	2.3		P
Silver	687.81		669.98		2.6		P
Sodium	73565.59		80688.56	B	9.7		P
Thallium	4.30	U	21.50	U			P
Vanadium	69.96	B	74.60	B	6.6		P
Zinc	4960.54		5395.54		8.8		P
Molybdenu	154.23		156.30	B	1.3		P
Strontium	1449.29		1483.00	B	2.3		P
Tin	155.79	B	169.67	B	8.9		P
Lithium	2144.09		2198.22		2.5		P
Uranium	145.41	B	211.73	B	45.6		P

FORM IX - IN

145

Nitrite/Nitrate
BUILDING 779
PITS/VAULTS

Nitrate Data Received

Commodore Advanced Sciences, Inc.

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A0884#001

Page 1 of 1

Collector: Margaret Schlabach / Tom Lonergan

RIN: 00A0884

Project Title: Sump Pits 122-2-2E

To (Lab): RECRA Labnet-PA (L)

Protocol: CLEANUP CAS Sel-003

Contact/Requester: GRAVES, MATT / ZBRYK, KATHY

Sampling Origin: Building 779 R 126 Basement

Logbook No.: 94 DOBGE

Method of Shipment: SAMPLE TEAM

Telephone No.: 3054 MSIN FAX

Purchase Order/Charge Code: KT03DT09

Ice Chest No.: n/a Temp.: -3.4

Bill of Lading/Air Bill No.: 4633 2125 3899

PRE: N/a

POSSIBLE SAMPLE HAZARDS/REMARKS: ** **

SPECIAL INSTRUCTIONS: IDC 1988 ENTERED 922

Hold Time

Total Activity Exemption: Yes ☐ No ☐

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative: Packing
00A0884-001.001	1A	AQUEOUS	12/3/99	0943	Building 779 Sumps	1-L P/G	SS05C016 (Total 600 Metals wo/Hg RDL-2) [Rush]	HN03 4 degrees C
00A0884-002.001	2A	AQUEOUS		0952	Building 779 Sumps	1-L P/G	SS05C016 (Total 600 Metals wo/Hg RDL-2) [Rush]	HN03 4 degrees C
00A0884-003.001	2B	AQUEOUS		1000	Building 779 Sumps	1-L P/G	SS05C016 (Total 600 Metals wo/Hg RDL-2) [Rush]	HN03 4 degrees C

JSW 12/2/99

RECEIVED DEC - 4 1999

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	11/10 12/10/99	T591B Tower #2 via alarm		T591B Judgette	12/3/99 1025	[illegible]	12/3/99 1225
[illegible]	12/3/99 1300	FedEX					
FedEx		Jansson	12/4/99 1000				

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

DEC-07-99 08:47 AM P.02

FAXED 12/14

ENTERED 12/14

Date: 12/09/99
Page 1 - B

PRELIMINARY REPORT OF ANALYSIS

Analytical Services
Rocky Flats Env Technology Site
10808 Highway 93 Unit B
Building 881 Room 214
Golden, CO 80403-8200

Lab Job Number: 035197 RFP002
Date Samples Received: 12/03/99
Report ID Number: 00A0884
Customer PO Number: KH700326EP6

Acculabs Designation:	99-A26257
Client Designation:	00A0884-001.002
Sample Location:	BUILDING 779 SUMPS
Location II:	1A
Date/Time Collected	12/03/99 9:43

General Chemistry (results in mg/L unless noted):

Nitrate plus Nitrite (as N)	0.44

Acculabs Designation:	99-A26258
Client Designation:	00A0884-002.002
Sample Location:	BUILDING 779 SUMPS
Location II:	2A
Date/Time Collected	12/03/99 9:52

General Chemistry (results in mg/L unless noted):

Nitrate plus Nitrite (as N)	0.05

Acculabs Designation:	99-A26259
Client Designation:	00A0884-003.002
Sample Location:	BUILDING 779 SUMPS
Location II:	2B
Date/Time Collected	12/03/99 10:00

General Chemistry (results in mg/L unless noted):

Nitrate plus Nitrite (as N)	< 0.05

NOTES:

Scheduled sample disposal/return date: , .

XXXXXXXXXXXXXXXXXX

Trudy L. Scott
Laboratory Manager

PRELIMINARY INFORMATION

148

VOA DATA

RIN#00A0827

CASE NARRATIVE
KHCO
SDG# 00A0827.002-VOA
Analysis by GC/MS

Sample Analysis:

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol from EPA SW-846 Third Edition, Method 8260B, Revision 2, December 1996:

Laboratory Number	Sample Description
9912134-01	00A0827-001
9912134-02	00A0827-002
9912134-03	00A0827-003
QC673586	00A0827-002MS (Matrix Spike)
QC673587	00A0827-002MSD (Matrix Spike)
QC674911	VBLK01(Blank)
QC674912	VBLK01LCS (Laboratory Control Sample)

System Configuration:

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5970	Jet Separator	Tekmar 2000 / Archon
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series / 5973	Direct	Tekmar 2000 / Archon

Chromatographic Column:

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

J&W1 DB - 624, 60 m x 0.32 mm, 1.8um (identified by the J&W1 designation)
J&W2: DB - 624, 75 m x 0.53 mm, 3 um (identified by the J&W2 designation)
Rtx1 Rtx Volatiles, 60 m x 0.53 mm, 1.5 um (identified by the Rtx VOA designation)
J&W3 DB-624, 60 m x 0.25 mm, 1.4 um (identified by the J&W3 designation)

Samples are prepared using Purge and Trap samplers containing the following P & T trap:

VOCARB 3000: Carbopack B/ Carboxen 1000 &1001

Instrument Configuration:

The samples reported in this sample delivery group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP5890/HP5970	J&W2	VOCARB 3000
VOA2	HP6890/HP5973	J&W3	VOCARB 3000
VOA4	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890/HP5972	J&W3	VOCARB 3000
VOA7	HP5890/HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890/HP5973	J&W3	VOCARB 3000
VOA9	HP6890/HP5973	J&W3	Tenax/Silicagel/ Charcoal

Instrument Calibration:

The instrument was calibrated to meet the 8260B initial calibration criteria. Although sample analyses are quantitated using the average response factor generated from the initial calibration, a daily calibration verification standard (CCV) is analyzed to verify the accuracy and acceptability of the multipoint initial calibration. The criteria adopted by the laboratory to determine the acceptability and accuracy of the initial calibration is a percent difference (%D) of less than 40% in response factor for each target analyte of interest. In the CCV, all the %Ds met the 40% criteria except for trichlorofluoromethane. The recovery of this analyte was high, qualifying any detection of this target analyte in samples associated with this CCV as biased high.

For a complete list of data files for the initial calibration, see the Calibration History Report.

Holding Time:

All samples were analyzed within the required holding time.

Surrogates:

Surrogate recoveries in all samples were within the required acceptance limits, except for the following sample:

Laboratory Number	Surrogate Standards
9912134-01	Dibromofluoromethane & Toluene-d8

The sample was initially analyzed diluted and surrogates passed, however when the sample was analyzed undiluted, the surrogates failed high. It appeared the high recoveries may be have been due to matrix effect, that were diluted out in the initial analysis.

Internal Standards:

Internal Standard areas in all samples were within the required acceptance limits.

Blanks:

No target analytes were detected in the method blank above the required reporting limit, however the following were detected below the reporting level:

Trichlorofluoromethane
Methylene chloride

RIN#00A0827

Spike Analyses:

The matrix spike (MS) and matrix spike duplicate (MSD) were analyzed on the following sample number:

GEL ID # 9912134-02 (00A0827-002)

All of the analytes in the MS and MSD were within the required acceptance limits for percent recovery.

All analytes in the MS/MSD set were within the required acceptance limits for relative percent difference.

Laboratory Control Samples:

All analytes in the laboratory control sample were within the required acceptance limits for percent recovery.

Dilutions:

None of the following samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this SDG.

General Comments:

Data files associated with both the initial calibration and continuing calibration check may have been manually integrated to correct misidentification of peaks by the integration software. Manual integrations are performed because of poor peak shapes exhibited by selective compounds at low concentrations, or as a result of overlapping retention time windows of similar isomeric compounds contained on the extended reporting list. If applicable, peak profiles for the affected compounds are contained in the raw data section.

The preceding narrative has been reviewed by: Charles W. [illegible] Date: 12-21-99

RIN#00A0827

2A
WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 #	OTHER	TOT OUT
01	VBLK01LCS	108	96	103		0
02	VBLK01	108	98	104		0
03	00A0827-002	109	95	105		0
04	00A0827-003	107	95	105		0
05	00A0827-002MS	108	93	104		0
06	00A0827-002MSD	108	95	105		0
07	00A0827-001	128*	98	133*		2
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
SMC1 (TOL)	= toluene-d8	(73-122)
SMC2 (BFB)	= bromofluorobenzene	(73-129)
SMC3	= Dibromofluoromethane	(66-117)

Column to be used to flag recovery values

* Values outside of contract required QC limits

RIN#00A0827

3A
WATER VOLATILE LAB CONTROL SAMPLE

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix Spike - EPA Sample No.: VBLK01

COMPOUND	SPIKE ADDED (ug/l)	SAMPLE CONCENTRATION (ug/l)	LCS CONCENTRATION (ug/l)	LCS % REC #	QC. LIMITS REC.
trichloroethene	50.0	0.0	52.3	105	69-127
toluene	50.0	0.0	51.8	104	79-121
1,1-dichloroethene	50.0	0.0	50.6	101	70-144
chlorobenzene	50.0	0.0	50.0	100	78-118
benzene	50.0	0.0	51.7	103	74-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 5 outside limits

COMMENTS: _____

FORM III VOA-1 OLM03.0

154

RIN#00A0827

3A
WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix Spike - EPA Sample No.: 00A0827-002

COMPOUND	SPIKE ADDED (ug/l)	SAMPLE CONCENTRATION (ug/l)	MS CONCENTRATION (ug/l)	MS % REC #	QC. LIMITS REC.
trichloroethene	50.0	0.0	48.1	96	52-150
toluene	50.0	0.0	48.9	98	73-117
1,1-dichloroethene	50.0	0.0	49.7	99	82-136
chlorobenzene	50.0	0.0	47.1	94	70-115
benzene	50.0	0.0	49.1	98	85-126

COMPOUND	SPIKE ADDED (ug/l)	MSD CONCENTRATION (ug/l)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
trichloroethene	50.0	50.7	101	5	30	52-150
toluene	50.0	50.6	101	3	30	73-117
1,1-dichloroethene	50.0	51.3	103	4	30	82-136
chlorobenzene	50.0	49.3	99	5	30	70-115
benzene	50.0	51.1	102	4	30	85-126

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS:

155

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00A0827-001

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: 9912134-01

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M317

Level: (low/med) LOW Date Received: 12/04/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-97-5	bromochloromethane	5.0	U
74-87-3	chloromethane	5.0	U
74-83-9	bromomethane	5.0	U
75-01-4	vinyl chloride	5.0	U
75-00-3	chloroethane	5.0	U
75-09-2	methylene chloride	0.77	JB
67-64-1	acetone	66.7	JB
75-15-0	carbon disulfide	5.0	U
75-35-4	1,1-dichloroethene	5.0	U
75-34-3	1,1-dichloroethane	1.2	J
67-66-3	chloroform	5.0	U
107-06-2	1,2-dichloroethane	5.0	U
78-93-3	2-butanone	20.2	J
71-55-6	1,1,1-trichloroethane	5.0	U
56-23-5	carbon tetrachloride	5.0	U
75-27-4	bromodichloromethane	5.0	U
78-87-5	1,2-dichloropropane	5.0	U
10061-01-5	cis-1,3-dichloropropene	5.0	U
79-01-6	trichloroethene	2.3	J
124-48-1	dibromochloromethane	5.0	U
79-00-5	1,1,2-trichloroethane	5.0	U
71-43-2	benzene	0.63	J
10061-02-6	trans-1,3-dichloropropene	5.0	U
75-25-2	bromoform	5.0	U
108-10-1	4-methyl-2-pentanone	101	
591-78-6	2-hexanone	8.2	J
127-18-4	tetrachloroethene	3.4	J
79-34-5	1,1,2,2-tetrachloroethane	5.0	U
108-88-3	toluene	9.3	
108-90-7	chlorobenzene	5.0	U
100-41-4	ethylbenzene	11.4	
100-42-5	styrene	5.0	U
75-71-8	Dichlorodifluoromethane	5.0	U

FORM I VOA OLM03.0

B DETECTED IN SAMPLE

JB " " SAMPLE & BLANK @ ABOVE MDL, BELOW REPORTING LIMIT

J IN SAMPLE BELOW REPORTING LIMIT

156

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00A0827-001

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: 9912134-01

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M317

Level: (low/med) LOW Date Received: 12/04/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-69-4	Trichlorofluoromethane	7.0	
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
74-95-3	Dibromomethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
142-28-9	1,3-Dichloropropane	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
98-82-8	Isopropyl benzene	0.52	J
108-86-1	Bromobenzene	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	1.2	J
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	1.5	J
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	Isopropyltoluene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
96-12-8	1,2-dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	3.1	J
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	trichlorotrifluoroethane	10.0	U
1330-20-7	xylenes (total)	63.8	
156-60-5	trans-1,2-dichloroethene	5.0	U
156-59-2	cis-1,2-Dichloroethene	1.9	J

FORM I VOA OLM03.0

157

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00A0827-002

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: 9912134-02

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M311

Level: (low/med) LOW Date Received: 12/04/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-97-5	bromochloromethane	5.0	U
74-87-3	chloromethane	5.0	U
74-83-9	bromomethane	5.0	U
75-01-4	vinyl chloride	5.0	U
75-00-3	chloroethane	5.0	U
75-09-2	methylene chloride	6.6	B
67-64-1	acetone	100	U
75-15-0	carbon disulfide	5.0	U
75-35-4	1,1-dichloroethene	5.0	U
75-34-3	1,1-dichloroethane	5.0	U
67-66-3	chloroform	5.0	U
107-06-2	1,2-dichloroethane	5.0	U
78-93-3	2-butanone	100	U
71-55-6	1,1,1-trichloroethane	5.0	U
56-23-5	carbon tetrachloride	5.0	U
75-27-4	bromodichloromethane	5.0	U
78-87-5	1,2-dichloropropane	5.0	U
10061-01-5	cis-1,3-dichloropropene	5.0	U
79-01-6	trichloroethene	5.0	U
124-48-1	dibromochloromethane	5.0	U
79-00-5	1,1,2-trichloroethane	5.0	U
71-43-2	benzene	5.0	U
10061-02-6	trans-1,3-dichloropropene	5.0	U
75-25-2	bromoform	5.0	U
108-10-1	4-methyl-2-pentanone	50.0	U
591-78-6	2-hexanone	50.0	U
127-18-4	tetrachloroethene	5.0	U
79-34-5	1,1,2,2-tetrachloroethane	5.0	U
108-88-3	toluene	5.0	U
108-90-7	chlorobenzene	5.0	U
100-41-4	ethylbenzene	5.0	U
100-42-5	styrene	5.0	U
75-71-8	Dichlorodifluoromethane	5.0	U

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00A0827-002

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: 9912134-02

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M311

Level: (low/med) LOW Date Received: 12/04/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-69-4	Trichlorofluoromethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
74-95-3	Dibromomethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
142-28-9	1,3-Dichloropropane	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
98-82-8	Isopropyl benzene	5.0	U
108-86-1	Bromobenzene	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	5.0	U
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	5.0	U
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	Isopropyltoluene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
96-12-8	1,2-dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	trichlorotrifluoroethane	10.0	U
1330-20-7	xylenes (total)	5.0	U
156-60-5	trans-1,2-dichloroethene	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U

FORM I VOA OLM03.0

159

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00A0827-003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: 9912134-03

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M312

Level: (low/med) LOW Date Received: 12/04/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-97-5	bromochloromethane	5.0	U
74-87-3	chloromethane	5.0	U
74-83-9	bromomethane	5.0	U
75-01-4	vinyl chloride	5.0	U
75-00-3	chloroethane	5.0	U
75-09-2	methylene chloride	6.4	B
67-64-1	acetone	3.8	JB
75-15-0	carbon disulfide	5.0	U
75-35-4	1,1-dichloroethene	5.0	U
75-34-3	1,1-dichloroethane	5.0	U
67-66-3	chloroform	5.0	U
107-06-2	1,2-dichloroethane	5.0	U
78-93-3	2-butanone	100	U
71-55-6	1,1,1-trichloroethane	5.0	U
56-23-5	carbon tetrachloride	5.0	U
75-27-4	bromodichloromethane	5.0	U
78-87-5	1,2-dichloropropane	5.0	U
10061-01-5	cis-1,3-dichloropropene	5.0	U
79-01-6	trichloroethene	5.0	U
124-48-1	dibromochloromethane	5.0	U
79-00-5	1,1,2-trichloroethane	5.0	U
71-43-2	benzene	5.0	U
10061-02-6	trans-1,3-dichloropropene	5.0	U
75-25-2	bromoform	5.0	U
108-10-1	4-methyl-2-pentanone	50.0	U
591-78-6	2-hexanone	50.0	U
127-18-4	tetrachloroethene	5.0	U
79-34-5	1,1,2,2-tetrachloroethane	5.0	U
108-88-3	toluene	5.0	U
108-90-7	chlorobenzene	5.0	U
100-41-4	ethylbenzene	5.0	U
100-42-5	styrene	5.0	U
75-71-8	Dichlorodifluoromethane	5.0	U

FORM I VOA OLM03.0

160

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00A0827-003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: 9912134-03

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M312

Level: (low/med) LOW Date Received: 12/04/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-69-4	Trichlorofluoromethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
74-95-3	Dibromomethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
142-28-9	1,3-Dichloropropane	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
98-82-8	Isopropyl benzene	5.0	U
108-86-1	Bromobenzene	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	5.0	U
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	5.0	U
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	Isopropyltoluene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
96-12-8	1,2-dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	trichlorotrifluoroethane	10.0	U
1330-20-7	xylenes (total)	5.0	U
156-60-5	trans-1,2-dichloroethene	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U

FORM I VOA OLM03.0

161

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: QC674911

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M309KHCO

Level: (low/med) LOW Date Received: 12/08/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-97-5	bromochloromethane	5.0	U
74-87-3	chloromethane	5.0	U
74-83-9	bromomethane	5.0	U
75-01-4	vinyl chloride	5.0	U
75-00-3	chloroethane	5.0	U
75-09-2	methylene chloride	3.8	J
67-64-1	acetone	2.3	J
75-15-0	carbon disulfide	5.0	U
75-35-4	1,1-dichloroethene	5.0	U
75-34-3	1,1-dichloroethane	5.0	U
67-66-3	chloroform	5.0	U
107-06-2	1,2-dichloroethane	5.0	U
78-93-3	2-butanone	100	U
71-55-6	1,1,1-trichloroethane	5.0	U
56-23-5	carbon tetrachloride	5.0	U
75-27-4	bromodichloromethane	5.0	U
78-87-5	1,2-dichloropropane	5.0	U
10061-01-5	cis-1,3-dichloropropene	5.0	U
79-01-6	trichloroethene	5.0	U
124-48-1	dibromochloromethane	5.0	U
79-00-5	1,1,2-trichloroethane	5.0	U
71-43-2	benzene	5.0	U
10061-02-6	trans-1,3-dichloropropene	5.0	U
75-25-2	bromoform	5.0	U
108-10-1	4-methyl-2-pentanone	50.0	U
591-78-6	2-hexanone	50.0	U
127-18-4	tetrachloroethene	5.0	U
79-34-5	1,1,2,2-tetrachloroethane	5.0	U
108-88-3	toluene	5.0	U
108-90-7	chlorobenzene	5.0	U
100-41-4	ethylbenzene	5.0	U
100-42-5	styrene	5.0	U
75-71-8	Dichlorodifluoromethane	5.0	U

FORM I VOA OLM03.0

162

RIN#00A0827

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00A0827.002

Matrix: (soil/water) WATER Lab Sample ID: QC674911

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2M309KHCO

Level: (low/med) LOW Date Received: 12/08/99

% Moisture: not dec. _____ Date Analyzed: 12/08/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-69-4	Trichlorofluoromethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
74-95-3	Dibromomethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
142-28-9	1,3-Dichloropropane	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
98-82-8	Isopropyl benzene	5.0	U
108-86-1	Bromobenzene	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	5.0	U
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	5.0	U
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	Isopropyltoluene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
96-12-8	1,2-dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	trichlorotrifluoroethane	10.0	U
1330-20-7	xylenes (total)	5.0	U
156-60-5	trans-1,2-dichloroethene	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U

FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 559 PA Inorganic Laboratories Sample No.: 1

Lab Sample ID: 99P0061-08 Bldg 779 Ground Water Leakage Sample (A654808)

Section: ICPAES

Lab Sample I.D.s beginning with X' indicates TCLP Extract.

% Solids for Sample : < 0.5000

Date Sampled: 11/27/95 SDG No. : NOV27

Lab Receipt Data: 11/30/95 QC Report No.: SD112795.RPT

Matrix: Water X
Soil
Sludge
Other

Elements Identified and Measured

Concentration Units: mg/L

N V * E O O S +

Analyte	Concentration	C	Q	M
Aluminum	0.3000	U		P
Antimony	0.1000	U		P
Arsenic	0.1000	U		P
Barium	0.0500	U		P
Beryllium	0.0050	U		P
Cadmium	0.0697	B		P
Calcium	62.4770	B		P
Chromium	0.1274	B		P
Cobalt	0.0500	U		P
Copper	0.3126	B		P
Iron	2.2157	B		P
Lead	1.3979	B		P
Magnesium	0.5934	B		P
Manganese	0.5364	B		P
Molybdenum	0.0968	B		P
Nickel	0.3943	B		P
Phosphorus	124.1797	B		P
Selenium	0.0750	U		P
Silver	0.0440	B		P
Strontium	0.1954	B		P
Thallium	0.1000	U		P
Titanium	0.0200	U		P
Vanadium	0.0600	U		P
Zinc	27.8536	B		P

Color Before: Clarity Before:

Color After: Clarity After:

Texture:

Artifacts:

Comments: Sample < 0.50 % Solids. Total Metals Digestion only !

Metals (mg/kg) Radionuclides (pCi/g)

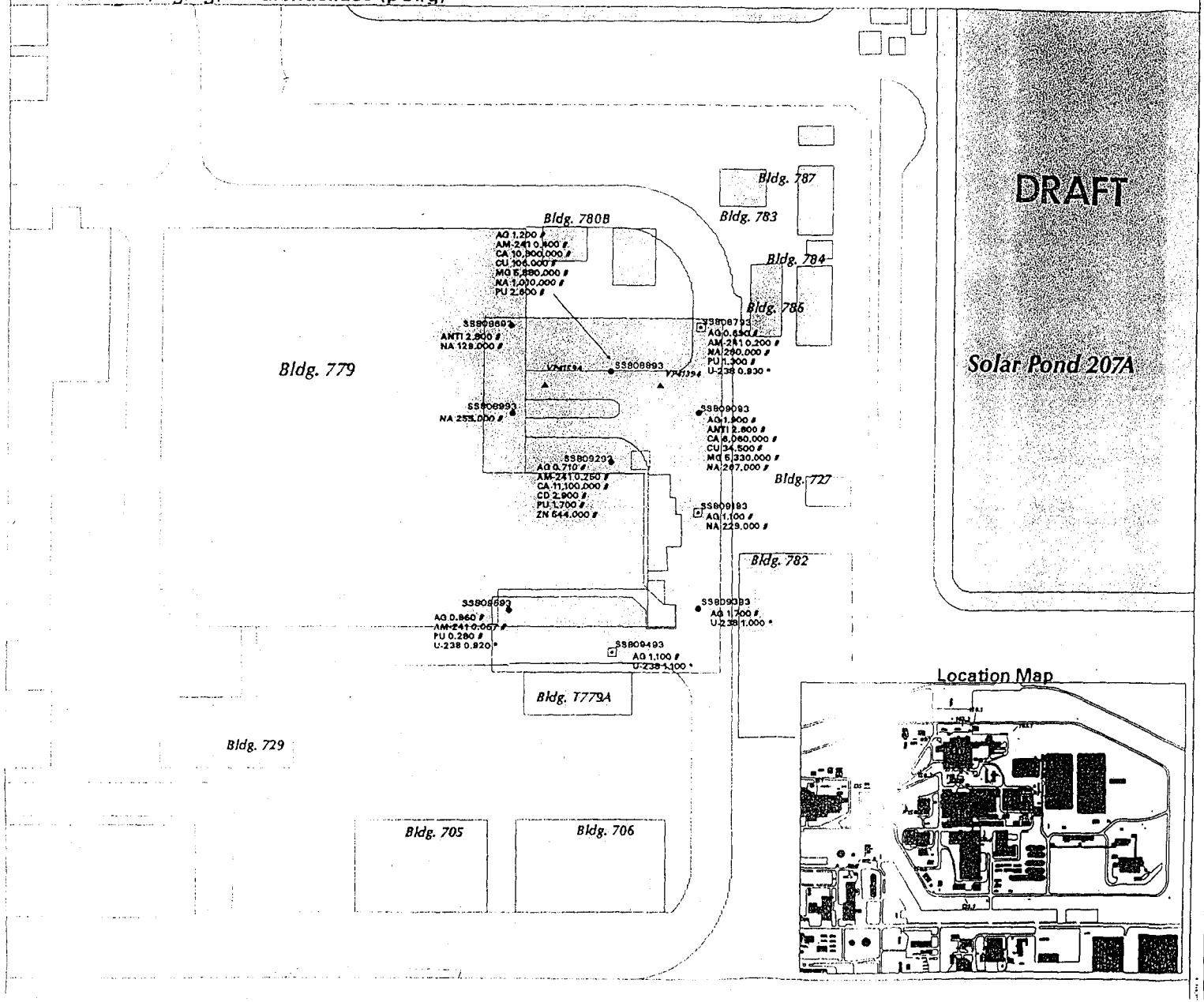


FIGURE 3-30

OU8-IHSS 150.6/150.8

SURFACE-SOIL ANALYTICAL RESULTS FOR INORGANICS

EXPLANATION

- Surface Soil Sample Location
- Surface Soil and Asphalt Sample Location
- Analyte elevated above background
- Vertical Soil Profile Sammple Location Data Provided in Appendix C.
- OU8 IHSS
- Buildings or other structures
- Building footprint (where overlaps IHSS)
- Fences
- Paved roads
- Dirt roads

AG = Silver
AM-241 = Americium-241
ANTI = Antimony
CA = Calcium
CD = Cadmium
CU = Copper
MG = Magnesium
NA = Sodium
PU = Plutonium-239/240
U-235 = Uranium-235
U-238 = Uranium-238
ZN = Zinc

DRAFT

Analytical results are indicated by the chemical symbol, result, and threshold flag. Flags are:

* Positive detection above PRG
\# Positive detection above background
● Positive detection above PRG and background

Estimated or "J" qualified values are reported as positive detections. See associated data tables for full data presentation.

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

Prepared by:

RMRS
Rocky Mountain Remediation Services
A Limited Liability Company
7100 East Belleview Avenue, Suite 300
Englewood, Colorado 80110

s:\fjara\621908\projects\ou8\ou8hcpplates\fig1506.aml

Rad Survey Data

B779 Room 001 Pit Characterization

Total Surface Activity Survey

Meter Model:	NE Electra w/ DP6 Probe			Local Area Bkgd (cpm)	NE Electra w/ DP6 Probe			Local Area Bkgd (cpm)
Instrument #:	1826			3.3	1826			640.4
Cal. Due Date:	4/13/00				4/13/00			
Efficiency (c/d):	0.213				0.298			

	ALPHA Total Surface Activity Measurements					BETA Total Surface Activity Measurements				
Pit #	Serial #	Date	(cpm)	MDA (dpm/100 cm²)	(dpm/100 cm²)	Serial #	Date	(cpm)	MDA (dpm/100 cm²)	(dpm/100 cm²)
1A-1	1826	12/02/99	6.7	41	15.9	1826	12/02/99	641.0	328	2.0
1A-2	1826	12/02/99	4.7	41	6.6	1826	12/02/99	735.0	328	317.2
1A-3	1826	12/02/99	6.0	41	12.7	1826	12/02/99	740.0	328	334.0
1A-4	1826	12/02/99	4.7	41	6.6	1826	12/02/99	667.0	328	89.2
1A-5	1826	12/02/99	4.7	41	6.6	1826	12/02/99	715.0	328	250.2
1A-6	1826	12/02/99	6.7	41	15.9	1826	12/02/99	639.0	328	-4.7
1A-7	1826	12/02/99	6.0	41	12.7	1826	12/02/99	675.0	328	116.0
1A-8	1826	12/02/99	6.0	41	12.7	1826	12/02/99	704.0	328	213.3
1A-9	1826	12/02/99	3.3	41	0.0	1826	12/02/99	636.0	328	-14.8
1A-10	1826	12/02/99	5.3	41	9.4	1826	12/02/99	784.0	328	481.6
2A-1	1826	12/02/99	5.3	41	9.4	1826	12/02/99	622.0	328	-61.7
2A-2	1826	12/02/99	3.3	41	0.0	1826	12/02/99	666.0	328	85.8
2A-3	1826	12/02/99	1.3	41	-9.4	1826	12/02/99	727.0	328	290.4
2A-4	1826	12/02/99	2.7	41	-2.8	1826	12/02/99	747.0	328	357.5
2A-5	1826	12/02/99	1.3	41	-9.4	1826	12/02/99	671.0	328	102.6
2A-6	1826	12/02/99	4.0	41	3.3	1826	12/02/99	592.0	328	-162.3
2A-7	1826	12/02/99	3.3	41	0.0	1826	12/02/99	748.0	328	360.8
2A-8	1826	12/02/99	3.3	41	0.0	1826	12/02/99	734.0	328	313.9
2A-9	1826	12/02/99	5.3	41	9.4	1826	12/02/99	669.0	328	95.9
2A-10	1826	12/02/99	2.0	41	-6.1	1826	12/02/99	691.0	328	169.7
2B-1	1826	12/02/99	8.7	41	25.3	1826	12/02/99	623.0	328	-68.4
2B-2	1826	12/02/99	2.0	41	-6.1	1826	12/02/99	663.0	328	75.8
2B-3	1826	12/02/99	2.0	41	-6.1	1826	12/02/99	682.0	328	139.5
2B-4	1826	12/02/99	5.3	41	9.4	1826	12/02/99	659.0	328	62.4
2B-5	1826	12/02/99	2.0	41	-6.1	1826	12/02/99	801.0	328	538.6
2B-6	1826	12/02/99	2.0	41	-6.1	1826	12/02/99	634.0	328	-21.5
2B-7	1826	12/02/99	0.7	41	-12.2	1826	12/02/99	663.0	328	75.8
2B-8	1826	12/02/99	3.3	41	0.0	1826	12/02/99	662.0	328	72.4
2B-9	1826	12/02/99	3.3	41	0.0	1826	12/02/99	643.0	328	8.7
2B-10	1826	12/02/99	4.0	41	3.3	1826	12/02/99	671.0	328	102.6

(Pits 1A-2B) MAX = 25.3 Total

MAX = 538.6 Uranium

B779 Room 001 Pit Characterization

T5-1	1826	12/03/99	5.3	41	9.4	1826	12/03/99	1116.0	328	1594.9
T5-2	1826	12/03/99	8.0	41	22.0	1826	12/03/99	651.0	328	35.5
T5-3	1826	12/03/99	12.7	41	44.0	1826	12/03/99	2016.0	328	4613.0
T5-4	1826	12/03/99	7.3	41	18.7	1826	12/03/99	964.0	328	1085.2
T5-5	1826	12/03/99	34.7	41	147.1	1826	12/03/99	1027.0	328	1296.4
T5-6	1826	12/03/99	16.7	41	62.8	1826	12/03/99	1010.0	328	1239.4
T5-7	1826	12/03/99	215.0	41	992.0	1826	12/03/99	789.0	328	498.3
T5-8	1826	12/03/99	43.3	41	187.4	1826	12/03/99	780.0	328	468.1
T5-9	1826	12/03/99	173.0	41	795.2	1826	12/03/99	785.0	328	484.9
T5-10	1826	12/03/99	65.3	41	290.5	1826	12/03/99	743.0	328	344.1
				MIN	-12.2				MIN	-162.3
				MAX	992.0				MAX	4613.0
				MEAN	66.6				MEAN	399.8
				SD	201.9				SD	786.0
				Transuranic $DCGL_W$	100				Uranium $DCGL_W$	5000

B779 Room 001 Pit Characterization

			ALPHA				BETA		
Measurement #	Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm^2)	MDA	Serial #	Gross (cpm)	(dpm/100 cm^2)	MDA
1A-1	814	12/3/99	0.0	-0.9	8.3	BC920	41.5	-11.6	73.3
1A-2	1160	12/3/99	0.0	-1.5	8.3	BC920	45.5	4.4	73.3
1A-3	1407	12/3/99	0.0	-0.6	8.3	BC920	44.0	-1.6	73.3
1A-4	814	12/3/99	0.0	-0.9	8.3	BC920	46.0	6.4	73.3
1A-5	1160	12/3/99	0.0	-1.5	8.3	BC920	41.0	-13.6	73.3
1A-6	1407	12/3/99	0.5	0.9	8.3	BC920	51.0	26.4	73.3
1A-7	814	12/3/99	0.0	-0.9	8.3	BC920	40.0	-17.6	73.3
1A-8	1160	12/3/99	0.5	0.0	8.3	BC920	50.0	22.4	73.3
1A-9	1407	12/3/99	0.5	0.9	8.3	BC920	42.0	-9.6	73.3
1A-10	814	12/3/99	0.0	-0.9	8.3	BC920	42.0	-9.6	73.3
2A-1	1160	12/3/99	0.0	-1.5	8.3	BC920	34.5	-39.6	73.3
2A-2	1407	12/3/99	0.0	-0.6	8.3	BC920	46.0	6.4	73.3
2A-3	814	12/3/99	0.5	0.6	8.3	BC920	40.0	-17.6	73.3
2A-4	1160	12/3/99	1.0	1.5	8.3	BC920	30.5	-55.6	73.3
2A-5	1407	12/3/99	0.5	0.9	8.3	BC920	44.5	0.4	73.3
2A-6	814	12/3/99	0.0	-0.9	8.3	BC920	47.0	10.4	73.3
2A-7	1160	12/3/99	0.0	-1.5	8.3	BC920	47.0	10.4	73.3
2A-8	1407	12/3/99	0.5	0.9	8.3	BC920	42.5	-7.6	73.3
2A-9	814	12/3/99	0.5	0.6	8.3	BC920	40.5	-15.6	73.3
2A-10	1160	12/3/99	0.0	-1.5	8.3	BC920	51.0	26.4	73.3
2B-1	1407	12/3/99	1.0	2.4	8.3	BC920	43.5	-3.6	73.3
2B-2	814	12/3/99	0.0	-0.9	8.3	BC920	46.5	8.4	73.3
2B-3	1160	12/3/99	0.0	-1.5	8.3	BC920	46.0	6.4	73.3
2B-4	1407	12/3/99	0.0	-0.6	8.3	BC920	38.5	-23.6	73.3
2B-5	814	12/3/99	0.0	-0.9	8.3	BC920	35.5	-35.6	73.3
2B-6	1160	12/3/99	0.0	-1.5	8.3	BC920	38.0	-25.6	73.3
2B-7	1407	12/3/99	0.0	-0.6	8.3	BC920	51.5	28.4	73.3
2B-8	814	12/3/99	0.0	-0.9	8.3	BC920	40.5	-15.6	73.3
2B-9	1160	12/3/99	0.0	-1.5	8.3	BC920	48.5	16.4	73.3
2B-10	1407	12/3/99	0.0	-0.6	8.3	BC920	44.0	-1.6	73.3
T5-1	814	12/3/99	1.0	2.1	8.3	BC920	40.0	-17.6	73.3
T5-2	1160	12/3/99	3.0	7.5	8.3	BC920	44.0	-1.6	73.3
T5-3	1407	12/3/99	0.0	-0.6	8.3	BC920	43.5	-3.6	73.3
T5-4	814	12/3/99	0.0	-0.9	8.3	BC920	38.5	-23.6	73.3
T5-5	1160	12/3/99	1.0	1.5	8.3	BC920	52.5	32.4	73.3
T5-6	1407	12/3/99	0.0	-0.6	8.3	BC920	44.0	-1.6	73.3

B779 Room 001 Pit Characterization

T5-7	814	12/3/99	5.0	**14.1**	8.3	BC920	42.5	**-7.6**	73.3
T5-8	1160	12/3/99	1.5	**3.0**	8.3	BC920	38.0	**-25.6**	73.3
T5-9	1407	12/3/99	4.0	**11.4**	8.3	BC920	39.5	**-19.6**	73.3
T5-10	814	12/3/99	1.0	**2.1**	8.3	BC920	43.0	**-5.6**	73.3
			MIN	-1.5			MIN	-55.6	
			MAX	**14.1**			MAX	**32.4**	
			MEAN	**0.7**			MEAN	**-5.1**	
			SD	3.3			SD	19.1	

MAX (All) = 14.1 dpm/100 cm^2

Uranium Removable Limit = 200 dpm/100 cm^2

170

559 Laboratories Analytical Report

This report provides g/l U-235, Am-241, and Pu values determined using procedures L-4184 and L-4182. All methods are Safeguards qualified. The Q column lists data qualifiers. A 'U' in this field indicates that the measured result is below the MDA for the method, and the MDA is given in the result field. SAN codes are provided when the results are within the Safeguards approved range for the method. Also included are g/l Cl- and M H+/OH- results, when requested. These are produced utilizing procedures L-4187 and L-4189, respectively. The LL/TRU field is filled when sufficient information is available to do so.

Sample Owner	Graves, Matt	*Phone #*	3054
Company		*Pager*	
APO Sample ID	00A0827-001,002	*Customer Sample ID*	Sump 1A
Date Received	11/30/99	*Location*	779 Sumps
Date Analyzed	12/2/99		
Date Reported	12/2/99		

Case Narrative

This sample was received by the 559 Radiochemistry Laboratory for g/l Pu, U-235, and Am-241 analyses. No anomalies occurred during analysis. All QA/QC was within limits. A fingerprint was requested as an additional analysis.

This report is a reprint with an evaulated MDC for Pu, which is 2.81E-07 g/l.

				Q				
Pu g/l	1.98E-07	+/-	1.03E-07	U	*Pu SAN Code*	RCPU		
Am g/l	3.97E-10	+/-		U	*Am SAN Code*	RCAM	*LL/TRU*	LL
U g/l	5.25E-04	+/-		U	*U SAN Code*	RCEU		
		Cl-						
		pH	11.00					
		H+						
		OH-						

Approval Roger U Henderson

Peer Review Yvonne B Maggio

171

559 Laboratories Analytical Report

This report provides g/l U-235, Am-241, and Pu values determined using procedures L-4184 and L-4182. All methods are Safeguards qualified. The Q column lists data qualifiers. A 'U' in this field indicates that the measured result is below the MDA for the method, and the MDA is given in the result field. SAN codes are provided when the results are within the Safeguards approved range for the method. Also included are g/l Cl- and M H+/OH- results, when requested. These are produced utilizing procedures L-4187 and L-4189, respectively. The LL/TRU field is filled when sufficient information is available to do so.

Sample Owner	Graves, Matt	*Phone #*	3054
Company		*Pager*	
APO Sample ID	00A0827-002.002	*Customer Sample ID*	Sump 1A
Date Received	11/30/99	*Location*	779 Sumps
Date Analyzed	12/2/99		
Date Reported	12/2/99		

Case Narrative

This sample was received by the 559 Radiochemistry Laboratory for g/l Pu, U-235, and Am-241 analyses. No anomalies occurred during analysis. All QA/QC was within limits. A fingerprint was requested as an additional analysis.

This report is a reprint with an evaulated MDC for Pu, which is 2.81E-07 g/l.

				Q		
Pu g/l	2.41E-07	+/-	1.15E-07	U	*Pu SAN Code*	RCPU
Am g/l	2.38E-10	+/-		U	*Am SAN Code*	RCAM
U g/l	5.00E-04	+/-		U	*U SAN Code*	RCEU
		Cl-				
		pH	7.00			
		H+				
		OH-				

LL/TRU LL

Approval Roger A Henderson

Peer Review Yvonne B Maggo

172

559 Laboratories Analytical Report

This report provides g/l U-235, Am-241, and Pu values determined using procedures L-4184 and L-4182. All methods are Safeguards qualified. The Q column lists data qualifiers. A 'U' in this field indicates that the measured result is below the MDA for the method, and the MDA is given in the result field. SAN codes are provided when the results are within the Safeguards approved range for the method. Also included are g/l Cl- and M H+/OH- results, when requested. These are produced utilizing procedures L-4187 and L-4189, respectively. The LL/TRU field is filled when sufficient information is available to do so.

Sample Owner	Graves, Matt	*Phone #*	3054
Company		*Pager*	
APO Sample ID	00A0827-003.002	*Customer Sample ID*	Sump 1A
Date Received	11/30/99	*Location*	779 Sumps
Date Analyzed	12/2/99		
Date Reported	12/2/99		

Case Narrative

This sample was received by the 559 Radiochemistry Laboratory for g/l Pu, U-235, and Am-241 analyses. No anomalies occurred during analysis. All QA/QC was within limits. A fingerprint was requested as an additional analysis.

This report is a reprint with an evaulated MDC for Pu, which is 2.81E-07 g/l.

				Q				
Pu g/l	1.98E-07	+/-	1.03E-07	U	*Pu SAN Code*	RCPU		
Am g/l	3.94E-10	+/-		U	*Am SAN Code*	RCAM	*LL/TRU*	LL
U g/l	4.89E-04	+/-		U	*U SAN Code*	RCEU		
		Cl-						
		pH	8.00					
		H+						
		OH-						

Approval Roger C. Henderson

Peer Review Yvonne B. Maggio

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is < 2000 pCi/g, otherwise it is RAD.

APO Sample ID	00A0827-001.001
Date Received	11/30/99
Location	779 Sumps
Date Analyzed	11/30/99
Date Reported	11/30/99
Case Narrative	This sample was received by the 559 Radiochemistry Laboratory for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha	3.0	+/-	1.2	*pCi/g*
Beta	4.3	+/-	1.0	*pCi/g*

Total Activity: 9.4 *pCi/g* *DOT Classification:* NONRAD

Approval Roger A. Henderson

Peer Review John N. Trost

174

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is < 2000 pCi/g, otherwise it is RAD.

APO Sample ID	00A0827-002.001
Date Received	11/30/99
Location	779 Sumps
Date Analyzed	11/30/99
Date Reported	11/30/99
Case Narrative	This sample was received by the 559 Radiochemistry Laboratory for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha 0.0 +/- 0.4 *pCi/g*

Beta 0.1 +/- 0.6 *pCi/g*

Total Activity: 1.1 *pCi/g* *DOT Classification:* NONRAD

Approval Roger A. Henderson

Peer Review John N. Frost

175

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is <2000 pCi/g, otherwise it is RAD.

APO Sample ID	00A0827-003.001
Date Received	11/30/99
Location	779 Sumps
Date Analyzed	11/30/99
Date Reported	11/30/99
Case Narrative	This sample was received by the 559 Radiochemistry Laboratory for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha	0.3	+/-	0.4	*pCi/g*
Beta	0.1	+/-	0.5	*pCi/g*

Total Activity: 1.3 *pCi/g* *DOT Classification:* NONRAD

Approval Roger A Henderson

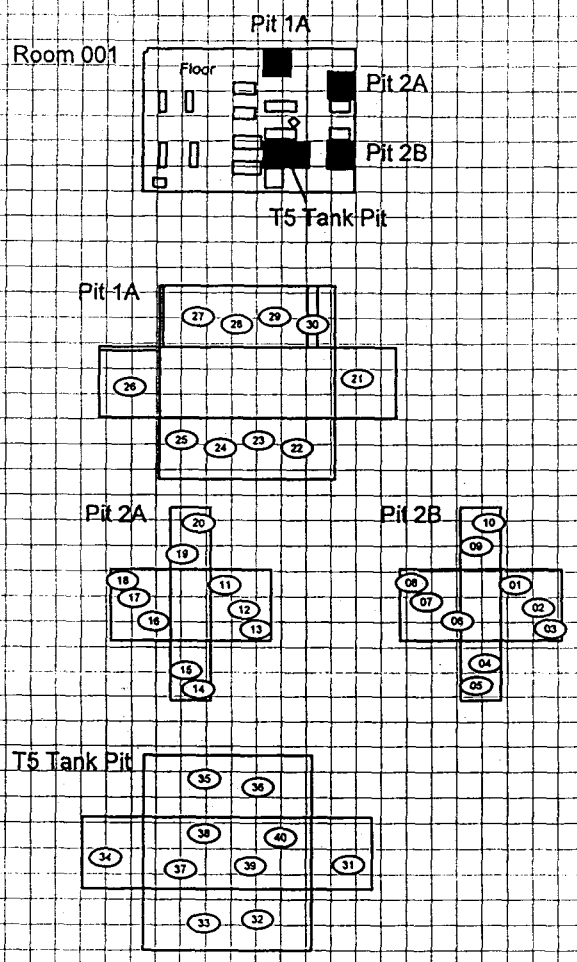
Peer Review John G Fraser

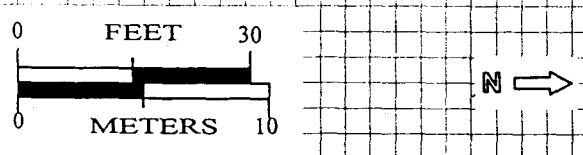
RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

Survey Area: G **Survey Unit: 77943** **Classification: 1**
Building: 779
Survey Unit Description: B779 First Floor Main Bldg Room 001 Pits Characterization

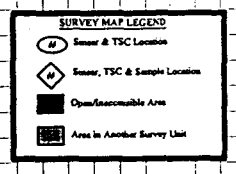
Total Room 001 Pit Floor Area: 47 sq. m **Total Pit Area: 183 sq. m**

Room 001 Pits Characterization





N



Water Sample Results
B779 Room 001 Pits

RADSCREEN RESULTS			g/l Results				
Pit #		Results + Error (pCi/g)	Nuclide	Results (g/l)	< MDC	SA (Ci/g)	Results (pCi/l)
1A	Alpha	4.2	Pu	1.98E-07	YES	0.0613	[redacted]
	Beta	5.3	Am-241	<3.97E-10	Yes		
			U-235	<5.25E-04	Yes		
2A	Alpha	0.4	Pu	2.41E-07	YES	0.0613	[redacted]
	Beta	0.7	Am-241	<2.38E-10	Yes		
			U-235	<5.00E-04	Yes		
2B	Alpha	0.7	Pu	1.98E-07	YES	0.0613	[redacted]
	Beta	0.6	Am-241	<3.94E-10	Yes		
			U-235	<4.89E-04	Yes		

178

WATER DATA

BUILDING 779

PIT 1A

BUILDING 782

SUMP

SAMPLE SUMMARY FOR RIN: 00A1075

RIN Title: PZT SAMPLES
Project Name: D&D PROJECTS
Task Name: Bldg 782
Aggregate Area: N/A

Sampling Team: CAS
Sampling Mgr/Coordinator: Kathy Zbryk
Samplers: HS, JG
Field Logbook ID: 94 DOPGC
Media: AQUEOUS;SOLID

This sample summary is supplied to waste generators as notification of sample collection. Inquires into the status of this sampling effort may be directed to the Analytical Services Division (ASD).

Bottle Number	Customer Bottle Number	Location	LIC (See Attached)	Laboratory	Date Collected	Date Shipped	Date Returned	Comments
00A1075-001.001	N/A	~~Bldg 782 Outside Tank~~ B779 Pit	4,5	S. Cohen & Associates	02/01/00	02/02/00		ONLY THE WAST PIT HAD LIQUID LEFT IN IT. THE OTHER TWO PITS WERE DAMP BUT NO FREE LIQUID
00A1075-001.002		Bldg 782 Outside Tank	6	S. Cohen & Associates				
00A1075-001.003		Bldg 782 Outside Tank	1	Thermo NuTech				
00A1075-002.001		Bldg 782 Outside Tank	3	S. Cohen & Associates				
00A1075-002.002		Bldg 782 Outside Tank	2	Thermo NuTech				
00A1075-003.001		Bldg 782, Sump	4,5	S. Cohen & Associates				
00A1075-003.002		Bldg 782, Sump	6	S. Cohen & Associates				
00A1075-003.003		Bldg 782, Sump	1	Thermo NuTech				
00A1075-003.004		Bldg 782, Sump	7	General Engineering				
00A1075-003.005		Bldg 782, Sump	7	General Engineering				
00A1075-003.006		Bldg 782, Sump	7	General Engineering				
00A1075-003.007		Bldg 782, Sump	8	General Engineering				
00A1075-004.001		Bldg 782, Sump	3	S. Cohen & Associates				
00A1075-004.002		Bldg 782, Sump	2	Thermo NuTech				

Returning Excess Sample Material:

Unmodified sample material remaining after analysis is generally returned to the generator. The generator must be prepared to receive and dispose of excess sample material for applicable state and federal regulations. Regulatory exclusions for returning excess sample material are specified in the Code of Colorado Regulation (CCR) 1007-3, Part 261.4(d) 'Samples'. If problems with the disposal of excess sample material are encountered, the Environmental Coordinator for the generation area should be contacted for resolution of the issues. Only sample material which has not been modified during analysis will be returned. Material which has been acidified for preservation purposes will not be returned.

Customer Acknowledgement: _____
(Sign and Print Name)

Comments:

Line Item Codes:

1)	OS01A002	(RadScreen - Aqueous)
2)	OS01A003	(Rad-Screen - Solid)
3)	RC01B003	(Isotopic (Soil))
4)	RC01B007	(Americium - Water)
5)	RC01B012	(Plutonium (Water))
6)	RC01B017	(Uranium (Water))
7)	SS01B008	(VOA 8260-Water)
8)	SS05C046	(Diss. 846 Metals wo/Hg RDL-2)

Thermo NUtech - Rocky Flats
Radscreen Results

RIN: 00A1075
Analysis: Radscreen
Report Date: 02/03/00

Distribution/Fax: ASD/ 4555

Laboratory Sample ID	APO Sample ID			Matrix	Gross Alpha		Gross Beta		Total Activity	DOT
	RIN	Event	Bottle		pCi/L	2σ	pCi/L	2σ	pCi/ml	Class
00020003-01	00A1075	001	003	Water	660	350	1735	315	3.06	NONRAD
00020003-02	00A1075	002	002	Water	1164	425	1786	320	3.70	NONRAD
00020003-03	00A1075	003	003	Water	120	107	6	109	0.34	NONRAD
00020003-04	00A1075	004	002	Water	88	100	59	117	0.36	NONRAD

DOT Classification <2000 pCi/ml total activity is NONRAD
>= 2000 pCi/ml total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements. If the measured activity is negative, 0 pCi/L (instead of the negative value) is used to calculate the total activity.

Analysis Methods Sample Preparation Procedure: L-6278-A, "Sample Preparation for Radiological Screening by Gas Proportional Counting".
Counting Procedure: ATP-008, "Operation of Tennelec LB4100 Gas Proportional Counters".

L M Haggland /Date 2/3/00
Technical Review

Patricia R. Newton /Date 2-3-00
Quality Assurance Review

Thermo NUtech - Rocky Flats
RFETS - Building T886D
Golden, Colorado 80402
(303) 966-6550

RP-0001 (11/97)

SAMPLE SUMMARY FOR RIN: 00D1090

RIN Title: I.W.00012
Project Name: Incidental Water
Task Name: INCIDENTAL_WATER
Aggregate Area: Bldg 782 PIT

Sampling Team: CAS
Sampling Mgr/Coordinator: SUE Barker / Kathy Zbryk
Samplers: HS, JG
Field Logbook ID: 94' Dodge VAN
Media: AQUEOUS

This sample summary is supplied to waste generators as notification of sample collection. Inquires into the status of this sampling effort may be directed to the Analytical Services Division (ASD).

Bottle Number	Customer Bottle Number	Location	LIC (See Attached)	Laboratory	Date Collected	Date Shipped	Date Returned	Comments
00D1090-001.001	I.W.00012	B782 PIT	1	Thermo NuTech	02/01/00	02/02/00		

Returning Excess Sample Material:

Unmodified sample material remaining after analysis is generally returned to the generator. The generator must be prepared to receive and dispose of excess sample material for applicable state and federal regulations. Regulatory exclusions for returning excess sample material are specified in the Code of Colorado Regulation (CCR) 1007-3, Part 261.4(d) 'Samples'. If problems with the disposal of excess sample material are encountered, the Environmental Coordinator for the generation area should be contacted for resolution of the issues. Only sample material which has not been modified during analysis will be returned. Material which has been acidified for preservation purposes will not be returned.

Customer Acknowledgement: _____
(Sign and Print Name)

Comments:

Line Item Codes:

1) OS01A004 (Gross Alpha/Beta - Aqueous)

183

INCIDENTAL WATER REPORT

CUSTOMER NAME:	Kathy Zbryk	EXT:	6647
ORGANIZATION:	RMRS	PAGER:	212-4197
BLDG:	706		

Identification

LOCATION (BLDG):	782	IWIC NO:	00012
LOCATION TYPE:	Building Pit	DATE:	2/1/00
LOCATION DESCRIPTION:			

☐ EXEMPT? If YES, then the water is exempt from the requirements of Procedure 1-C91-EPR-SW.01. See attached Incidental Water Control Exemption Request.

Results

pH:	8.41	***Acceptable Range: 6.0 to 9.0******
NO3 as N (mg/L):	11.7	***Not to Exceed: 10 mg/L****
COND (mS/cm):	1.14	***Not to Exceed: 0.700 mS/cm****
GROSS ALPHA (pCi/L):	729 +/- 58	***Not to Exceed: 40 pCi/L****
GROSS BETA (pCi/L):	-6 +/-6	***Not to Exceed: 50 pCi/L****
OTHER CONTAMINANTS:	NA	
EVALUATION OF DATA:	Gross alpha, conductivity, and nitrate exceed limits for discharge to the environment. Water should be treated.	

Limits based on Colorado Water Quality Stream Standards/Best Management Practices

Disposition

METHOD OF DISPOSAL:	Treatment	START DATE:	2/10/00
DESTINATION:	To B374	END DATE:	2/29/00
COMMENTS:			

I certify that this document was prepared in accordance with Procedure 1-C91-EPR-SW.01. The information submitted is, to the best of my knowledge, true, accurate, and complete.

Susan J Walker — Surface Water Representative

2/10/00 — Date

184

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80403
(303) 966-6860

RIN: 00D1090
Report Date: 02/09/00

Method Summary

Gross alpha and gross beta activities are measured by evaporating an aliquot of the prepared sample onto a counting planchet and counting the alpha and beta activities in a low background, thin-windowed, gas flow proportional counter. Organics or combustible solids are ashed, the residue dissolved in acid, and the solution or an aliquot of the solution is evaporated onto a counting planchet. Aqueous samples are concentrated and then evaporated onto a counting planchet. Analysis of aqueous samples and prepared non-aqueous samples is described in detail in Rocky Flats Procedure, L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples"*. Preparation of oils, solvents and other combustible organics is described in ATP-005, *"Preparation of Oils, Solvents and Combustibles for Analysis of Gross Alpha and Gross Beta Activity"*. The counting procedure is described in procedure ATP-008, *"Operation of the Tennelec LB4100 Gas Proportional Counters"*.

The detector counting efficiency and self-absorption effects of the salt residue on the planchet are determined from calibration curves which are generated by counting several planchets prepared with a known amount of alpha or beta activity and increasing amounts of salt (0 to 100 mg). Americium-241 is used as the spike for the alpha curves and a solution of Sr-90, Y-90 is used for the beta curves. These standards are prepared from certified reference material which is traceable to the National Institute of Standards Technology (NIST).

The theoretical minimum detectable activity (MDA) for the analysis is based on the detector background, detector efficiency and self-absorption effects, count time and quantity of sample analyzed. The MDA for each analysis is calculated and is also reported. If the reported result is based on the average of two or more counts, the average MDA is reported.

Quality Control Summary

A sample batch consists of eleven or fewer samples, a duplicate of one of the samples, an alpha and a beta laboratory control sample, and a preparation blank. Each set of samples forms a "QC Batch" and is assigned a QC batch number. A sample can be traced back to its corresponding quality control samples through the QC Batch number. The preparation blank (PB), an aliquot of deionized, distilled water, is prepared and analyzed with the samples to confirm that the samples were not contaminated during the analysis. The activities reported for samples and standards were not corrected for preparation blank activity. The alpha and beta laboratory control samples are aqueous standards of ^{241}Am and ^{90}Sr, respectively. The SRM standards used to prepared these standards are traceable to NIST. The duplicate, designated as the sample ID followed by a "D", is a second aliquot of one of the samples in the QC Batch which is carried through the procedure as a separate sample.

The instrument QC includes determining instrument backgrounds weekly and counting an instrument check source daily on the Tennelec LB4100 multidetector gas proportional counters. The instrument backgrounds are based on the average of at least five, and normally ten or more, 4 hour counts. The instrument check sources are counted daily to verify that the efficiencies of the detectors have not changed. A summary of the instrument backgrounds is included in the instrument raw data section of this report. The daily check source information is available in the supporting documentation package.

Narrative

This sample was submitted for analysis of gross alpha and gross beta activity. It was prepared for counting using procedure L-6240, *"Sample Preparation for Analysis of Gross Alpha-Gross Beta Activity in Aqueous Samples."* Due to the apparent presence of particulate contamination, which made taking a representative sample very difficult, this sample was analyzed numerous times. All data obtained during the analyses are included in the report.

The sample was initially analyzed in QC batch 00AB012. The data from the duplicate analyses in this batch failed to meet the acceptance criteria for duplicate precision. The sample was reanalyzed in QC batch 00AB015. During the preparation of this batch, the samples splattered and the planchets were cross-contaminated. The analysis of QC batch 00AB015 was restarted. The data from the duplicate analyses in QC batch 00AB015 again failed to meet the acceptance criteria for duplicate precision. Additionally, the residue weight on the planchet prepared for sample 00020004-01 exceeded the allowable maximum of 100 mg. Due to the excessive residue weight, the alpha activity for sample 00020004-01 may be slightly biased low. However, the data from these analyses are of adequate quality to provide additional documentation regarding the particulate contamination in this sample. The sample was analyzed for a third time in QC batch 00AB018. The sample aliquot was reduced to 40 ml for the sample and dup for this batch due to high residual mass on the planchets in the

Thermo NUtech - Rocky Flats
RFETS, Building T889D
Golden, Colorado 80403
(303)966-6960

RIN: 00D1090
Report Date: 02/09/00

Narrative (Cont.)

previous two batches. The prep blank beta result for QC batch 00AB016 was more negative than the uncertainty, and was therefore counted again. The average of the two counts are reported for the prep blank. The routine count time of 4 hours was used for all analyses. The MDAs do not meet the RDLs of 2 pCi/l alpha and 4 pCi/l beta; however, this does not adversely impact data quality due to the elevated activity level in this sample. Sample 00020004-02 D is a duplicate of sample 00020004-01. All QC data obtained for the PB and the LCS samples are acceptable.

Thermo NUtech - Rocky Flats
RFETS, Building T886D
Golden, Colorado 80403
(303) 966-6860

IN 00012
RIN: 00D1090
Report Date: 020900

Sample and Duplicate Analysis Results

Customer Sample ID	Lab Sample ID	Gross Alpha			Gross Beta			Units	QC Batch
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
00D1090-001.001	00020004-01	729	58	4	-6	6	11	pCi/l	00AB012
00D1090-001.001	00020004-02 D	112	13	8	36	6	7	pCi/l	00AB012
00D1090-001.001	00020004-01	894	66	7	19	8	12	pCi/l	00AB015
00D1090-001.001	00020004-02 D	57	9	9	45	6	6	pCi/l	00AB015
00D1090-001.001	00020004-01	67	11	11	51	8	8	pCi/l	00AB016
00D1090-001.001	00020004-02 D	56	10	11	54	7	8	pCi/l	00AB016

Preparation Blank Results

QC Batch	Lab Sample ID	Gross Alpha			Gross Beta			Units
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA	
00AB012	00020004-03	0.1	1.6	2.8	-0.9	3.0	5.2	pCi/l
00AB015	00020004-03	-0.6	1.4	2.7	0.4	2.8	4.8	pCi/l
00AB016	00020004-03	0.0	1.5	3.7	-0.5	2.8	6.6	pCi/l

LCS Results

QC Batch	Lab Sample ID	Gross Alpha			Gross Beta			Units	SRM
		Activity	Unc. (2s)	MDA	Activity	Unc. (2s)	MDA		
00AB012	00020004-04	24.1	4.6	4.8	30.7	5.1	6.2	pCi/l	STD_56
00AB015	00020004-04	24.4	4.7	4.8	28.6	4.8	5.8	pCi/l	STD_56
00AB016	00020004-04	24.9	4.8	4.9	31.2	4.9	5.8	pCi/l	STD_56

187

Commodor dvanced Sciences, Inc.

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 0 1075#001

Page 1 of 1

Collector	Contact/Requester: SZYDLOWSKI, TOM	Telephone No.: 8165	MSIN / FAX
RIN: 00A1075	Sampling Origin: B782 + B779	Purchase Order/Charge Code: KT03PM00	
Project Title: 25779 C12132	Logbook No.: 94 Dodge	Ice Chest No.: N/A	Temp.: N/A
To (Lab): S. Cohen & Associates Pit Samples	Method of Shipment: CAS Sample Team	Bill of Lading/Air Bill No.: N/A	
Protocol: CAS-SOP-003	Related COC (if any): 00A1025 #002 & #003	PRE	

POSSIBLE SAMPLE HAZARDS/REMARKS: ** EVENTS -004-002 WERE TO BE A COMPOSITE OF THREE SUMPS IN B779 BASEMENT. ONLY THE WEST PIT HAS LIQUID IN IT. ALL SAMPLES CAME FROM THAT SINGLE PIT.

SCREENING REQUIRED

SPECIAL INSTRUCTIONS: Hold Time. Total Activity Exemption: Yes ☐ No ☐. The aqueous uranium samples must be filtered using 0.45 micron membrane filters prior to analysis. The solid samples must be de-watered before drying and homogenizing for analysis.

KH 100 1845

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00A1075-001.001	N/A	AQUEOUS	02/01/00	1438	Bldg 782 ~~Outside Tank~~ 779 Pit	4-L P	RC01B007 (Americium - Water) [Routine]; RC01B012 (Plutonium (Water)) [Routine] 1845-01	None / None
00A1075-001.002		AQUEOUS			Bldg 782 ~~Outside Tank~~ 779 Pit	2-L P	RC01B017 (Uranium (Water)) [Routine] KH100 1846-01	HN03 / None
00A1075-002.001		SOLID			Bldg 782 ~~Outside Tank~~ 779 Pit	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] (Cancel yes)	None / None
00A1075-003.001		AQUEOUS		1513	Bldg 782, Sump	4-L P	RC01B007 (Americium - Water) [Routine]; RC01B012 (Plutonium (Water)) [Routine] 1845-02	None / None
00A1075-003.002		AQUEOUS			Bldg 782, Sump	2-L P	RC01B017 (Uranium (Water)) [Routine] 1846-02	HN03 / None
00A1075-004.001		SOLID			Bldg 782, Sump	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] (Cancel yes)	None / None

02/01/00

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
	02/01/00 1650	File Sub #11284 Bldg 708	02/01/00 / 1650		2-8-00 / 1500	FedEx	
File Sub #11284 Bldg 708	02/02/00 0923		02/02/00 0923				
	02/02/00 1600	TRUCK FROG #2	1930 02/02/00				
TRUCK FROG #2	2-8-00 1400		2-8-00 / 1400				

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

SS1

CASE NARRATIVE
RIN 00A1075
Laboratory Report Identification Number: 1845, 1846
PSA Module RC01B.3

March 3, 2000

I. Introduction

On February 9, 2000, four water samples, (RIN 00A1075), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The samples were analyzed in accordance with Kaiser-Hill specifications stated in the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RC01-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

II. Analytical Methodology

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

Samples KH100-1846-01 and KH100-1846-02 were filtered through a 0.45 micron membrane filter prior to analysis.

Because we anticipated matrix interference in these samples, all samples were analyzed in triplicate using different sample volumes. Aliquot sizes of 100 mL, 50 mL, and 25 mL, were analyzed for each sample. The analytical results with the best tracer recovery and MDC are presented in this Sample Data Package.

III. Analytical Results

Deficiencies

None.

Matrix Interferences

There were indications matrix interference in sample KH100-1845-01.

Dilutions

No dilutions were required.

Detection Limits

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

PRELIMINARY INFORMATION

189

Reanalysis

There were no reanalysis.

Deviations from Protocols

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

Contacts with the CTR

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

IV. Quality Control

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-1845-LC1	Laboratory Control Sample (U)
Laboratory Type II Water	SCAQC-1845-PB	Preparation Blank (U)
00A1075-003.001 Bldg 782 Sump	SCAQC-1845-LD1	Laboratory Duplicate Sample (U)

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-1846-LC1	Laboratory Control Sample (U)
Laboratory Type II Water	SCAQC-1846-PB	Preparation Blank (U)
00A1075-003.001 Bldg 782 Sump	SCAQC-1846-LD1	Laboratory Duplicate Sample (U)

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

Sincerely,

Joe Stinson

Joe Stinson
Laboratory Manager

3/14/00
Date

PRELIMINARY INFORMATION

Additional Analyte Request Form

Report Identification Number (RIN) 00A 1075

Please cancel the isotopic analysis for the following samples

00A1075.002.001
00A1075.004.001

Additions Authorized By: Thomas J. Szydlowski Date: 2/9/00

Copies of analyte additions and deletions must be sent to both ASD and Lab offices.

03/14/00 14:21 S. COHEN & ASSOC >>> Salmans/COC/DP 005

161

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1075

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1075#001	Matrix:	Water
Site Sample ID:	001.001				
Other Sample ID:	Bldg 779 Pit	Collection Date:	2/1/00	Date Received:	2/9/00
		Batch Number:	1845	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	PU-239/240	KH100-1845-01	162	9.86	33.9	0.023
ACW03	AM-241	KH100-1845-01	77.3	4.78	16.2	0.024

ENTERED 3/15

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
Pu	SCAQC-1845-LC1	SCAQC-1845-LD1	SCAQC-1845-PB
Am	SCAQC-1845-LC1	SCAQC-1845-LD1	SCAQC-1845-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.2[illegible]

PRELIMINARY INFORMATION

92

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1075

Project Name: Kaiser-Hill	Chain-of-Custody Number: 00A1075#001	Matrix: Water
Site Sample ID: 003.001		
Other Sample ID: Bldg 782 Sump	Collection Date: 2/1/00	Date Received: 2/9/00
	Batch Number: 1845	Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	PU-239/240	KH100-1845-02	0.090	0.052	0.055	0.020
ACW03	AM-241	KH100-1845-02	0.558	0.157	0.192	0.029

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
Pu	SCAQC-1845-LC1	SCAQC-1845-LD1	SCAQC-1845-PB
Am	SCAQC-1845-LC1	SCAQC-1845-LD1	SCAQC-1845-PB

1000 Montlinde Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

PRELIMINARY INFORMATION

193

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1075

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1075#001	Matrix:	Water
Site Sample ID:	001,002				
Other Sample ID:	Bldg 779 Pit	Collection Date:	2/1/00	Date Received:	2/9/00
		Batch Number:	1846	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	KH100-1846-01B	58.5	10.6	16.8	0.728
ACW03	U-235	KH100-1846-01B	3.97	2.35	2.63	0.898
ACW03	U-238	KH100-1846-01B	335	44.8	80.7	1.53

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1846-LC1	SCAQC-1846-LD1	SCAQC-1846-PB

PRELIMINARY INFORMATION

1000 Montbello Court * Montgomery, Alabama * 36117 * 334.272.2934 * FAX 334.213.0407

194

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00A1075

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00A1075#001	Matrix:	Water
Site Sample ID:	003.002				
Other Sample ID:	Bldg 752 Sump	Collection Date:	2/1/00	Date Received:	2/9/00
		Batch Number:	1846	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	KH100-1846-02	8.74	0.999	1.52	0.206
ACW03	U-235	KH100-1846-02	0.222	0.200	0.210	0.120
ACW03	U-238	KH100-1846-02	2.98	0.887	0.908	0.097

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1846-LC1	SCAQC-1846-LD1	SCAQC-1846-PB

PRELIMINARY INFORMATION

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.272.2334 • FAX 334.213.0407

195

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A1075

Project Name: Kaiser-Hill
Site Sample ID: BLANK1
Other Sample ID: BLANK1
Chain-of-Custody Number: None
Collection Date: 2/9/00
Matrix: Water
Date Received: 2/9/00
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	PU-239/240	SCAQC-1845-PB	0.007	0.104	0.105	0.229
ACW03	AM-241	SCAQC-1845-PB	0.000	0.000	0.000	0.381

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
Pu	SCAQC-1845-LC1	SCAQC-1845-LD1	SCAQC-1845-PB
Am	SCAQC-1845-LC1	SCAQC-1845-LD1	SCAQC-1845-PB

1000 Montcastle Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

PRELIMINARY INFORMATION

196

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00A1075

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: CONTROL2		
Other Sample ID: CONTROL2	Collection Date: 2/9/00	Date Received: 2/9/00
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
ACW03	U-233/234	SCAQC-1846-PB	0.167	0.150	0.153	0.091
ACW03	U-235	SCAQC-1846-PB	0.041	0.082	0.083	0.112
ACW03	U-238	SCAQC-1846-PB	0.371	0.238	0.250	0.190

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1846-LC1	SCAQC-1846-LD1	SCAQC-1846-PB

1000 Montcastle Court • Montgomery, Alabama • 36117 • 334.272.2234 • FAX 334.213.0407

PRELIMINARY INFORMATION

197

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00A1075

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/L)	(OV) Laboratory Control Sample Activity (pCi/L)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1845-LC1	21.6 ∓ 20.6	21.4 ∓ 5.09	98.8	0.013
ACW03	PU-239/240	SCAQC-1845-LC1	20.5 ∓ 1.02	18.0 ∓ 4.23	87.7	0.850
ACW03	U-233/234	SCAQC-1846-LC1	36.1 ∓ 1.45	34.6 ∓ 7.83	95.8	0.278
ACW03	U-238	SCAQC-1846-LC1	36.1 ∓ 1.45	39.1 ∓ 8.78	108	0.461

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/L)	Duplicate Sample Activity (pCi/L)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	PU-239/240	SCAQC-1845-LD1	0.090 ∓ 0.055	0.152 ∓ 0.097	0.062	0.557
ACW03	AM-241	SCAQC-1845-LD1	0.558 ∓ 0.192	0.519 ∓ 0.201	0.039	0.139
ACW03	U-233/234	SCAQC-1846-LD1	5.74 ∓ 1.52	7.46 ∓ 2.49	1.72	0.589
ACW03	U-235	SCAQC-1846-LD1	0.222 ∓ 0.210	0.160 ∓ 0.304	0.072	0.195
ACW03	U-238	SCAQC-1846-LD1	2.98 ∓ 0.909	3.86 ∓ 1.57	0.882	0.376

1000 Monticello Court • Montgomery, Alabama • 36117 • 334.277.2234 • FAX 334.213.0407

PRELIMINARY INFORMATION

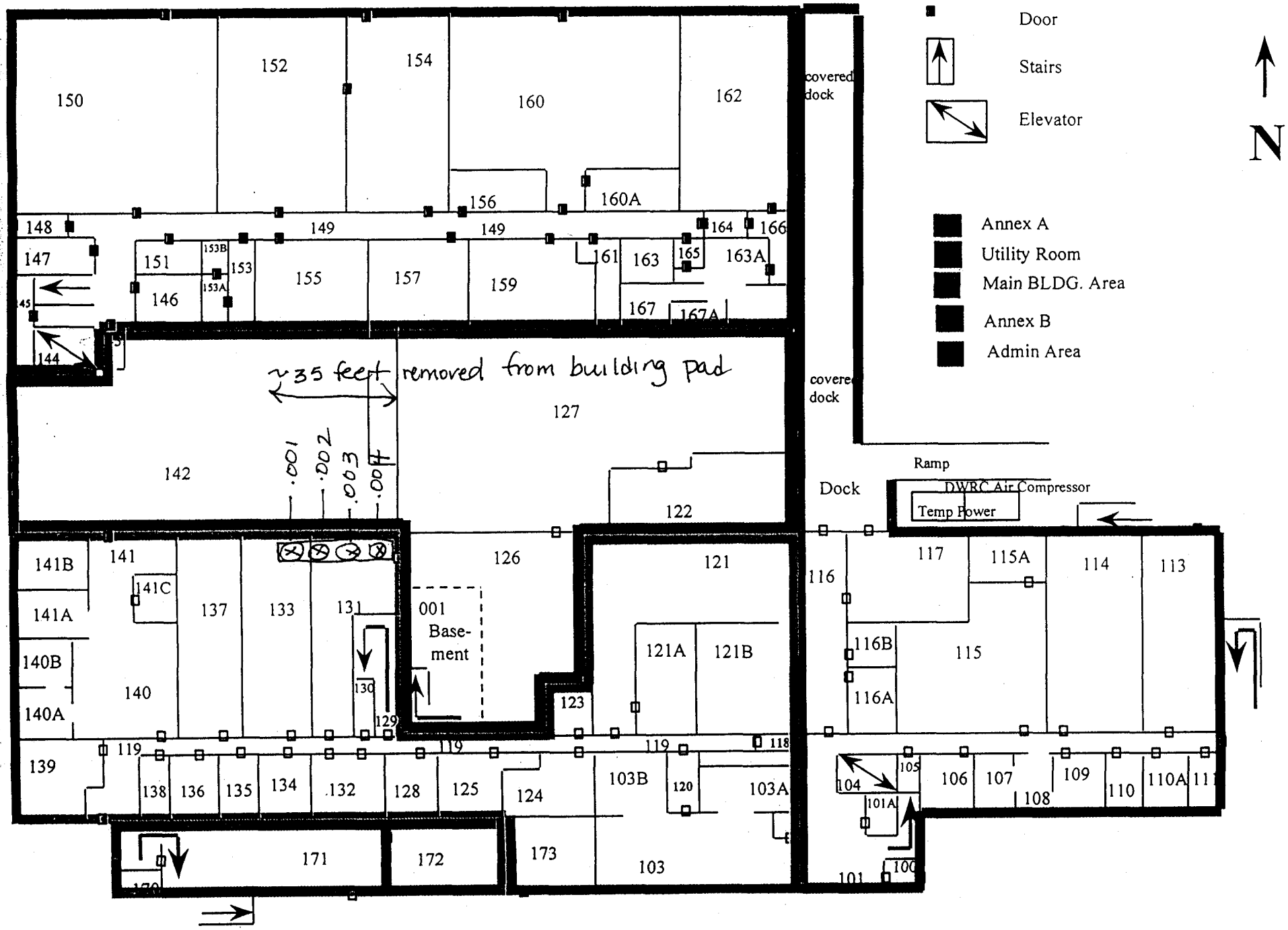
198

Soil Data
Building 779

SAMPLING FOR RIN
00R0970

BUILDING 779 FIRST FLOOR - Area Location Map

August 10, 1999



200

Commodore Advanced Sciences, Inc. RFETS	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # 00R0[illegible]0#002 Page 1 of 1

Collector: HERSHEY/ J. WINGARD	Contact/Requester: GRAVES, MATT / ZBRYK, KATHY	Telephone No.: 3054 MSIN FAX
RIN: 00R0970	Sampling Origin: Building 779, North Side	Purchase Order/Charge Code: KT03DT09
Project Title	Logbook No.: 2000 VAN	Ice Chest No.: N/A Temp.
To (Lab): S. Cohen & Associates	Method of Shipment: FEDERAL EXPRESS	Bill of Lading/Air Bill No.: 4533 2125 4474
Protocol		PRE

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐
SAMPLES 003.002, AND 004.002 WERE PUT ON CHAIN 00R0970#006 BECAUSE THEY ARE BEING SHIPPED AS CLASS 7 RADIOACTIVE MATERIAL (LIMITED QUANITY).

KH199 1798

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
00R0970-001.002	#1 SOUTH TRENCH	SOLID	12/14/1999	10:05 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] - 01	None 4 degrees C
00R0970-002.002	# 2 SOUTH TRENCH	SOLID	12/14/1999	10:10 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] 02	None 4 degrees C

12/21/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
S. Miller	12-21-99/1500	Fed EX				C Owens SCA	12/22/99 11:00
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time

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

202

Commodore Advanced Sciences, Inc.

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00R09[illegible]006

Page 1 of 1

Collector: HERSHEY/ J. WINGARD	Contact/Requester: GRAVES, MATT / ZBRYK, KATHY	Telephone No.: 3054 MSIN FAX
RIN: 00R0970	Sampling Origin: Building 779, North Side	Purchase Order/Charge Code
Project Title	Logbook No.: 2000 VAN	Ice Chest No.: N/A Temp.
To (Lab): S. Cohen & Associates	Method of Shipment: FEDERAL EXPRESS	Bill of Lading/Air Bill No.: 4533 2125 4522
Protocol		PRE

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

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

KH199 - 1799

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00R0970-003.002	# 3 NORTH TRENCH	SOLID	12/14/1999	10:15 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] -01	None 4 degrees C
00R0970-004.002	# 4 NORTH TRENCH	SOLID	12/14/1999	10:20 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] -02	None 4 degrees C

12/21/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
R. Miller	12-21-99/1440	Refrig. #2	12-21-99/1440	Refridge #2	12/22/99 1150	[signature]	12/22/99 1150
[signature]	12/22/99 1150	FedEx				Wanda Hall/SCA	12/23/99 1030

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

CASE NARRATIVE
RIN 00R0970
Laboratory Report Identification Number: 1798, 1799
PSA Module RC01B.3

January 21, 2000

I. Introduction

On December 22, 1999, two soil samples, (RIN 00R0970), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. On December 23, 1999, two additional samples were received. The sample was analyzed in accordance with Kaiser-Hill specifications stated in the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RCO1-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

II. Analytical Methodology

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

III. Analytical Results

Deficiencies

See Reanalysis.

Matrix Interferences

See deviations from protocol.

Dilutions

A dilution ratio of approximately 400/1 was required for samples KH199-1798-02, KH199-1799-01, and KH199-1799-02 analyzed for Pu-239 and Am-241.

Detection Limits

The required detection limits (RDL) were not met for samples KH199-1798-02, KH199-1799-01, and KH199-1799-02 because the very high concentrations of plutonium and americium required small sample sizes for analysis.

Reanalysis

There were very high concentrations of plutonium and americium in samples KH199-1798-02, KH199-1799-01, and KH199-1799-02. Because of this the tracer peaks could not be distinguished from the Pu-239 and Am-241 peaks. The sample size was reduced and the samples were reanalyzed (KH199-1798-02B, KH199-1799-01B, and KH199-1799-02B) beginning with sample preparation. Again, the tracer peaks could not be distinguished from the Pu-239 and Am-241 peaks. The samples were reanalyzed again beginning with sample preparation using an even smaller sample size. The samples were digested, diluted, and reanalyzed with acceptable results. The Original and Reanalysis Sample I.D. are listed below.

Original Laboratory Sample I.D.	Reanalysis Laboratory Sample I.D.	Analysis Type
KH199-1798-02	KH199-1798-02B	Pu-239, Am-241
KH199-1799-01	KH199-1799-01B	Pu-239, Am-241
KH199-1799-02	KH199-1799-02B	Pu-239, Am-241

Deviations from Protocols

The extremely high plutonium and americium concentrations in these samples required a 400/1 dilution in order to reduce the activity levels to those acceptable for alpha spectroscopy detectors. This degree of dilution would have rendered the tracer levels to undetectable amounts; therefore, the tracer was added following dilution.

Contacts with the CTR

The contract technical representative (CTR) was notified of the high concentration of plutonium and americium in these samples.

IV. Quality Control

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-1782-LC1	Laboratory Control Sample
00A0933-001.002 Bldg 779, Rm 001	SCAQC-1782-LD1	Laboratory Duplicate Sample
Laboratory Type II Water	SCAQC-1782-PB	Preparation Blank

These soil samples received on 12/22/99 and 12/23/99, RIN 00R0970 (Batch No. 1798, 1799), were analyzed concurrently with three soil samples received on 12/9/99, RIN 00A0933, (Batch No. 1782). Therefore, the Laboratory Control Sample (SCAQC-1782-LC1), the Laboratory Duplicate Sample (SCAQC-1782-LD1), and the Preparation Blank (SCAQC-1782-PB) were used as quality control samples for both sample batches.

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

Sincerely,

Joe Stinson

Joe Stinson
Laboratory Manager

1/26/00
Date

205

FEB-09-2000 WED 11:31 AM SOURCE ONE HSD FAX NO. 303 900 4555 P. 05 902

Commodore Ad[illegible]ced Sciences, Inc.
RFETS

CHAIN OF CUSTODY/SAM[illegible]LE ANALYSIS REQUEST

C.O.C. # 00R0[illegible]0#002

Page 1 of 1

Collector: HERSHEY/ J. WINGARD	Contact/Requester: GRAVES, MATT / ZBRYK, KATHY	Telephone No.: 3054 MSIN FAX
RIN: 00R0970	Sampling Origin: Building 779, North Side	Purchase Order/Charge Code: KT03DT09
Project Title	Logbook No.: 2000 VAN	Ice Chest No.: N/A Temp.
To (Lab): S. Cohen & Associates	Method of Shipment: FEDERAL EXPRESS	Bill of Lading/Air Bill No.: 4533 2125 4474
Protocol		PRE

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐
SAMPLES 003.002, AND 004.002 WERE PUT ON CHAIN 00R0970#006 BECAUSE THEY ARE BEING SHIPPED AS CLASS 7 RADIOACTIVE MATERIAL (LIMITED QUANITY).

KH199 1798

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
00R0970-001.002	#1 SOUTH TRENCH	SOLID	12/14/1999	10:05 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] - 01	None 4 degrees C
00R0970-002.002	# 2 SOUTH TRENCH	SOLID	12/14/1999	10:10 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] 02	None 4 degrees C

12/21/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
S. Miller	12-21-99/1500	Fed EX				C Owens SCA	12/22/99 11:00

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

Commodore Adv[illegible]d Sciences, Inc.

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00R09[illegible]006

Page 1 of 1

Collector: HERSHEY/ J. WINGARD	Contact/Requester: GRAVES, MATT / ZBRYK, KATHY	Telephone No.: 3054 MSIN FAX
RIN: 00R0970	Sampling Origin: Building 779, North Side	Purchase Order/Charge Code
Project Title	Logbook No.: 2000 VAN	Ice Chest No.: N/A Temp.
To (Lab): S. Cohen & Associates	Method of Shipment: FEDERAL EXPRESS	Bill of Lading/Air Bill No.: 4533 2125 4522
Protocol		PRE

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

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

KH199 - 1799

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00R0970-003.002	# 3 NORTH TRENCH	SOLID	12/14/1999	10:15 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] -01	None 4 degrees C
00R0970-004.002	# 4 NORTH TRENCH	SOLID	12/14/1999	10:20 AM	Building 779, north side.	125-G P/G	RC01B003 (Isotopic (Soil)) [Routine] -02	None 4 degrees C

12/21/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	12-21-99/1440	Refrig. #2 [signature]	12-21-99/1440	Refridge #2 [signature]	12/22/99 1150	[signature]	12/22/99 1150
[signature]	12/22/99 1150	Fed Ex				Wanda Hall/SCA	12/23/99 1030

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

FEB-09-2000 WED 11:52 AM SOURCE ONE HSD

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00R0970

Project Name: Kaiser-Hill
Chain-of-Custody Number: 00R0970#002
Matrix: Soil
Site Sample ID: 00A0933-001.002
Other Sample ID: 00A0933-001.001
Collection Date: 12/8/99
Date Received: 12/22/99
Batch Number: 1782
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1782-01	2.06	0.573	0.706	0.148
ACW03	U-235	KH199-1782-01	0.114	0.133	0.137	0.103
ACW03	U-238	KH199-1782-01	12.8	2.08	3.29	0.083
ACW03	PU-239/240	KH199-1782-01	186	24.4	44.5	0.085
ACW03	AM-241	KH199-1782-01	79.4	11.4	19.6	0.226

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00R0970

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00R0970#002	Matrix:	Soil
Site Sample ID:	001.002				
Other Sample ID:	Building 779 north side	Collection Date:	12/14/99	Date Received:	12/22/99
		Batch Number:	1798	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1798-01	0.932	0.257	0.317	0.042
ACW03	U-235	KH199-1798-01	0.019	0.038	0.039	0.052
ACW03	U-238	KH199-1798-01	0.882	0.248	0.305	0.042
ACW03	PU-239/240	KH199-1798-01	11.1	1.58	2.72	0.037
ACW03	AM-241	KH199-1798-01	16.1	2.34	3.97	0.039

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

014

209

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00R0970

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00R0970#002	Matrix:	Soil
Site Sample ID:	002.002				
Other Sample ID:	Building 779 north side	Collection Date:	12/14/99	Date Received:	12/22/99
		Batch Number:	1798	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1798-02	0.707	0.212	0.255	0.039
ACW03	U-235	KH199-1798-02	0.036	0.050	0.052	0.048
ACW03	U-238	KH199-1798-02	0.876	0.239	0.296	0.039
ACW03	PU-239/240	KH199-1798-02C	10730	1850	2830	54.9
ACW03	AM-241	KH199-1798-02C	5120	1030	1460	91.1

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00R0970

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00R0970#006	Matrix:	Soil
Site Sample ID:	003.002				
Other Sample ID:	Building 779 north side	Collection Date:	12/14/99	Date Received:	12/23/99
		Batch Number:	1799	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1799-01	1.05	0.399	0.451	0.165
ACW03	U-235	KH199-1799-01	0.280	0.229	0.244	0.204
ACW03	U-238	KH199-1799-01	0.754	0.330	0.363	0.093
ACW03	PU-239/240	KH199-1799-01C	97320	15000	24570	111
ACW03	AM-241	KH199-1799-01C	40080	6720	10460	110

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

016

Z 11

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: 00R0970

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	00R0970#006	Matrix:	Soil
Site Sample ID:	004.002				
Other Sample ID:	Building 779 north side	Collection Date:	12/14/99	Date Received:	12/23/99
		Batch Number:	1799	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1799-02	1.00	0.385	0.434	0.188
ACW03	U-235	KH199-1799-02	0.148	0.168	0.174	0.196
ACW03	U-238	KH199-1799-02	1.03	0.382	0.434	0.090
ACW03	PU-239/240	KH199-1799-02C	32310	5230	8320	58.8
ACW03	AM-241	KH199-1799-02C	15550	2900	4260	66.2

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 00R0970

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	None	Matrix:	Water
Site Sample ID:	N/A				
Other Sample ID:	PB	Collection Date:	12/9/99	Date Received:	12/23/99
				Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1782-PB	0.013	0.052	0.053	0.105
ACW03	U-235	SCAQC-1782-PB	-0.008	0.016	0.017	0.098
ACW03	U-238	SCAQC-1782-PB	0.043	0.059	0.060	0.079
ACW03	PU-239/240	SCAQC-1782-PB	0.019	0.048	0.048	0.088
ACW03	AM-241	SCAQC-1782-PB	0.176	0.179	0.183	0.239

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Pu	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB
Am	SCAQC-1782-LC1	SCAQC-1782-LD1	SCAQC-1782-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: 00R0970

Project Name: Kaiser-Hill Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (dpm)	(OV) Laboratory Control Sample Activity (dpm)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1782-LC1	4.24 ∓ 0.116	4.24 ∓ 1.16	100	0.011
ACW03	PU-239/240	SCAQC-1782-LC1	4.37 ∓ 0.219	4.97 ∓ 1.35	114	0.685
ACW03	U-233/234	SCAQC-1782-LC1	8.02 ∓ 0.321	6.99 ∓ 1.78	87.1	0.885
ACW03	U-238	SCAQC-1782-LC1	8.02 ∓ 0.321	7.86 ∓ 1.97	98.0	0.126

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1782-LD1	2.06 ∓ 0.706	2.67 ∓ 0.794	0.611	0.575
ACW03	U-235	SCAQC-1782-LD1	0.114 ∓ 0.137	0.230 ∓ 0.179	0.116	0.513
ACW03	U-238	SCAQC-1782-LD1	12.8 ∓ 3.29	13.6 ∓ 3.33	0.820	0.175
ACW03	PU-239/240	SCAQC-1782-LD1	186 ∓ 44.5	170 ∓ 40.5	16.2	0.269
ACW03	AM-241	SCAQC-1782-LD1	79.4 ∓ 19.6	88.4 ∓ 21.9	8.97	0.305

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

Volatile Organics Case Narrative

Sample Analysis

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol referenced in the "Analysis/Instrument Information" section of this case narrative:

Lab ID	Client ID	Lab SDG	Client SDG
1000008587	VBLK01 (Blank)		
1000008588	VBLK01LCS (Laboratory Control Sample)		
1000010383	VBLK02 (Blank)		
1000010384	VBLK02LCS (Laboratory Control Sample)		
1000008589	00R0970-001.003MS (Matrix Spike)		
1000008590	00R0970-001.003MSD (Matrix Spike Duplicate)		
9901477001	00R0970-001.003	9901477	00R0970
9901477002	00R0970-002.003	9901477	00R0970

Aanlysis/Instrument Information:

Batch #: 4430
Procedure: 8260B Volatiles In Soil Federal
Analytical Method: SW846 8260B
Prep Method: SW846 5030A
Lab Group: Volatile Organics Federal

System Configuration

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5972	Jet Separator	Tekmar 2000 / Precept
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series/5973	Direct	Tekmar 2000 / Archon

Chromatographic Column

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

Column ID	Column Description
J&W1	DB-624, 60m x 0.32mm, 1.8um
J&W2	DB-624, 75m x 0.53mm, 3um
Rtx VOA	Rtx Volatiles, 60m x 0.53mm, 1.5um
J&W3	DB-624, 60m x 0.25mm, 1.4um

Samples are prepared using Purge and Trap (P & T) assemblies containing the following P & T trap apparatus:

P & T ID	P & T Description
VOCARB	Carbopack B / Carboxen 1000 & 1001

Instrument Configuration

The samples reported in this sample delivery group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Config.	Chromatographic Column	P & T Trap
VOA1	HP6890 / HP5973	J&W3	VOCARB 3000
VOA2	HP6890 / HP5973	J&W3	VOCARB 3000
VOA4	HP5890 / HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890 / HP5972	J&W3	VOCARB 3000
VOA7	HP5890 / HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890 / HP5973	J&W3	VOCARB 3000
VOA9	HP6890 / HP5973	J&W3	Tenax/Silicagel/Charcoal

Calibration Information:

Initial Calibration

For a complete list of data files associated with the initial calibration, see the Calibration History Report.

All initial calibration requirements have been met for this analysis.

CCAL Requirements

The instrument was calibrated to meet the 8260B initial calibration criteria. Although sample analyses are quantitated using the average response factor generated from the initial calibration, a daily calibration verification standard (CCV) is analyzed to verify the accuracy and acceptability of the multi-point initial calibration. The criteria adopted by the laboratory to determine the acceptability and accuracy of the initial calibration is a ± 40 % response factor difference for all non-CCC analytes of interest. In the following CCVs, the following target analyte(s) did not meet the criteria:

Date of CCV	Target Analyte(s)
12-23-99	Trichlorofluoromethane
01-03-00	Trichlorofluoromethane

The response factor for this target analyte in both CCVs was above the average response factor in the initial calibration. Detection and quantitation of this analyte in samples would be considered biased high.

Quality Control (QC) Information:

QC Sample Designation

The following sample was chosen as the method QC for this sample set:

Sample ID	Comment
9901477001	For matrix spike (MS) and matrix spike duplicate (MSD).

Surrogate Recoveries

All recoveries met the required acceptance criteria for this sample set.

Blank Acceptance

In the method blanks analyzed in this sample set, no target analytes were detected above the required reporting limit, however acetone was detected below the reporting limit at 2.9 ug/kg in VBLK02 (file 2q109). A detection of this analyte in samples associated with the blank will be flagged with a "B".

LCS Recovery Statement

All laboratory control sample (LCS) spike recoveries for this sample set were within the required acceptance limits.

MS/MSD Recovery Statement

The MS/MSD spike recoveries for this sample set were within the required acceptance limits, except for the low recovery of benzene in the MS and the high recovery of trichloroethylene in the MSD. The trend for the recoveries of the spiking compounds in the MS was similar to that of the MSD; benzene recovering low and trichloroethylene high. However the recoveries were lower for all in the MS. Due to the similarity, the cause for failed recoveries may be due to matrix effect.

MS/MSD RPD Statement

The relative percent difference (RPD) between each MS and MSD was within the required acceptance limits.

Internal Standard (IS) Acceptance

All sample internal standard responses met the required acceptance criteria.

Technical Information:

Sample Integrity

Prior to analysis, analysts inspect each analytical sample to verify that sample integrity has been maintained. Sample integrity specifications were met for this sample set.

Holding Time Specifications

Holding times are established and monitored in accordance with the referenced analytical methodology. The following samples did not meet the specified holding time requirements:

Sample Id	Comment
1000008589	Analyzed out of holding.
1000008590	Analyzed out of holding.

The MS/MSD for sample number 9901477001 was inadvertently missed due to the short hold time available to the laboratory. When the mistake was detected, the sample was analyzed past the hold time. Note, the parent sample was analyzed within the required hold time. See the Nonconformance Report (NCR) # GEL-AS-VO-887, found in the Sample Preparation Raw Data Package portion of this package.

Sample Re-prep/Re-analysis

Sample re-prep or re-analysis was not required for samples in this sample set.

Sample Dilutions

Samples in this sample set did not require dilutions.

Miscellaneous Information:

NCR Documentation

Nonconformance reports are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. The following Nonconformance Report (NCR) was generated to document procedural deviations that occurred with this sample set:

GEL-AS-VO-887

RTN# 00R0970

Manual Integrations

Data files associated with the initial calibration, continuing calibration check(s), and sample(s) may have been manually integrated to correct misidentification of peaks by the integration software. Manual integrations are performed when selective compounds exhibit poor peak shapes at low concentrations, or as a result of overlapping retention time windows of similar isomeric compounds contained on the extended reporting list. If applicable, peak profiles for the affected compounds are contained in the raw data section.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review. No additional comments were required for this sample set.

Review/Validation:

GEL requires all analytical data to be verified by a qualified data validator.

The following qualified data validator has reviewed this case narrative for content and accuracy:

Reviewer: Charles Wilson

Date: 01-27-00

RIN# 00R0970

2B
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Level: (low/med) LOW

	EPA SAMPLE NO.	SMC1 (BFB) #	SMC2 #	SMC3 (TOL) #	OTHER	TOT OUT
01	VBLK01LCS	91	113	114		0
02	VBLK01	92	111	110		0
03	00R0970-001.003	91	79	108		0
04	00R0970-002.003	90	88	109		0
05	VBLK02LCS	91	104	109		0
06	VBLK02	90	105	106		0
07	00R0970-001.003MS	89	89	108		0
08	00R0970-001.003MSD	90	75	107		0
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
SMC1 (BFB)	= Bromofluorobenzene	(73-129)
SMC2	= Dibromofluoromethane	(66-117)
SMC3 (TOL)	= Toluene-d8	(73-122)

Column to be used to flag recovery values

* Values outside of contract required QC limits

RIN# 00R0970

3B
SOIL VOLATILE LAB CONTROL SAMPLE

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix Spike - EPA Sample No.: VBLK01 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	LCS CONCENTRATION (ug/Kg)	LCS % REC #	QC. LIMITS REC.
1,1-Dichloroethylene	50.0	0.0	55.3	111	70-144
Benzene	50.0	0.0	55.2	110	74-133
Trichloroethylene	50.0	0.0	55.3	111	69-127
Toluene	50.0	0.0	54.8	110	79-121
Chlorobenzene	50.0	0.0	55.2	110	78-118

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 5 outside limits

COMMENTS:

RIN# 00R0970

3B
SOIL VOLATILE LAB CONTROL SAMPLE

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix Spike - EPA Sample No.: VBLK02 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	LCS CONCENTRATION (ug/Kg)	LCS % REC #	QC. LIMITS REC.
1,1-Dichloroethylene	50.0	0.0	54.2	108	70-144
Benzene	50.0	0.0	52.2	104	74-133
Trichloroethylene	50.0	0.0	55.1	110	69-127
Toluene	50.0	0.0	55.1	110	79-121
Chlorobenzene	50.0	0.0	54.7	109	78-118

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 5 outside limits

COMMENTS:

RIN# 00R0970

3B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix Spike - EPA Sample No.: 00R0970-001. Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethylene	55.8	0.0	49.6	89	82-136
Benzene	55.8	0.0	45.1	81*	85-126
Trichloroethylene	55.8	0.0	79.8	143	52-150
Toluene	55.8	0.0	47.0	84	73-117
Chlorobenzene	55.8	0.0	44.2	79	70-115

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethylene	55.8	54.4	97	9	30	82-136
Benzene	55.8	50.0	90	10	30	85-126
Trichloroethylene	55.8	89.4	160*	11	30	52-150
Toluene	55.8	52.3	94	11	30	73-117
Chlorobenzene	55.8	50.2	90	13	30	70-115

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 2 out of 10 outside limits

COMMENTS:

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-001.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 9901477001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20407

Level: (low/med) LOW Date Received: 12/22/99

% Moisture: not dec. 10 Date Analyzed: 12/23/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	5.6	U
74-87-3	Chloromethane	5.6	U
75-01-4	Vinyl chloride	5.6	U
74-83-9	Bromomethane	5.6	U
75-00-3	Chloroethane	5.6	U
75-69-4	Trichlorofluoromethane	5.6	U
75-35-4	1,1-Dichloroethylene	5.6	U
67-64-1	Acetone	112	U
75-15-0	Carbon disulfide	5.6	U
75-09-2	Methylene chloride	5.6	U
156-60-5	trans-1,2-Dichloroethylene	5.6	U
75-34-3	1,1-Dichloroethane	5.6	U
78-93-3	2-Butanone	112	U
156-59-2	cis-1,2-Dichloroethylene	5.6	U
594-20-7	2,2-Dichloropropane	5.6	U
74-97-5	Bromochloromethane	5.6	U
67-66-3	Chloroform	5.6	U
71-55-6	1,1,1-Trichloroethane	5.6	U
563-58-6	1,1-Dichloropropene	5.6	U
56-23-5	Carbon tetrachloride	5.6	U
107-06-2	1,2-Dichloroethane	5.6	U
71-43-2	Benzene	5.6	U
79-01-6	Trichloroethylene	5.6	U
78-87-5	1,2-Dichloropropane	5.6	U
74-95-3	Dibromomethane	5.6	U
75-27-4	Bromodichloromethane	5.6	U
10061-01-5	cis-1,3-Dichloropropylene	5.6	U
108-10-1	4-Methyl-2-pentanone	55.8	U
108-88-3	Toluene	5.6	U
10061-02-6	trans-1,3-Dichloropropylene	5.6	U
79-00-5	1,1,2-Trichloroethane	5.6	U
142-28-9	1,3-Dichloropropane	5.6	U
591-78-6	2-Hexanone	55.8	U

FORM I VOA OLM03.0

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-001.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 9901477001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20407

Level: (low/med) LOW Date Received: 12/22/99

% Moisture: not dec. 10 Date Analyzed: 12/23/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	5.6	U
124-48-1	Dibromochloromethane	5.6	U
106-93-4	1,2-Dibromoethane	5.6	U
108-90-7	Chlorobenzene	5.6	U
630-20-6	1,1,1,2-Tetrachloroethane	5.6	U
100-41-4	Ethylbenzene	5.6	U
107-02-8	Xylenes (total)	2.1	J
100-42-5	Styrene	5.6	U
75-25-2	Bromoform	5.6	U
98-82-8	Isopropylbenzene	5.6	U
79-34-5	1,1,2,2-Tetrachloroethane	5.6	U
96-18-4	1,2,3-Trichloropropane	5.6	U
108-86-1	Bromobenzene	5.6	U
103-65-1	n-Propylbenzene	5.6	U
95-49-8	2-Chlorotoluene	5.6	U
108-67-8	1,3,5-Trimethylbenzene	5.6	U
95-63-6	1,2,4-Trimethylbenzene	5.6	U
106-43-4	4-Chlorotoluene	5.6	U
98-06-6	tert-Butylbenzene	5.6	U
135-98-8	sec-Butylbenzene	5.6	U
99-87-6	4-Isopropyltoluene	5.6	U
541-73-1	1,3-Dichlorobenzene	5.6	U
106-46-7	1,4-Dichlorobenzene	5.6	U
104-51-8	n-Butylbenzene	5.6	U
95-50-1	1,2-Dichlorobenzene	5.6	U
96-12-8	1,2-Dibromo-3-chloropropane	5.6	U
120-82-1	1,2,4-Trichlorobenzene	5.6	U
87-68-3	Hexachlorobutadiene	5.6	U
91-20-3	Naphthalene	5.6	U
87-61-6	1,2,3-Trichlorobenzene	5.6	U
76-13-1	Trichlorotrifluoroethane	5.6	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-002.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 9901477002

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20408

Level: (low/med) LOW Date Received: 12/22/99

% Moisture: not dec. 15 Date Analyzed: 12/23/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	5.9	U
74-87-3	Chloromethane	5.9	U
75-01-4	Vinyl chloride	5.9	U
74-83-9	Bromomethane	5.9	U
75-00-3	Chloroethane	5.9	U
75-69-4	Trichlorofluoromethane	5.9	U
75-35-4	1,1-Dichloroethylene	5.9	U
67-64-1	Acetone	118	U
75-15-0	Carbon disulfide	5.9	U
75-09-2	Methylene chloride	5.9	U
156-60-5	trans-1,2-Dichloroethylene	5.9	U
75-34-3	1,1-Dichloroethane	5.9	U
78-93-3	2-Butanone	118	U
156-59-2	cis-1,2-Dichloroethylene	5.9	U
594-20-7	2,2-Dichloropropane	5.9	U
74-97-5	Bromochloromethane	5.9	U
67-66-3	Chloroform	5.9	U
71-55-6	1,1,1-Trichloroethane	5.9	U
563-58-6	1,1-Dichloropropene	5.9	U
56-23-5	Carbon tetrachloride	5.9	U
107-06-2	1,2-Dichloroethane	5.9	U
71-43-2	Benzene	5.9	U
79-01-6	Trichloroethylene	5.9	U
78-87-5	1,2-Dichloropropane	5.9	U
74-95-3	Dibromomethane	5.9	U
75-27-4	Bromodichloromethane	5.9	U
10061-01-5	cis-1,3-Dichloropropylene	5.9	U
108-10-1	4-Methyl-2-pentanone	59.0	U
108-88-3	Toluene	5.9	U
10061-02-6	trans-1,3-Dichloropropylene	5.9	U
79-00-5	1,1,2-Trichloroethane	5.9	U
142-28-9	1,3-Dichloropropane	5.9	U
591-78-6	2-Hexanone	59.0	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-0C2.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 9901477002

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20408

Level: (low/med) LOW Date Received: 12/22/99

% Moisture: not dec. 15 Date Analyzed: 12/23/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	5.9	U
124-48-1	Dibromochloromethane	5.9	U
106-93-4	1,2-Dibromoethane	5.9	U
108-90-7	Chlorobenzene	5.9	U
630-20-6	1,1,1,2-Tetrachloroethane	5.9	U
100-41-4	Ethylbenzene	5.9	U
107-02-8	Xylenes (total)	5.9	U
100-42-5	Styrene	5.9	U
75-25-2	Bromoform	5.9	U
98-82-8	Isopropylbenzene	5.9	U
79-34-5	1,1,2,2-Tetrachloroethane	5.9	U
96-18-4	1,2,3-Trichloropropane	5.9	U
108-86-1	Bromobenzene	5.9	U
103-65-1	n-Propylbenzene	5.9	U
95-49-8	2-Chlorotoluene	5.9	U
108-67-8	1,3,5-Trimethylbenzene	5.9	U
95-63-6	1,2,4-Trimethylbenzene	5.9	U
106-43-4	4-Chlorotoluene	5.9	U
98-06-6	tert-Butylbenzene	5.9	U
135-98-8	sec-Butylbenzene	5.9	U
99-87-6	4-Isopropyltoluene	5.9	U
541-73-1	1,3-Dichlorobenzene	5.9	U
106-46-7	1,4-Dichlorobenzene	5.9	U
104-51-8	n-Butylbenzene	5.9	U
95-50-1	1,2-Dichlorobenzene	5.9	U
96-12-8	1,2-Dibromo-3-chloropropane	5.9	U
120-82-1	1,2,4-Trichlorobenzene	5.9	U
87-68-3	Hexachlorobutadiene	5.9	U
91-20-3	Naphthalene	5.9	U
87-61-6	1,2,3-Trichlorobenzene	5.9	U
76-13-1	Trichlorotrifluoroethane	5.9	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 1000008587

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20406

Level: (low/med) LOW Date Received: 12/23/99

% Moisture: not dec. _____ Date Analyzed: 12/23/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethylene	5.0	U
67-64-1	Acetone	100	U
75-15-0	Carbon disulfide	5.0	U
75-09-2	Methylene chloride	5.0	U
156-60-5	trans-1,2-Dichloroethylene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
78-93-3	2-Butanone	100	U
156-59-2	cis-1,2-Dichloroethylene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
79-01-6	Trichloroethylene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
74-95-3	Dibromomethane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropylene	5.0	U
108-10-1	4-Methyl-2-pentanone	50.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropylene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
142-28-9	1,3-Dichloropropane	5.0	U
591-78-6	2-Hexanone	50.0	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 1000008587

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 20406

Level: (low/med) LOW Date Received: 12/23/99

% Moisture: not dec. _____ Date Analyzed: 12/23/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
107-02-8	Xylenes (total)	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
108-86-1	Bromobenzene	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	5.0	U
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	4-Isopropyltoluene	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	Trichlorotrifluoroethane	5.0	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 1000010383

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 2Q109

Level: (low/med) LOW Date Received: 01/03/00

% Moisture: not dec. _____ Date Analyzed: 01/03/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethylene	5.0	U
67-64-1	Acetone	2.9	J
75-15-0	Carbon disulfide	5.0	U
75-09-2	Methylene chloride	5.0	U
156-60-5	trans-1,2-Dichloroethylene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
78-93-3	2-Butanone	100	U
156-59-2	cis-1,2-Dichloroethylene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
79-01-6	Trichloroethylene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
74-95-3	Dibromomethane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropylene	5.0	U
108-10-1	4-Methyl-2-pentanone	50.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropylene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
142-28-9	1,3-Dichloropropane	5.0	U
591-78-6	2-Hexanone	50.0	U

FORM I VOA OLM03.0

231

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix: (soil/water) SOIL Lab Sample ID: 1000010383

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 2Q109

Level: (low/med) LOW Date Received: 01/03/00

% Moisture: not dec. _____ Date Analyzed: 01/03/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
107-02-8	Xylenes (total)	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
108-86-1	Bromobenzene	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	5.0	U
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	4-Isopropyltoluene	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	Trichlorotrifluoroethane	5.0	U

Commodore Advanced Sciences, Inc.

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00R0970#005

Page 1 of 1

Collector: HERSHEY/ J. WINGARD	Contact/Requester: GRAVES, MATT / ZBRYK, KATHY	Telephone No.: 3054 MSIN FAX
RIN: 00R0970	Sampling Origin: Building 779, North Side	Purchase Order/Charge Code
Project Title	Logbook No.: 2000 VAN	Ice Chest No.: N/A Temp.
To (Lab): General Engineering	Method of Shipment: FEDERAL EXPRESS	Bill of Lading/Air Bill No.: 4533 2125 4533
Protocol		PRE

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

9901505

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

~~WO#~~ 19991213 03

Pre-log

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
00R0970-003.003	#3 NORTH TRENCH	SOLID	12/14/1999	10:15 AM	Building 779, north side.	60-G G	SS01B006 (VOA 8260-Soil) [Routine]	None 4 degs C w/zhs
00R0970-004.003	#4 NORTH TRENCH	SOLID	12/14/1999	10:20 AM	Building 779, north side.	60-G G	SS01B006 (VOA 8260-Soil) [Routine]	None 4 degs C w/zhs

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
R. Miller	12-21-99 / 1440	Refrig #2	12-21-99 / 1440	Refrig #2	12-22-99 / 1400	R. Miller	12-22-99 / 1400
R. Miller	12/22/99 1500	Fed Ex					
		Patricia Power	12/23/11:00				

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

Volatile Organics Case Narrative

Sample Analysis

The following samples were analyzed for Volatile Organic Compounds using the analytical protocol referenced in the "Analysis/Instrument Information" section of this case narrative:

Lab ID	Client ID	Lab SDG	Client SDG
1000010903	VBLK01 (Blank)		
1000010904	VBLK01LCS (Laboratory Control Sample)		
9901505001	00R0970-003.003	9901505	00R0970.005
9901505002	00R0970-004.003	9901505	00R0970.005

Analysis/Instrument Information:

Batch #: 4728
Procedure: 8260B Volatiles In Soil Federal
Analytical Method: SW846 8260B
Prep Method: SW846 5030A
Lab Group: Volatile Organics Federal

System Configuration

The laboratory utilizes a variety of instrument configurations for volatile analyses. These analyses are accomplished using one or more of the GC and MS couplings, as follows:

GC/MS	Interface	Purge and Trap-Concentrator / Autosampler
5890 Series II / 5972	Jet Separator	Tekmar 2000 / Precept
5890 Series II / 5972	Direct	OI 4560 / Archon
6890 Series / 5973	Direct	Tekmar 3000 / Precept
6890 Series / 5973	Direct	OI 4560 / DPM-16
6890 Series/5973	Direct	Tekmar 2000 / Archon

Chromatographic Column

Chromatographic separation of volatile components is accomplished through analysis on one or more of the following columns:

Column ID	Column Description
J&W1	DB-624, 60m x 0.32mm, 1.8um
J&W2	DB-624, 75m x 0.53mm, 3um
Rtx VOA	Rtx Volatiles, 60m x 0.53mm, 1.5um
J&W3	DB-624, 60m x 0.25mm, 1.4um

Samples are prepared using Purge and Trap (P & T) assemblies containing the following P & T trap apparatus:

P & T ID	P & T Description
VOCARB	Carbopack B / Carboxen 1000 & 1001

Instrument Configuration

The samples reported in this sample delivery group (SDG) were analyzed on one or more of the following instrument systems (instrument systems are identified by the instrument ID designations listed below which can be found on the raw data or individual form headers):

Instrument ID	System Config.	Chromatographic Column	P & T Trap
VOA1	HP6890 / HP5973	J&W3	VOCARB 3000
VOA2	HP6890 / HP5973	J&W3	VOCARB 3000
VOA4	HP5890 / HP5972	Rtx VOA	VOCARB 3000
VOA5	HP5890 / HP5972	J&W3	VOCARB 3000
VOA7	HP5890 / HP5972	Rtx VOA	VOCARB 3000
VOA8	HP6890 / HP5973	J&W3	VOCARB 3000
VOA9	HP6890 / HP5973	J&W3	Tenax/Silicagel/Charcoal

Calibration Information:

Initial Calibration

For a complete list of data files associated with the initial calibration, see the Calibration History Report.

All initial calibration requirements have been met for this analysis.

CCAL Requirements

All continuing calibration (CCAL) criteria have been met for this sample set.

Quality Control (QC) Information:

QC Sample Designation

The analyses of a matrix spike (MS) and matrix spike duplicate (MSD) were analyzed on a sample of similar matrix in the KHCO SDG # 00R0970.

Surrogate Recoveries

Surrogate recoveries in all samples were within the required acceptance criteria, except for the following:

Sample ID	Surrogate Standards
9901505001	Dibromofluoromethane

In the initial analysis, the recovery of dibromofluoromethane was low. The sample was reanalyzed out of hold and the recovery of this surrogate was acceptable. A copy of the reanalysis was included in the Sample Preparation Raw Data Package portion of this package. The result for acetone, the only target analyte detected, was similar in both analyses.

Blank Acceptance

In the method blank analyzed in this sample set, no target analytes were detected above the required reporting limit, however 4-methyl-2-pentanone was detected below the reporting limit at 1.6 ug/kg. A detection of this analyte in samples associated with the blank will be flagged with a "B".

LCS Recovery Statement

All laboratrory control sample (LCS) spike recoveries for this sample set were within the required acceptance limits.

MS/MSD Recovery Statement

The MS/MSD spike recoveries for this sample set were within the required acceptance limits, except for the low recovery of benzene in the MS and the high recovery of trichloroethylene in the MSD. The trend for the recoveries of the spiking compounds in the MS was similar to that of the MSD; benzene recovering low and trichloroethylene high. However the recoveries were lower for all in the MS. Due to the similarity, the cause for failed recoveries may be due to matrix effect.

MS/MSD RPD Statement

The relative percent difference (RPD) between each MS and MSD was within the required acceptance limits.

Internal Standard (IS) Acceptance

All sample internal standard responses met the required acceptance criteria.

Technical Information:

Sample Integrity

Prior to analysis, analysts inspect each analytical sample to verify that sample integrity has been maintained. Sample integrity specifications were met for this sample set.

Holding Time Specifications

Holding times are established and monitored in accordance with the referenced analytical methodology. All samples in this sample set did meet the specified holding time requirements.

Sample Re-prep/Re-analysis

The following sample had multiple analyses for reasons other than dilution:

Samp ID	Comments
9901505001	Sample reanalyzed to confirm low surrogate recovery.

The reanalysis did not confirm the low recovery, instead all surrogate standards met the acceptance criteria. However, the data could not be reported since the reanalysis occurred after the holding time had expired.

Sample Dilutions

Samples in this sample set did not required dilutions.

Miscellaneous Information:

Manual Integrations

Data files associated with the initial calibration, continuing calibration check(s), and sample(s) may have been manually integrated to correct misidentification of peaks by the integration software. Manual integrations are performed when selective compounds exhibit poor peak shapes at low concentrations, or as a result of overlapping retention time windows of similar isomeric compounds contained on the extended reporting list. If applicable, peak profiles for the affected compounds are contained in the raw data section.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review. No additional comments were required for this sample set.

Review/Validation:

GEL requires all analytical data to be verified by a qualified data validator.

The following qualified data validator has reviewed this case narrative for content and accuracy:

Reviewer: Charles Wilson

Date: 01-27-00

RIN# 00R0970

2B
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Level: (low/med) LOW

	EPA SAMPLE NO.	SMC1 (BFB) #	SMC2 #	SMC3 (TOL) #	OTHER	TOT OUT
01	VBLK01LCS	98	105	106		0
02	VBLK01	108	109	100		0
03	00R0970-003.003	86	44*	80		1
04	00R0970-004.003	94	75	86		0
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
SMC1 (BFB)	= Bromofluorobenzene	(73-129)
SMC2	= Dibromofluoromethane	(66-117)
SMC3 (TOL)	= Toluene-d8	(73-122)

Column to be used to flag recovery values

* Values outside of contract required QC limits

RIN# 00R0970

3B
SOIL VOLATILE LAB CONTROL SAMPLE

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix Spike - EPA Sample No.: VBLK01 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	LCS CONCENTRATION (ug/Kg)	LCS % REC #	QC. LIMITS REC.
1,1-Dichloroethylene	50.0	0.0	52.5	105	70-144
Benzene	50.0	0.0	52.0	104	74-133
Trichloroethylene	50.0	0.0	48.5	97	69-127
Toluene	50.0	0.0	54.1	108	79-121
Chlorobenzene	50.0	0.0	55.0	110	78-118

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 5 outside limits

COMMENTS:

FORM III VOA-2 OLM03.0

240

RIN# 00R0970

3B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970

Matrix Spike - EPA Sample No.: 00R0970-001. Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethylene	55.8	0.0	49.6	89	82-136
Benzene	55.8	0.0	45.1	81*	85-126
Trichloroethylene	55.8	0.0	79.8	143	52-150
Toluene	55.8	0.0	47.0	84	73-117
Chlorobenzene	55.8	0.0	44.2	79	70-115

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethylene	55.8	54.4	97	9	30	82 136
Benzene	55.8	50.0	90	10	30	85-126
Trichloroethylene	55.8	89.4	160*	11	30	52-150
Toluene	55.8	52.3	94	11	30	73-117
Chlorobenzene	55.8	50.2	90	13	30	70-115

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 2 out of 10 outside limits

COMMENTS: _____

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-003.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix: (soil/water) SOIL Lab Sample ID: 9901505001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 8P219

Level: (low/med) LOW Date Received: 12/23/99

% Moisture: not dec. 18 Date Analyzed: 12/28/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume:_____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	6.1	U
74-87-3	Chloromethane	6.1	U
75-01-4	Vinyl chloride	6.1	U
74-83-9	Bromomethane	6.1	U
75-00-3	Chloroethane	6.1	U
75-69-4	Trichlorofluoromethane	6.1	U
75-35-4	1,1-Dichloroethylene	6.1	U
67-64-1	Acetone	37.0	J
75-15-0	Carbon disulfide	6.1	U
75-09-2	Methylene chloride	6.1	U
156-60-5	trans-1,2-Dichloroethylene	6.1	U
75-34-3	1,1-Dichloroethane	6.1	U
78-93-3	2-Butanone	121	U
156-59-2	cis-1,2-Dichloroethylene	6.1	U
594-20-7	2,2 Dichloropropane	6.1	U
74-97-5	Bromochloromethane	6.1	U
67-66-3	Chloroform	6.1	J
71-55-6	1,1,1-Trichloroethane	6.1	U
563-58-6	1,1-Dichloropropene	6.1	U
56-23-5	Carbon tetrachloride	6.1	U
107-06-2	1,2-Dichloroethane	6.1	U
71-43-2	Benzene	6.1	U
79-01-6	Trichloroethylene	6.1	U
78-87-5	1,2-Dichloropropane	6.1	U
74-95-3	Dibromomethane	6.1	U
75-27-4	Bromodichloromethane	6.1	U
10061-01-5	cis-1,3-Dichloropropylene	6.1	U
108-10-1	4-Methyl-2-pentanone	60.6	U
108-88-3	Toluene	6.1	U
10061-02-6	trans-1,3-Dichloropropylene	6.1	U
79-00-5	1,1,2-Trichloroethane	6.1	U
142-28-9	1,3-Dichloropropane	6.1	U
591-78-6	2-Hexanone	60.6	U

FORM I VOA OLM03.0

242

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-003.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix: (soil/water) SOIL Lab Sample ID: 9901505001

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 8P219

Level: (low/med) LOW Date Received: 12/23/99

% Moisture: not dec. 18 Date Analyzed: 12/28/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	6.1	U
124-48-1	Dibromochloromethane	6.1	U
106-93-4	1,2-Dibromoethane	6.1	U
108-90-7	Chlorobenzene	6.1	U
630-20-6	1,1,1,2-Tetrachloroethane	6.1	U
100-41-4	Ethylbenzene	6.1	U
1330-20-7	Xylenes (total)	6.1	U
100-42-5	Styrene	6.1	U
75-25-2	Bromoform	6.1	U
98-82-8	Isopropylbenzene	6.1	U
79-34-5	1,1,2,2-Tetrachloroethane	6.1	U
96-18-4	1,2,3-Trichloropropane	6.1	U
108-86-1	Bromobenzene	6.1	U
103-65-1	n-Propylbenzene	6.1	U
95-49-8	2-Chlorotoluene	6.1	U
108-67-8	1,3,5-Trimethylbenzene	6.1	U
95-63-6	1,2,4-Trimethylbenzene	6.1	U
106-43-4	4-Chlorotoluene	6.1	U
98-06-6	tert-Butylbenzene	6.1	U
135-98-8	sec-Butylbenzene	6.1	U
99-87-6	4-Isopropyltoluene	6.1	U
541-73-1	1,3-Dichlorobenzene	6.1	U
106-46-7	1,4-Dichlorobenzene	6.1	U
104-51-8	n-Butylbenzene	6.1	U
95-50-1	1,2-Dichlorobenzene	6.1	U
96-12-8	1,2-Dibromo-3-chloropropane	6.1	U
120-82-1	1,2,4-Trichlorobenzene	6.1	U
87-68-3	Hexachlorobutadiene	6.1	U
91-20-3	Naphthalene	6.1	U
87-61-6	1,2,3-Trichlorobenzene	6.1	U
76-13-1	Trichlorotrifluoroethane	6.1	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-004.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix: (soil/water) SOIL Lab Sample ID: 9901505002

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 8P220

Level: (low/med) LOW Date Received: 12/23/99

% Moisture: not dec. 9 Date Analyzed: 12/28/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	5.5	U
74-87-3	Chloromethane	5.5	U
75-01-4	Vinyl chloride	5.5	U
74-83-9	Bromomethane	5.5	U
75-00-3	Chloroethane	5.5	U
75-69-4	Trichlorofluoromethane	5.5	U
75-35-4	1,1-Dichloroethylene	5.5	U
67-64-1	Acetone	110	U
75-15-0	Carbon disulfide	5.5	U
75-09-2	Methylene chloride	5.5	U
156-60-5	trans-1,2-Dichloroethylene	5.5	U
75-34-3	1,1-Dichloroethane	5.5	U
78-93-3	2-Butanone	110	U
156-59-2	cis-1,2-Dichloroethylene	5.5	U
594-20-7	2,2-Dichloropropane	5.5	U
74-97-5	Bromochloromethane	5.5	U
67-66-3	Chloroform	5.5	U
71-55-6	1,1,1-Trichloroethane	5.5	U
563-58-6	1,1-Dichloropropene	5.5	U
56-23-5	Carbon tetrachloride	5.5	U
107-06-2	1,2-Dichloroethane	5.5	U
71-43-2	Benzene	5.5	U
79-01-6	Trichloroethylene	5.5	U
78-87-5	1,2-Dichloropropane	5.5	U
74-95-3	Dibromomethane	5.5	U
75-27-4	Bromodichloromethane	5.5	U
10061-01-5	cis-1,3-Dichloropropylene	5.5	U
108-10-1	4-Methyl-2-pentanone	55.2	U
108-88-3	Toluene	5.5	U
10061-02-6	trans-1,3-Dichloropropylene	5.5	U
79-00-5	1,1,2-Trichloroethane	5.5	U
142-28-9	1,3-Dichloropropane	5.5	U
591-78-6	2-Hexanone	55.2	U

FORM I VOA OLM03.0

244

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

00R0970-004.003

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix: (soil/water) SOIL Lab Sample ID: 9901505002

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 8P220

Level: (low/med) LOW Date Received: 12/23/99

% Moisture: not dec. 9 Date Analyzed: 12/28/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	5.5	U
124-48-1	Dibromochloromethane	5.5	U
106-93-4	1,2-Dibromoethane	5.5	U
108-90-7	Chlorobenzene	5.5	U
630-20-6	1,1,1,2-Tetrachloroethane	5.5	U
100-41-4	Ethylbenzene	5.5	U
1330-20-7	Xylenes (total)	5.5	U
100-42-5	Styrene	5.5	U
75-25-2	Bromoform	5.5	U
98-82-8	Isopropylbenzene	5.5	U
79-34-5	1,1,2,2-Tetrachloroethane	5.5	U
96-18-4	1,2,3-Trichloropropane	5.5	U
108-86-1	Bromobenzene	5.5	U
103-65-1	n-Propylbenzene	5.5	U
95-49-8	2-Chlorotoluene	5.5	U
108-67-8	1,3,5-Trimethylbenzene	5.5	U
95-63-6	1,2,4-Trimethylbenzene	5.5	U
106-43-4	4-Chlorotoluene	5.5	U
98-06-6	tert-Butylbenzene	5.5	U
135-98-8	sec-Butylbenzene	5.5	U
99-87-6	4-Isopropyltoluene	5.5	U
541-73-1	1,3-Dichlorobenzene	5.5	U
106-46-7	1,4-Dichlorobenzene	5.5	U
104-51-8	n-Butylbenzene	5.5	U
95-50-1	1,2-Dichlorobenzene	5.5	U
96-12-8	1,2-Dibromo-3-chloropropane	5.5	U
120-82-1	1,2,4-Trichlorobenzene	5.5	U
87-68-3	Hexachlorobutadiene	5.5	U
91-20-3	Naphthalene	5.5	U
87-61-6	1,2,3-Trichlorobenzene	5.5	U
76-13-1	Trichlorotrifluoroethane	5.5	U

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix: (soil/water) SOIL Lab Sample ID: 1000010903

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 8P206KHCO

Level: (low/med) LOW Date Received: 12/28/99

% Moisture: not dec. _____ Date Analyzed: 12/28/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethylene	5.0	U
67-64-1	Acetone	100	U
75-15-0	Carbon disulfide	5.0	U
75-09-2	Methylene chloride	5.0	U
156-60-5	trans-1,2-Dichloroethylene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
78-93-3	2-Butanone	100	U
156-59-2	cis-1,2-Dichloroethylene	5.0	U
594-20-7	2,2-Dichloropropane	5.0	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
563-58-6	1,1-Dichloropropene	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
79-01-6	Trichloroethylene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
74-95-3	Dibromomethane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropylene	1.6	J
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropylene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
142-28-9	1,3-Dichloropropane	50.0	U
591-78-6	2-Hexanone		

FORM I VOA OLM03.0

246

RIN# 00R0970

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 00R0970.005

Matrix: (soil/water) SOIL Lab Sample ID: 1000010903

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 8P206KHCO

Level: (low/med) LOW Date Received: 12/28/99

% Moisture: not dec. _____ Date Analyzed: 12/28/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
127-18-4	Tetrachloroethylene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
630-20-6	1,1,1,2-Tetrachloroethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
96-18-4	1,2,3-Trichloropropane	5.0	U
108-86-1	Bromobenzene	5.0	U
103-65-1	n-Propylbenzene	5.0	U
95-49-8	2-Chlorotoluene	5.0	U
108-67-8	1,3,5-Trimethylbenzene	5.0	U
95-63-6	1,2,4-Trimethylbenzene	5.0	U
106-43-4	4-Chlorotoluene	5.0	U
98-06-6	tert-Butylbenzene	5.0	U
135-98-8	sec-Butylbenzene	5.0	U
99-87-6	4-Isopropyltoluene	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
104-51-8	n-Butylbenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
91-20-3	Naphthalene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U
76-13-1	Trichlorotrifluoroethane	5.0	U

842

Commodore Advanced Sciences, Inc.
RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 00R0970#004

Page 1 of 1

Collector: Wingard / Hershey 516927	Contact/Requester: GRAVES, MATT	Telephone No.: 3054 MSIN FAX: 2864
RIN: 00R0970	Sampling Origin: Bldg. 779	Purchase Order/Charge Code: N/A
Project Title: N/A	Logbook No.: 2000 Step Van	Ice Chest No.: N/A Temp.: N/A
To (Lab): Building 559 Laboratory	Method of Shipment: Vehicle, CAS	Bill of Lading/Air Bill No.: N/A
Protocol: CAS-SOP.003		PRE: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS: ** ** DC 1374

SPECIAL INSTRUCTIONS: Hold Time: FAX RESULTS TO 3388-JSW

Total Activity Exemption: Yes ___ No ___

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00R0970-001.001	#1 South	SOLID	12/14/99	1005	Building 779, north side.	20-G G	PA04A015 (Radscreen - DOT) [Rush]	None None
00R0970-002.001	#2 South	SOLID		1010	Building 779, north side.	20-G G	PA04A015 (Radscreen - DOT) [Rush]	None None
00R0970-003.001	#3 North	SOLID		1015	Building 779, north side.	20-G G	PA04A015 (Radscreen - DOT) [Rush]	None None
00R0970-004.001	#4 North	SOLID		1020	Building 779, north side.	20-G G	PA04A015 (Radscreen - DOT) [Rush]	None None

12/14/99 NM

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Hershey	12/14/99 11:35	Scott Fuklin BSI	12-14-99 11:35	[signature]	BTI 16 DEC 99 1333	Hershey	12/16/99 13:43
Hershey	12/16/99 13:57	[signature]	12/16/99 1357				

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

LABORATORY USE ONLY

	Initials/Date	Y/N
TID/Intact:	NA	
Custody Seal Intact:	[signature] 12/16/99	✓
Labels/COC Agree:		✓
TID # (if applicable):	N/A	
TID Removed:		

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is < 2000 pCi/g, otherwise it is RAD.

ENTERED 12/20

APO Sample ID	00R0970-001.001
Date Received	12/16/99
Location	778 North side
Date Analyzed	12/17/99
Date Reported	12/17/99
Case Narrative	This sample was analyzed in the 559 Radiochemistry Lab for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha	16.6	+/-	17.5	*pCi/g*
Beta	0.0	+/-	15.8	*pCi/g*

Total Activity: 49.9 *pCi/g* *DOT Classification:* NONRAD

Approval Ron A Henderson

Peer Review John G Fraser

249

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is < 2000 pCi/g, otherwise it is RAD.

APO Sample ID	00R0970-002.001
Date Received	12/16/99
Location	779 North side
Date Analyzed	12/17/99
Date Reported	12/17/99
Case Narrative	This sample was analyzed in the 559 Radiochemistry Lab for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha 1330.0 +/- 107.0 *pCi/g*

Beta 0.0 +/- 20.7 *pCi/g*

Total Activity: 1457.7 *pCi/g* *DOT Classification:* NONRAD

Approval Roger A. Henderson

Peer Review John K. Traser

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is < 2000 pCi/g, otherwise it is RAD.

APO Sample ID	00R0970-003.001
Date Received	12/16/99
Location	779 North side
Date Analyzed	12/17/99
Date Reported	12/17/99
Case Narrative	This sample was analyzed in the 559 Radiochemistry Lab for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha	6190.0	+/-	205.0	*pCi/g*
Beta	0.0	+/-	39.9	*pCi/g*

Total Activity: 6434.9 *pCi/g* *DOT Classification:* RAD

Approval Roger R. Henderson

Peer Review John L. Jinsen

250

559 Laboratories DOT Radscreen Report

This radscreen report provides the user with the data necessary to make D.O.T. shipping criteria compliance determinations and cannot be used for any other purpose. The methods utilized for this analysis are L-4186 and L-4188. The DOT Classification is determined by summing the alpha and beta activities with their associated two-sigma error terms. Classification is NONRAD if the total activity is < 2000 pCi/g, otherwise it is RAD.

APO Sample ID	00R0970-004.001
Date Received	12/16/99
Location	776 North side
Date Analyzed	12/17/99
Date Reported	12/17/99
Case Narrative	This sample was analyzed in the 559 Radiochemistry Lab for a DOT screen. No anomalies occurred during analysis. All QA/QC was within limits.

Alpha	11400.0	+/-	764.0	*pCi/g*
Beta	0.0	+/-	191.0	*pCi/g*

Total Activity: 12355 *pCi/g* *DOT Classification:* RAD

Approval Roger A. Henderson

Peer Review John R. Fraser

251

B783, pit water

SIN # MTLS02-A2

FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 559 PA Inorganic Laboratories Sample No.: 2

Lab Sample ID: 99A6078-001D Bldg 783 Aqueous Sample

Section: ICPAES

Lab Sample I.D.s beginning with X' indicates TCLP Extract.

% Solids for Sample : <0.5

Date Sampled: 3/25/99 SDG No. : MAR26

Lab Receipt Date: 3/25/99 QC Report No.: SD032699.RPT

Matrix: Water ____ Soil ____ Sludge ____ Other X

Elements Identified and Measured

Concentration Units: mg/L

Analyte	Concentration	C	Q (N V * E O O S +)	M
Aluminum	0.6720	B		P
Antimony	0.1000	U		P
Arsenic	0.1000	U		P
Barium	0.2612	B		P
Beryllium	0.0050	U		P
Cadmium	0.0200	U		P
Calcium	254.5695	B		P
Chromium	0.2241	B		P
Cobalt	0.0500	U		P
Copper	0.1000	U		P
Iron	0.6868	B		P
Lead	0.0563	B		P
Magnesium	104.0230	B	E	P
Manganese	0.0315	B		P
Molybdenum	0.4335	B		P
Nickel	0.0500	U		P
Phosphorus	0.6584	B		P
Selenium	0.1000	U		P
Silver	0.0300	U		P
Strontium	2.7359	B		P
Thallium	0.1000	U		P
Titanium	0.0200	U		P
Vanadium	0.2353	B		P
Zinc	0.2750	B		P

Color Before: Colorless Clarity Before: Clear

Color After: Colorless Clarity After: Clear

Texture:

Artifacts:

Comments: Sample < 0.50 % Solids. Total Metals Digestion only !

PRELIMINARY INFORMATION

252

E

B783, pit water

SIN # MTLS02-A2

FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 559 PA Inorganic Laboratories Sample No.: 1

Lab Sample ID: 99A6078-001 Bldg 783 Aqueous Sample

Section: ICPAES

Lab Sample I.D.s beginning with 'X' indicates TCLP Extract.

% Solids for Sample : <0.5

Date Sampled: 3/25/99 SDG No. : MAR26

Lab Receipt Date: 3/25/99 QC Report No.: SD032699RF1

Matrix: Water ____ Soil ____ Sludge ____ Other X

Elements Identified and Measured

Concentration Units: mg/L

Analyte	Concentration	C	N V * E O O S + Q	M
Aluminum	0.6163	B		P
Antimony	0.1000	U		P
Arsenic	0.1000	U		P
Barium	0.2704	B		P
Beryllium	0.0050	U		P
Cadmium	0.0200	U		P
Calcium	265.1425	B		P
Chromium	0.2284	B		P
Cobalt	0.0500	U		P
Copper	0.1000	U		P
Iron	0.8474	B		P
Lead	0.1111	B		P
Magnesium	107.8149	B	E	P
Manganese	0.0331	B		P
Molybdenum	0.4514	B		P
Nickel	0.0500	U		P
Phosphorus	0.6086	B		P
Selenium	0.1000	U		P
Silver	0.0300	U		P
Strontium	2.8493	B		P
Thallium	0.1000	U		P
Titanium	0.0200	U		P
Vanadium	0.2075	B		P
Zinc	0.2663	B		P

Color Before: Colorless Clarity Before: Clear

Color After: Colorless Clarity After: Clear

Texture:

Artifacts:

Comments: Sample < 0.50 % Solids. Total Metals Digestion only !

PRELIMINARY INFORMATION

253

B783, pit water

559 Laboratories Analytical Report

This report provides the user with alpha/beta analytical results produced by utilizing procedures L-4186 and L-4188. The error terms reported are two-sigma. The MDA is calculated using formalism developed by Currie. The LL or TRU indication certifies that the sample material meets either definition based on the sample containing greater or less than 100 nCi/g of transuranic activity. Further data and explanation can be provided upon request to the 559 Laboratories.

Sample Owner	Zbryk, K.	*Pager*	
Phone #	6647	*Company*	RMRS 779
APO Sample ID	99A6078-002.001	*Customer Sample ID*	
Date Received	3/25/99	*Sample Location*	783
Date Analyzed	4/8/99		
Date Reported	4/9/99		

Case Narrative This sample was analyzed in the 559 Radiochemistry Laboratory. No anomalies occurred during analysis. All QA/QC was within limits.

LL/TRU Classification: LL

Alpha	3.63E+02	+/- 5.01E+02		*Alpha MDA*	4.13E+02
	1.4E-8				
Beta	3.74E+02	+/- 5.54E+02		*Beta MDA*	6.99E+02

Units: pCi/ l

Approval Roger C. Henderson

Peer Review John L. Fraser

Monday, April 12, 1999

Page 1 of 1

254

· B783, pit water

559 Laboratories Analytical Report

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. The method has been approved by the APO on 6/19/1997.

Sample Owner	Zbryk, K.	*Company*	RMRS 779
APO Sample ID	99A6076-002.001		
Date Received	3/25/99		
Date Analyzed	4/8/99		
Date Reported	4/9/99		

Case Narrative: This sample was analyzed in the 559 Radiochemistry Laboratory. No anomalies occurred during analysis. All QA/QC was within limits.

Physical Description: Single phase transparent colorless non-viscous liquid.

Water Test	Positive	
pH	7.00	*Standard pH units*
Specific Gravity	0.9963	*Relative to water @ 20 C*
Miscibility	Water	
Water Reactivity	No	
Ignitability	NA, Aqueous Sample	*degrees C*
Chlorinated Solvents	NA, Aqueous Sample	*ppm*

Approval Roger C. Henderson

Peer Review John L. Turner

Friday, April 09, 1999

Page 1 of 1

5

B783, pit water

SIN # MTLS02-A2

FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 559 PA Inorganic Laboratories Sample No.: 3

Lab Sample ID: 99A6078-002 Bldg 783 Aqueous Sample

Section: ICPAES

Lab Sample I.D.s beginning with 'X' indicates TCLP Extract.

% Solids for Sample : <0.5

Date Sampled: 3/25/99 SDG No. : MAR26

Lab Receipt Date: 3/25/99 QC Report No.: SD032699.RPT

Matrix: Water ____ Soil ____ Sludge ____ Other X

Elements Identified and Measured

Concentration Units: mg/L

Analyte	Concentration	C	Q (N V * E O Q S +)	M
Aluminum	0.6388	B		P
Antimony	0.1000	U		P
Arsenic	0.1000	U		P
Barium	0.2461	B		P
Beryllium	0.0050	U		P
Cadmium	0.0200	U		P
Calcium	258.7743	B		P
Chromium	0.2545	B		P
Cobalt	0.0500	U		P
Copper	0.1000	U		P
Iron	0.6568	B		P
Lead	0.1263	B		P
Magnesium	105.6639	B	E	P
Manganese	0.0342	B		P
Molybdenum	0.4404	B		P
Nickel	0.0500	U		P
Phosphorus	0.5924	B		P
Selenium	0.1000	U		P
Silver	0.0300	U		P
Strontium	2.7883	B		P
Thallium	0.1000	U		P
Titanium	0.0200	U		P
Vanadium	0.2248	B		P
Zinc	0.2889	B		P

Color Before: Colorless Clarity Before: Clear

Color After: Colorless Clarity After: Clear

Texture:

Artifacts:

Comments: Sample < 0.50 % Solids. Total Metals Digestion only !

PRELIMINARY INFORMATION

256

B783, pit water

559 Laboratories Analytical Report

This report provides the user with alpha/beta analytical results produced by utilizing procedures L-4186 and L-4188. The error terms reported are two-sigma. The MDA is calculated using formalism developed by Currie. The LL or TRU indication certifies that the sample material meets either definition based on the sample containing greater or less than 100 nCi/g of transuranic activity. Further data and explanation can be provided upon request to the 559 Laboratories.

Sample Owner	Zbryk, K.	*Pager*	
Phone #	6647	*Company*	RMRS 779
APO Sample ID	99A6078-003.001	*Customer Sample ID*	
Date Received	3/25/99	*Sample Location*	783
Date Analyzed	4/9/99		
Date Reported	4/12/99		

Case Narrative This sample was analyzed in the 559 Radiochemistry Laboratory. No anomalies occurred during analysis. All QA/QC was within limits.

LL/TRU Classification: LL

Alpha	1.38E+02	+/-	4.28E+02	*Alpha MDA*	4.13E+02
Beta	3.49E+02	+/-	5.80E+02	*Beta MDA*	6.99E+02

9 X 10 - 9 g/L

Units: pCi/ l

Approval Ross A. Henderson

Peer Review

Monday, April 12, 1999

Page 1 of 1

257

B 783, pit water

559 Laboratories Analytical Report

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the Ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. The method has been approved by the APO on 6/19/1997.

Sample Owner	Zbryk, K.	*Company*	RMRS 779
APO Sample ID	99A6078-003.001		
Date Received	3/25/99		
Date Analyzed	4/9/99		
Date Reported	4/12/99		
Case Narrative	This sample was analyzed in the 559 Radiochemistry Laboratory. No anomalies occurred during analysis. All QA/QC was within limits.		
Physical Description	Single phase transparent colorless non-viscous liquid.		
Water Test	Positive		
pH	7.00	*Standard pH units*	
Specific Gravity	1.0063	*Relative to water @ 20 C*	
Miscibility	Water		
Water Reactivity	No		
Ignitability	NA, Aqueous Sample	*degrees C*	
Chlorinated Solvents	NA, Aqueous Sample	*ppm*	

Approval [signature]

Peer Review [signature]

Monday, April 12, 1999

Page 1 of 1

9

B 783, pit water

SIN # MTLS02-A2

FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 559 PA Inorganic Laboratories Sample No.: 4

Lab Sample ID: 99A6078-003 Bldg 783 Aqueous Sample

Section: ICPAES

Lab Sample I.D.s beginning with 'X' indicates TCLP Extract.

% Solids for Sample : <0.5

Date Sampled: 3/25/99 SDG No. : MAR26

Lab Receipt Date: 3/25/99 QC Report No.: SD032699.RPT

Matrix: Water ____ Soil ____ Sludge ____ Other X

Elements Identified and Measured

Concentration Units: mg/L

Analyte	Concentration	C	Q (N V * E O O S +)	M
Aluminum	0.7076	B		P
Antimony	0.1000	U		P
Arsenic	0.1000	U		P
Barium	0.2680	B		P
Beryllium	0.0050	U		P
Cadmium	0.0200	U		P
Calcium	256.3304	B		P
Chromium	0.2237	B		P
Cobalt	0.0500	U		P
Copper	0.1000	U		P
Iron	0.5626	B		P
Lead	0.0500	U		P
Magnesium	104.7683	B	E	P
Manganese	0.0341	B		P
Molybdenum	0.4386	B		P
Nickel	0.0500	U		P
Phosphorus	0.6054	B		P
Selenium	0.1000	U		P
Silver	0.0300	U		P
Strontium	2.7786	B		P
Thallium	0.1000	U		P
Titanium	0.0200	U		P
Vanadium	0.2252	B		P
Zinc	0.2932	B		P

Color Before: Colorless Clarity Before: Clear

Color After: Colorless Clarity After: Clear

Texture:

Artifacts:

Comments: Sample < 0.50 % Solids. Total Metals Digestion only !

PRELIMINARY INFORMATION

259

B783, pit water

559 Laboratories Analytical Report

This report provides the user with alpha/beta analytical results produced by utilizing procedures L-4186 and L-4188. The error terms reported are two-sigma. The MDA is calculated using formalism developed by Currie. The LL or TRU indication certifies that the sample material meets either definition based on the sample containing greater or less than 100 nCi/g of transuranic activity. Further data and explanation can be provided upon request to the 559 Laboratories.

Sample Owner	Zbryk, K.	*Pager*	
Phone #	6647	*Company*	RMRS 779
APO Sample ID	99A6078-004.001	*Customer Sample ID*	
Date Received	3/25/99	*Sample Location*	783
Date Analyzed	4/9/99		
Date Reported	4/12/99		

Case Narrative This sample was analyzed in the 559 Radiochemistry Laboratory. No anomalies occurred during analysis. A blank was run with normal results. All QA/QC was within limits.

LL/TRU Classification: LL

Alpha	4.33E+02	+/-	4.94E+02	*Alpha MDA*	3.71E+02
Beta	1.67E+02	+/-	5.90E+02	*Beta MDA*	8.92E+02

1.5 E-8

Units: pCi/ l

Approval Ron A Henderson

Peer Review

260

B783, pit water

559 Laboratories Analytical Report

This report provides fingerprint data for a sample analyzed per procedure L-4178. Requirements per Module SS08-A are included. The method used for the determination of the ignitability characteristic does not currently comply with 40 CFR 261.21. A Miniflash instrument is used to determine the ignitability characteristic. Comparison data has been generated which demonstrate acceptable comparability of the Miniflash method with the approved Setaflash method. The method has been approved by the APO on 6/19/1997.

Sample Owner	Zbryk, K.	*Company*	RMRS 779
APO Sample ID	99A6078-004.001		
Date Received	3/26/99		
Date Analyzed	4/9/99		
Date Reported	4/12/99		

Case Narrative: This sample was analyzed in the 559 Radiochemistry Laboratory. No anomalies occurred during analysis. A blank was run with normal results. All QA/QC was within limits.

Physical Description: Single phase transparent colorless non-viscous liquid.

Water Test	Positive	
pH	7.00	*Standard pH units*
Specific Gravity	0.9972	*Relative to water @ 20 C*
Miscibility	Water	
Water Reactivity	No	
Ignitability	NA, Aqueous Sample	*degrees C*
Chlorinated Solvents	NA, Aqueous Sample	*ppm*

Approval

Peer Review

Monday, April 12, 1999

Page 1 of 1

261

B783, pit water

SIN # MTLS02-A2

FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 559 PA Inorganic Laboratories Sample No.: 6

Lab Sample ID: 99A6078-004 Bldg 783 Aqueous Sample

Section: ICPAES

Lab Sample I.D.s beginning with X' indicates TCLP Extract.

% Solids for Sample : <0.5

Date Sampled: 3/25/99 SDG No. : MAR26

Lab Receipt Date: 3/25/99 QC Report No.: SD032699.RPT

Matrix: Water ____ Soil ____ Sludge ____ Other X

Elements Identified and Measured

Concentration Units: mg/L

Analyte	Concentration	C	Q (N V 1 E O O S +)	M
Aluminum	0.6269	B		P
Antimony	0.1000	U		P
Arsenic	0.1000	U		P
Barium	0.2648	B		P
Beryllium	0.0050	U		P
Cadmium	0.0200	U		P
Calcium	260.5905	B		P
Chromium	0.2393	B		P
Cobalt	0.0500	U		P
Copper	0.1000	U		P
Iron	0.6835	B		P
Lead	0.0578	B		P
Magnesium	106.3251	B	E	P
Manganese	0.0354	B		P
Molybdenum	0.4432	B		P
Nickel	0.0500	U		P
Phosphorus	0.6422	B		P
Selenium	0.1000	U		P
Silver	0.0300	U		P
Strontium	2.8173	B		P
Thallium	0.1000	U		P
Titanium	0.0200	U		P
Vanadium	0.1928	B		P
Zinc	0.3318	B		P

Color Before: Colorless Clarity Before: Clear

Color After: Colorless Clarity After: Clear

Texture:

Artifacts:

PRELIMINARY INFORMATION

Comments: Sample < 0.50 % Solids. Total Metals Digestion only !

262

Commodore Advanced Sciences, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 99A6078#001

Page 1 of 1

Collector: Hershey 516927/Jurnigard	Contact/Requester: ZBRYK, KATHY	Telephone No.: 6647 MSIN FAX
RIN: 99A6078	Sampling Origin: Bldg 783 Towers	Purchase Order/Charge Code: KT95AA00
Project Title: NA	Logbook No.: Vehicle-92-VAN	Ice Chest No.: N/A Temp.
To (Lab): Building 559 Laboratory	Method of Shipment: Vehicle	Bill of Lading/Air Bill No.: NA
Protocol: N/A		Offsite Property No.: NA

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐
Please FAX RADSCREEN RESULTS TO 3308
thanks! jen

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
99A6078-001.002	N/A	AQUEOUS	3/25/99	9:00	BLDG 783	125-ML P/G	RS05A021 (Mtls w/o Hg Unfiltered SW846) [Priority]	HN03 None
99A6078-001.001		AQUEOUS			BLDG 783	40-ML G	PA03A005 (Fingerprint) [Priority]; PA04A013 (Alpha/Beta Radscreen) [Priority]	None 4 degrees C
99A6078-002.002		AQUEOUS			BLDG 783	125-ML P/G	RS05A021 (Mtls w/o Hg Unfiltered SW846) [Priority]	HN03 None
99A6078-002.001		AQUEOUS			BLDG 783	40-ML G	PA03A005 (Fingerprint) [Priority]; PA04A013 (Alpha/Beta Radscreen) [Priority]	None 4 degrees C
99A6078-003.002		AQUEOUS			BLDG 783	125-ML P/G	RS05A021 (Mtls w/o Hg Unfiltered SW846) [Priority]	HN03 None
99A6078-003.001		AQUEOUS			BLDG 783	40-ML G	PA03A005 (Fingerprint) [Priority]; PA04A013 (Alpha/Beta Radscreen) [Priority]	None 4 degrees C
99A6078-004.002		AQUEOUS			BLDG 783	125-ML P/G	RS05A021 (Mtls w/o Hg Unfiltered SW846) [Priority]	HN03 None

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Jurnigard CAS	3/25/99 1125	LB Johnson	3/25/99 1125				
LB Johnson	3/25/99 1125	Frig 102	3/25/99 1125				

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

7

263

Commodore Advanced Sciences, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 99A6078#001

Page 2 of 2

RIN 99A6078

Contact/Requestor ZBRYK, KATHY

Telephone No. 6647 MSIN FAX

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
99A6078-004.001	N/A	AQUEOUS	3/25/99	9:00	BLDG 783	40-ML G	PA03A005 (Fingerprint) [Priority]; PA04A013 (Alpha/Beta Radscreen) [Priority]	None 4 degrees C

JSW 3/25/99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Winyard CAS	3/25/99 11:25	LB Johnson	3/25/99 1125				
LB Johnson	3/25/99 1125	Frig 102	3/25/99 1125				

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

8

264

APPENDIX J

MSDS FOR SOIL SEMENT

MIDWEST INDUSTRIAL SUPPLY, INC.
P. O. BOX 8431
CANTON, OHIO 44711 U.S.A.

Emergency Phone Numbers: 330-456-3121
If no answer: 330-453-0666 or 330-862-3712

SOIL-SEMENT®

Dust and Erosion Control Agent

MATERIAL SAFETY DATA SHEET

SECTION I -- IDENTIFICATION OF SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

TRADE NAME:	SOIL-SEMENT®
CHEMICAL NAME:	POLYMER EMULSION
SYNONYMS:	DUST RETARDANT
CHEMICAL FAMILY:	N/A
MOLECULAR WEIGHT:	N/A
FORMULA:	AQUEOUS ACRYLIC VINYL ACETATE POLYMER EMULSION
CAS REGISTRY NO.:	PRODUCT A BLEND - NO NUMBER ASSIGNED

SECTION II -- COMPOSITION/INFORMATION ON INGREDIENTS

NAME	CAS REG NO.	WT. %
Acrylic & Vinyl Acetate Polymer	Non-hazardous	5-50
Water	7732-18-5	95-50

SECTION III -- HAZARDS IDENTIFICATION

Acrylic & Vinyl Acetate Polymer	Non-hazardous
Water	Non-hazardous

SECTION IV -- FIRST AID MEASURES

EYES:	Flush eyes with flowing water at least 15 minutes, get medical attention.
INHALATION:	Move subject to fresh air.
SKIN:	Flush with large amount of water or wash with soap and water.
INGESTION:	Give water to drink. Call a physician.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS *UNCONSCIOUS OR HAVING CONVULSIONS.*

266

MIDWEST INDUSTRIAL SUPPLY, INC.
P. O. BOX 8431
CANTON, OHIO 44711 U.S.A.

Emergency Phone Numbers: 330-456-3121
If no answer: 330-453-0666 or 330-862-3712

SECTION V -- FIRE FIGHTING MEASURES

FLASH POINT (TEST METHOD):	Non-Combustible
AUTOIGNITION TEMPERATURE:	N/A
EXTINGUISHING MEDIUM:	N/A
SPECIAL FIREFIGHTING PROCEDURES:	N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Material can splatter above 212°F. Dried polymer film can burn but will not support combustion.

SECTION VI - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK PROCEDURES: Dike and control spill. Transfer liquid to containers for recovery or disposal. Keep spills out of sewers and open bodies of water.

SECTION VII -- HANDLING AND STORAGE

STORAGE:	Keep in a cool, dry, ventilated storage area and in closed containers. Avoid freezing temperatures. Minimize contact with the air to prevent microorganism contamination and reduce the formation of skins on the surface.
HANDLING:	Handle in a well ventilated work space.

SECTION VIII -- EXPOSURE CONTROL/PERSONAL PROTECTION

RESPIRATORY PROTECTION:	None required if good ventilation is maintained.
VENTILATION:	Mechanical exhaust at point of contaminant.
EYE PROTECTION:	Chemical splash, goggles recommended.
PROTECTIVE CLOTHING:	Impervious gloves recommended.
OTHER:	Under normal handling conditions, the risk of exposure to residual monomer is negligible.

267

BOILING/MELTING POINT @ 760 mm Hg:	212°F
VAPOR PRESSURE mm Hg @ 20°C:	17
SPECIFIC GRAVITY OR BULK DENSITY:	1.01 to 1.15
SOLUBILITY IN WATER:	Dilutable
APPEARANCE:	Milky White Liquid
ODOR:	Characteristic Acrylic odor
pH:	4.0 to 9.5

SECTION X -- STABILITY AND REACTIVITY

STABILITY:	Stable
CHEMICAL INCOMPATIBILITY:	No hazardous reactions are expected to occur under normal industrial conditions.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide and water.
HAZARDOUS POLYMERIZATION:	Does not occur
CONDITIONS TO AVOID:	N/A
CORROSIVE TO METAL:	No
OXIDIZER:	No

SECTION XI -- TOX ICOLOGICAL INFORMATION

EFFECTS OF OVEREXPOSURE

INHALATION:	Vapor from stored, undiluted product can cause headache and nausea.
SKIN:	Stored, undiluted product is slightly irritating to skin.
EYES:	Slightly irritating to eyes.
INGESTION:	May be irritating to digestive tract.

	OSHA		ACGIH	
NAME	TWA	STEL	TWA	STEL
Acrylic & Vinyl Acetate Polymer	None	None	None	None
Water	None	None	None	None

SECTION XII -- ECOLOGICAL INFORMATION

268

Animal toxicity studies on blended SOIL-SEMENT® have not been carried out because we believe the fish toxicity studies done on the blend demonstrate it is as non-toxic as the individual emulsions which go into the blend. TABLE #1 gives the results of our fish toxicity tests.

In summary, these data show that the LC_{50} of SOIL-SEMENT® on goldfish is somewhere above 12,500 ppm. This is extremely low toxicity, especially in view of the legal requirement that chemicals must be labeled "toxic to fish" only if their LC_{50} is less than 1.0 ppm.

TABLE I

FISH TOXICITY STUDIES			
EMULSION NUMBER	**TYPE OF FISH**	**HOURS**	**LC_{50} PPM**
C	Rainbow Trout	24	10,000
C	Rainbow Trout	96	8,950
C	Bluegill Sunfish	24	10,000
C	Bluegill Sunfish	96	5,640
C	Goldfish	24	4,200
H	Goldfish	24	7,500
G	Goldfish	24	10,000
D	Goldfish	24	13,400
F	Goldfish	24	13,400
SOIL-SEMENT®	Goldfish	24	12.500 - 25,000
SOIL-SEMENT®	Goldfish	48	12,500 - 25,000
SOIL-SEMENT®	Goldfish	72	12,500 - 20,000
B	Goldfish	24	24,000
E	Goldfish	24	24,000

The 48 hour LC_{50} for Daphnia Magna based on nominal test concentrations and mortality at the end of testing was calculated to be 3,482.8 parts per million (ppm).

SECTION XIII -- DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:

Coagulate the emulsion by the stepwise addition of ferric chloride and lime. Remove the clear supernatant liquid and flush to a chemical sewer or landfill. Incinerate solids and the contaminated diking material according to local, state and federal regulations.

CONTAINER DISPOSAL:

Do not re-use containers. Do not weld on metal containers.

SECTION XIV -- TRANSPORTATION INFORMATION

D.O.T. PROPER SHIPPING NAME (49CFR172.101):	None
HAZARDOUS SUBSTANCE (40CFR116):	N/A
REPORTABLE QUANTITY (RQ):	N/A
D.O.T. HAZARD CLASSIFICATION (49CFR172.101):	Non-regulated
D.O.T. PLACARDS REQUIRED:	None
POISON CONSTITUENT (49CFR173.343):	N/A
BILL OF LADING DESCRIPTION:	Liquid plastic, NOS
C NO.:	N/A
UN/NA CODE:	N/A

SECTION XV-- REGULATORY INFORMATION

SOIL-SEMENT® is not a restricted article according to the Department of Transportation and International Air Transport Association regulations.

EPA SARA Title III hazard class:	None
OSHA HCS hazard class:	Non-OSHA hazardous (29CFR1910.1200)
EPA SARA Title III Section 313 (40CFR372) Toxic Chemicals present in quantities greater than the "de minimus" level are:	None

This product is not a "controlled product" under the Canadian Workplace Hazardous Material Information System (WHMIS)

SECTION XVI -- OTHER INFORMATION

ABBREVIATIONS AND SYMBOLS:

N.D. - Not Determined
N.A. - Not Applicable
N.T. - Not Tested
< - LESS THAN
> - MORE THAN

270

APPENDIX K

LESSONS LEARNED

1. Memo, Glovebox Operations in Rooms 154 and 160.
2. Memo, Waste Crate Movement.
3. Summary of All Hands Meeting.
4. Memo, Lessons Learned Meeting.
5. Memo, Glovebox Training (GB-225).
6. Memo, Glovebox 2115 and Glovebox 6120 Removal.
7. Memo, PIGMA Welder.
8. Memo, Glovebox Removal, Room 222
9. 779 Closure Project Health and Safety Notes.
10. Presentation, Lessons Learned Review.
11. Building 779 Cluster Final Status Survey.

Safe Sites OF COLORADO, L.L.C.

INTEROFFICE CORRESPONDENCE

DATE: October 13, 1997

TO: Distribution

FROM: L. A. Pasquini, 779/886 Closure Proj, Bldg. 779, X3201

SUBJECT: LESSONS LEARNED 779 PROJECT - LAP-157-97

Ref: Occurrence Report RFO--KHILL-779 OPS - 1997-0024

Attached is Building 779 Lessons Learned No 1997-0004 regarding a contamination incident after completion of glovebox operations in Rooms 154 and 160 in Building 779. If you have any questions regarding this occurrence, you can contact J. J. Mackin at extension 8103, Pager 1702.

RGW:ras

Attachment:
As Stated

Distribution:

C.	A.	Baker	SSOC
P.	J.	Boomgaard	SSOC/LATA
S.	J.	Bruske	SSOC
S.	M.	Buescher	"
P.	B.	Chadley	"
J.	L.	Davila	SSOC
D.	C.	Del Vecchio	SSOC
K.	J.	Falls	"
G.	L.	Fischer	SSOC/LATA
D.	G.	Hamrick	SSOC
D.	I.	Hunter	"
D.	S.	Hyder	"
S.	P.	Klover	LATA
J.	J.	Mackin	SSOC
T.		Moleff	"
M.	P.	Rodriquez	"
K.	E.	Ryan	"
S.	M.	Sax	"
A.	W.	Smith	SSOC/LATA
C.	J.	Stieff	SSOC
J.	E.	Truax	SSOC
H.	C.	Wolf	"

cc:

R.	F.	Bacon	SSOC
M.	J.	Bullock	K-H
P.	B.	Clark	LATA
R.	L.	Dichard	K-H
R.	E.	Kell	K-H
M.	K.	Korenko	SSOC
R.	D.	Raaz	"
D.	J.	Swaim	"
R.	G.	Wilson	"
K.	Z.	Wolf	"

Lessons Learned 779-0004

Modesty Clothing Discovered Contaminated
Occurrence Report RFO–KHLL-779OPS-1997-0024

On 9/18/97, at approximately 1630 hours, after completion of glovebox operations in Rooms 154 and 160, an Experimental Operator (EO) self monitored and discovered contamination on the exterior of anti-contamination clothing. A Radiological Control Technician (RCT) was called who performed a full body frisk and confirmed 3500 disintegrations per minute (dpm) per 100 centimeters squared (cm2) of alpha contamination on the exterior of the anti-contamination clothing. The EO Supervisor, assisting with the same operation, was found to have 1100 dpm per 100 cm2 on modesty clothing and 400 dpm on paperwork that was being hand carried. The Supervisor's contamination was discovered at the step-off pad.

The Shift Manager was immediately notified who terminated glovebox operations in Building 779 and posted the two rooms for respiratory protection. Other personnel involved in the same operations were monitored with no contamination identified. The two rooms were surveyed and high volume air samples were taken to determine the extent of contamination. Surveys identified 6,000 dpm in Room 154, on Glovebox 1364 gloves. 2,000 dpm was found in Room 160 on Glovebox 865 gloves and 800 dpm located on the floor. The high volume air sampler and fixed air heads in Rooms 160 and 154 did not indicate elevated contamination levels. The source of the contamination was later identified to be a pin-hole in each of two gloves located on Glovebox 1364. The contamination was then tracked to Room 160, where the EO entered Glovebox 865 gloves. Extensive surveys were taken in adjoining hallways and other suspect rooms (pathway the EO had taken) with no further contamination found. Precautionary nasal smears were taken on the employees involved with no detectable levels of contamination found. The contaminated areas were deconned and the two degraded gloves on Glovebox 1364 were replaced.

Fact-Finding and Corrective Action Meetings were held on Monday, 9/22/97, to determine the facts and corrective actions necessary to prevent recurrence. Glovebox operations were suspended until all gloveboxes in Building 779 were resurveyed and released by the Radiological Control Technicians (RCTs). The corrective actions are summarized below:

Short Term Corrective Actions

- Verify that the combos and alpha mets used during this incident were operable and in-service. Completed.
- Determine the age of the gloves currently in-use on Glovebox 1364, Room 154. Completed.
- Issue a Lessons Learned regarding cross contamination and the importance of utilizing correct surveying techniques. Completed.
- Conduct a briefing for all building personnel regarding the "Lessons Learned" from this incident. Completed.
- Replace the 2 degraded gloves on Glovebox 1364. Completed.
- Re-survey all gloveboxes in Building 779 before operators are allowed in the gloves. Completed.
- Remove the glove port covers from Glovebox 1364. Completed.

Long Term Corrective Actions

- Evaluate the practice of taking off personal articles at the step-off pad before monitoring.

Several important lessons were learned as a result of this occurrence regarding the importance of attention to detail and adequate administrative controls. Because deactivation activities in Building 779 involve entering gloveboxes which may have been unused for long periods of time, it is critical to raise the worker awareness to expect possible degradation of the glovebox gloves and to use strict attention to detail when working with these gloves.

Strict attention to detail is mandatory by personnel entering gloves which may have aged and been on gloveboxes for long periods of time. Both operators utilizing the gloves and RCTs surveying the gloves should expect degradation and treat the gloves with that in mind. To prevent further contamination from possibly degraded gloves, glovebox entry was prohibited in Building 779 until each glovebox was resurveyed and released by the RCT. The RCT performed a thorough survey of the gloveboxes including surveying between the glove fingers where degradation is most likely to occur. Additionally, the glove port covers were surveyed, proving that they also were a source of hidden contamination. The contaminated port covers were removed and packaged as contaminated waste per plant procedures. The remaining port covers were removed to prevent further hidden contamination problems.

Enhanced awareness by the operator must be used while self monitoring when exiting glovebox gloves. Past contamination problems in Room 154 were known because of the properties associated with hydride operations in Glovebox 1364. On 9/18/97, upon exiting Glovebox 1364, the EO monitored his hands on the alpha met after removing his hands from each glove. The EO then proceeded to the combo located outside Room 154. Finding no contamination at the alpha mets or the combo, the EO then proceeded to Room 160, where he entered the gloves in Glovebox 865. Upon finishing his work, he exited the gloves and checked his hands on the alpha met located on Glovebox 865. Again, finding no contamination, he proceeded to the combo located at the entrance of Room 160. This time, however, contamination was detected at the combo and he called for a RCT who performed a full body frisk. The RCT identified 3500 dpm of alpha contamination on the EO's anti-contamination clothing. While the EO had used the alpha met and combo to self monitor, he did not pick up any contamination until frisking himself for the fifth time. It is possible for alpha particles to become entrapped between the folds of anti-contamination clothing. It is very important, therefore, to monitor slowly and ensure every fold of clothing is adequately monitored. Additionally, it is important to monitor between the glove fingers where contamination is most likely to occur.

To assure the operability of the instruments used by the EO, the in-service dates were verified current as a corrective action. Operability checks are performed daily with a source check in Building 779 by an independent organization. No discrepancies were found. To disseminate the importance of attention to detail by all personnel entering gloves and all RCTs surveying gloveboxes, a "Lessons Learned" briefing was developed and implemented to building personnel. Additionally, the "Lessons Learned" memo is being distributed to Site personnel who may benefit most from the information.

Adequate administrative control is mandatory to effectively control contamination especially in the era of deactivation which includes the unexpected or unknown. The manufacture date of the degraded gloves on Glovebox 1364 was 1992. With no required formal system at the Site to inspect or periodically change out glovebox gloves it is critical for each glovebox worker to personally inspect gloves prior to using them. It is especially important to inspect for contamination, degradation, and manufacturing dates. If a glove is suspect, they should be replaced with new gloves prior to working in the glovebox. Finally, the current practice of taking off personal articles at the step-off pad is being evaluated to determine its adequacy. The Supervisor may have cross-contaminated her modesty clothing with the contaminated paperwork while self monitoring. For radiological controls to prove effectual, administrative controls must be adequate and strictly followed by personnel.

Safe Sites OF COLORADO

INTEROFFICE CORRESPONDENCE

DATE: October 22, 1997

TO: Distribution

FROM: J. J. Mackin, Facility Manager, SSOC, Building 779, X8103

SUBJECT: LESSONS LEARNED: LOW-LEVEL WASTE CRATE MOVED VIA FORKLIFT NOT ACCORDING TO PROCEDURE, [redacted]

LESSONS LEARNED:

When interpreting the requirements of the Rocky Flats Transportation Safety Manual, personnel should be aware that the transportation definition of Hazardous Materials, unlike the Resource Conservation Recovery Act (RCRA) definition, includes radioactive as well as other hazardous materials. This definition, therefore, prohibits transportation of low-level radioactive waste crates between buildings via forklifts.

Violation: On September 30, 1997, during a procedure review by Facility Management, it was determined that a procedural violation had occurred when a low-level radioactive waste crate was transported between Buildings 779 and 776 using a forklift. The Onsite Transportation of Hazardous and Radioactive Materials Manual, 1-T93-TRAFFIC-110, prohibits the use of forklifts for transporting hazardous materials over or across roadways shared with vehicular traffic.

Background:

The low-level waste crate was scheduled to be transported via a closed truck at 0830 hours on 9/30/97; the truck did not arrive as scheduled. Trucking was rescheduled for 1330 hours that afternoon but again did not arrive as scheduled. Facility Management requested assistance from the responsible site organization to aid in transporting the waste crate. Because several roads were closed which limited trucking from entering the Protected Area (PA), Facility Management asked the Traffic authorities if they could move the waste crate via a forklift to the receiving building, which was nearby.

Upon verifying that a qualified forklift operator was available and the waste crate was low-level radioactive waste and not hazardous (per RCRA) , the Traffic authorities concurred with Facility Management that moving waste crates was an acceptable past practice at the Site. Facility Management interpreted this information to mean they had the authority to move the waste crate from Building 779 to Building 776 via the forklift. The crate was then moved via a forklift by a qualified forklift operator with the use of spotters.

After the waste crate was transported via the forklift, further review of the Rocky Flats Transportation Safety Manuals by Facility Management, revealed that the manual definition of hazardous material

included radioactive material (see Transportation Manual, 1-T91-TRAFFIC-100, Section 4, Definitions). Specifically, the definition says, "Hazardous material ... is an all-inclusive term which covers radioactive and other hazardous materials... . When asked by the Traffic authorities if the waste crate was hazardous, Facility Management, however, used the common and known definition as defined by the Resource Conservation Recovery Act (RCRA). Hazardous waste per RCRA as cited in the 1-C75-HWRM-03, Hazardous Waste Requirements Manual is defined as any solid waste or waste-like material that exhibits a hazardous characteristic identified in the regulations (Code of Colorado Regulations, 6 CCR 1007-3) or that is specifically listed as a hazardous waste in the regulations. Because the low-level waste crate was not defined hazardous by the RCRA definition, the interpretation by Facility Management was that the crate was not, in fact, hazardous when referring to it in regards to transportation policies at the Site.

Root and Direct Cause: Policy not adequately defined, disseminated, or enforced.

Section 5.3, Loading/Unloading and Tie-Down, of the On-Site Transportation of Hazardous and Radioactive Materials Manual provides specific instructions under the Note on Page 15: Forklifts shall not be used as a means for transporting hazardous materials over or across roadways shared with vehicular traffic. Facility Management used the commonly known RCRA definition to interpret that the low-level radioactive waste crate was not hazardous, but indeed, was radioactive. The note was determined to apply to hazardous materials and, therefore, not radioactive materials. The definition section in the On-Site Transportation of Hazardous and Radioactive Materials Manual refered the user back to the Rocky Flats Dictionary and Section 4 of the Transportation Manual, 1-T91-Traffic-100. While this procedure was also contained as a procedure in the Rocky Flats Transportation Safety Manuals, it was a stand alone procedure. As a corrective action, a lessons learned memo has been disseminated to appropriate personnel who may engage in similar transporting activities. Additionally, the On-Site Transportation of Hazardous and Radioactive Materials Manual is being revised to clarify the definition of hazardous materials. It is critical that the procedure clearly states that the requirement for movement by a closed truck (not forklift) applies to both hazardous and radioactive material.

Corrective Actions Taken or Planned:

1. Develop and disseminate a "Lessons Learned" memo emphasizing the importance of researching all applicable procedures before transporting low-level radioactive waste.

2. Revise the On-Site Transportation of Hazardous and Radioactive Materials Manual to clarify definition of hazardous materials (specifically, that hazardous materials includes radioactive material).

Distribution:

C. A. Baker	SSOC
P. J. Boomgaard	SSOC/LATA
S, J, Bruske	SSOC
S. M. Buescher	SSOC
P. B. Chadley	SSOC
J. L. Davila	SSOC
D. C. DelVecchio	SSOC
K. J. Falls	SSOC
G. L. Fischer	SSOC/LATA
D. G. Hamrick	SSOC
D. I. Hunter	SSOC
D. S. Hyder	SSOC
S. P. Klover	LATA
J. J. Mackin	SSOC
T Moleff	SSOC
M. P. Rodriquez	SSOC
K. E. Ryan	SSOC
S. M. Sax	SSOC
A. W. Smith	SSOC/LATA
C. J. Stieff	SSOC
J. E. Truax	SSOC
H. C. Wolf	SSOC

cc:

R. F. Bacon	SSOC
M. J. Bullock	K-H
P. B. Clark	LATA
R. L. Dichard	K-H
R. E. Kell	K-H
M. K. Korenko	SSOC
R. D. Razz	SSOC
D. J. Swaim	SSOC
R. G. Wilson	SSOC
K. Z. Wolf	SSOC

PRACTICES TO BE IMPROVED UPON TO INCREASE SAFETY:

- Ensure First-line Management does not allow practices that may result in an injury by their personnel they are supervising.
- Have Superintendents and Foreman of Building Trades be RFETS trained to ensure they know the requirements of the Site (i.e., following work packages, following safety practices already identified through Lessons Learned, etc.). Make training for Superintendents and Foreman of Building Trades more rigorous to ensure they understand IWCP process, etc.
- Increase awareness of RFETS first-line managers to the conditions of demolition (i.e., increased dust); and increase awareness of Trades to the hazards present at RFETS and the requirements in place to protect them and the environment (i.e., metals like mercury, corrosive chemicals, IWCP packages, etc.)
- Temper the last minute pushing so hard for Performance Measures.
- Follow IWCP packages accurately
- Although we have policies against unsafe acts, it doesn't appear that we enforce them on the same plane that we enforce training no shows, traffic violations, etc.

SAFE PRACTICES OBSERVED:

- Craft very good about coming and questioning if they do not know if they are doing something the correct way, or if a forklift is operable, etc.
- Trades will come and question if they do not know if a metal is hazardous, etc.

ARE PERSONNEL AWARE OF SAFETY INDICATORS:

- Stop signs grab attention
- Rewarding with donuts when no first aids is a very good indicator and grabs attention. Suggest though that in All Hands, do a slide that shows the occurrences, and indicate period that their performance is being rewarded.
- Safety Indicators are published on the boards, but do not mean as much. Charts do not mean as much
- Personnel do hear about Site accidents through Lessons Learned, ISM board, etc.

PRACTICES TO BE IMPROVED UPON:

- Site communication and integration of communication between companies. Used to have a vehicle to pass out information for Site employees about where to go for information, etc. No such vehicle is being used throughout plantsite anymore. Inadvertently step on another person's jurisdiction, but not made aware of the requirement.
- IWCP Procedure has just been revised, but the JHIT is too restrictive, accomplished too early in the planning process, and not functional. AHA more in tune to actual work being done.
- The way the Plant handles the First Aid situation. It is a requirement to send each hang-nail and scratch to Medical for a first aid (even though individual may have done at home). It may become a vehicle for a person to get out work for an afternoon, if they are so inclined.

SPECIFIC SAFETY CONCERNS FOR 779 AREA:

- Movement of Pedestrian Access Gate to west side causing issues:
  - Ensure exterior 705 light on to illuminate pathway for walking from guard shack to work
  - Put more sand/gravel around guard shack, muddy and slippery
  - Water downspout from 778 pushes water across the road between 778 and 705, very slippery in winter and snow.
- Slow down forklift
- Slow down security vehicles
- Correct poor housekeeping that is occurring in B779.
- Work on communicating two different cultures to workers:
  - The Construction culture that is dusty and "bang and go"
  - The RFETS site culture that is clean and neat because of working around GBs and hazardous items.

GENERAL COMMENTS:

- Working safety is each individual's personal responsibility. Do not always blame on someone or something else
- Work on Site communication, and general communication.

779 Closure Project Lessons Learned

- 779 Lessons Learned
- Rocky Flats Lessons Learned
- DOE Lessons Learned
- Project Status
- Project Goals

281

Safety Fact Finding
Lessons Learned Meeting
January 27, 1998
779 Closure Project

Background of Task and Activity

As three workers were loading stainless steel plates on and off of cart, the worker steering the cart attempted to move the cart closer to the work location, however, the other two workers were unaware of this movement and as they turned around, the plate was falling and the two workers attempted to catch the plate causing hand bruising and smashing of a thumb.

PPE Utilized

Safety glasses with side shields
Leather gloves
Normal work coveralls
Safety shoes

Extent of Injury

One worker smashed his thumb and one worker bruised his upper hand when attempting to catch falling plates. This was a medical first aid and no restrictions were warranted.

Root Causes

Lack of communication between workers

Need additional person to help unload plate

Uneven pavement causing cart to move

Wheels on cart swivel causing cart to tilt

Corrective Actions

A fourth person is to be utilized to help move plates (Implemented)
A forklift is now used to move plates in a lot of cases
Communications and attention to detail will be continually improved by awareness programs (Implemented)
Utilize C-Clamp on carts (Implemented)
Inspect and evaluate utilizing different cart
Ensure pre-evolution briefings include cold side work
Tape metal edges of sheet metal (Implemented)

Safety Fact Finding
Lessons Learned Meeting
February 10, 1998
779 Closure Project

Background of Task and Activity

As workers were placing non skid material on plates on the floor in the 779 annex hallway, one worker who was bending down stood quickly up and bumped his head on an electrical box. This resulted in the worker receiving three stitches in the head region.

PPE Utilized

Safety glasses with side shields
Leather gloves
Normal work coveralls
Safety shoes

Extent of Injury

One worker received three stitches in his head as a result of hitting his head on the electrical box. This was a recordable injury, however no work restrictions were placed on the individual.

Root Causes

Lack of communication among workers

Workers not aware of surrounding conditions

No bump caps or hard hats utilized

Buddy system not utilized fully

Corrective Actions

Possible use of safety monitors for each work crew
Utilize the buddy system more effectively
Utilize hard hats or bump caps
Pad electrical panels and boxes

Safety Fact Finding
Lessons Learned Meeting
February 18, 1998
779 Closure Project

Background of Task and Activity

As workers were uncoupling pipe pieces with a crescent wrench, problems were encountered during the uncoupling phase and the two workers decided to leave the work area and regroup. As the workers were getting out of their crouched positions, one worker hit his head on a piece of support metal attached to the glove box. This resulted in the one worker receiving a laceration on his head. No stitches or restrictions were required.

PPE Utilized

Safety glasses with side shields
Leather gloves
Normal work coveralls
Full set of anti-c clothing (Excluding respirators)
Safety shoes

Extent of Injury

The one affected worker was taken to medical, examined and released.

This was a first aid injury, and no work restrictions were placed on the individual.

Root Causes

Glovebox edges and support pieces not taped or covered

Lack of communication among workers

No bump caps or hard hats utilized

Workers not aware of surrounding conditions

Buddy system not utilized fully

Corrective Actions

Utilize the buddy system more effectively
Utilize hard hats or bump caps
Pad sharp edges on glovebox and support pieces
Improve IWCP walk downs to identify sharp edges and support pieces attached to the glove boxes and other hazards in the immediate work area

SS-98-010.10

OF COLORADO LLC

LESSON LEARNED:
Fall protection planning does no good if the worker doesn't apply it on the job.

Lesson Learned Number: SSOC -98-003 **Date:** February 10, 1998

Description of Event:

A maintenance electrician was standing on top of an 8-foot high control cabinet, without fall protection, pulling wire through a conduit when he lost his balance. He grabbed a fire sprinkler pipe for support, but it gave way, and he fell from the cabinet, severely spraining his ankle.

At a Fact Finding Meeting on the incident, the following information was provided:

- The work package contained directions on the use of fall protection.
- A Job Hazard Analysis identified the need to evaluate the need for fall protection.
- Although no Pre-Evolution Brief was given on the day of the incident because the same people were continuing the work, a pre-job brief was given at the job site that included fall protection/harness tie-off requirements. The worker that fell did not attend the brief.
- Fall protection equipment was in the room and available to the worker.
- The wire being pulled was the last one to complete the job.
- The worker was aware of fall protection requirements, but chose to ignore them as he focused on getting the job done.

Follow-up Actions:

All facilities conducted a review of current maintenance and construction projects with respect to fall protection and work at elevated heights. Deficiencies found include the following:

- Toe boards missing from scaffolds.
- Fixed ladders not installed on scaffolds.
- Hard hat areas not properly posted.
- Ladders not properly stowed when not in use.

LESSONS LEARNED STATEMENT:

Safety is a constant. It must be on everyone's mind, all the time. This incident is a good example of the worker losing focus on safety for just a short period of time, but the result was an injury that could have been much more serious. Safety awareness must remain at the forefront, from initial planning to the completion of the job---no exceptions allowed.

5

285

Lessons Learned / Generic Implications

KAISER • HILL

INFORMATION DISTRIBUTION

Date: 2/24/98

Document ID: GMV-066-98 (2-15)

SD-98-571

Subject: HYDROGEN GENERATION IN NON-RADIOACTIVELY CONTAMINATED ACID SYSTEMS

ACID SOLUTIONS REACT WITH STAINLESS STEEL TO GENERATE HYDROGEN

Description:

Recently, in Building 771, an explosive concentration of hydrogen was discovered in a piping system which had been operationally empty and stagnant for 20 years. In this case, a chemical/corrosion reaction involving oxalic acid with stainless steel pipe generated hydrogen.

Specifically, during a Tap and Drain operation of an oxalic acid piping system in Building 771, hydrogen in excess of 20% was unexpectedly encountered during the draining. Facilities should use the provisions of Standing Order 40, Hydrogen Control Safety Requirements, when breaching any acid system piping.

Acid dissolution of stainless steel occurs relatively slowly; however, the stagnant conditions which existed for a long period of time in Building 771 were sufficient to generate hydrogen. Even weak acid solutions in stagnant dead legs (e.g., .5N oxalic acid) can lead to hydrogen generation over a period of time.

Generic Implications / Lessons Learned:

Acid allowed to set stagnant in stainless steel lines can generate hydrogen over a period of time.

Utilization of chemical experts during planning processes may reduce the potential of encountering unexpected hazards.

Questions? Contact K-H LL/GI Program Personnel: Jim McLaughlin, X3471 Dave Steinman, X5986 FAX: 4960

The information contained in this document was released pursuant to the duties of disclosure as required by Federal and State laws and regulations, or DOE Orders

6

286

Lessons Learned / Generic Implications

INFORMATION DISTRIBUTION

Date: 2/5/98

Document ID: 1998-RL-HNF-0004

SD-98-393

Subject: Handling drums safely

THREE RECENT INCIDENTS OF DROPPED WASTE DRUMS HAVE HIGHLIGHTED THE NEED FOR A SAFETY REMINDER ABOUT HOISTING AND RIGGING.

Description:

Lessons Learned Bulletin 1997-RL-HNF-0039 described an event resulting in an injury. A drum being lifted with barrel hooks on a continuous-loop sling struck an obstacle while being loaded onto a truck and dropped to the truck bed. A worker on the truck was injured when he fell to the ground while avoiding the falling drum.

In another drum handling operation, the bolt on the lid clamping-ring became entangled in the free end of the hoist chain. The free end of the hoisting chain was traveling in the upward direction as the drum was being lowered. The load weight was relieved from the rigging, the hooks disengaged, and the drum dropped six to eight feet. There were no injuries nor spread of contamination. The hoist was not equipped with a chain bucket to collect and feed out the free end of the hoist chain.

Recently while off-loading waste drums from a covered van in the Central Waste Complex, a drum was pulled off its pallet by a rope extension on the pull-down strap on the roll-up door of the van. No release or injuries occurred. This type of van typically has a strap hanging from the bottom of the roll-up door which the drivers/operators reach to close the door. This particular van had an additional rope with a loop at the bottom attached to the strap to make it easier to reach from the ground. The "eye" of the rope caught on the bolt in the lid band of a drum closure and dislodged the drum from the pallet causing it to fall to the ground.

Generic Implications / Lessons Learned:

Proper rigging equipment must be used, procedures must be followed, and safe lifting practices must be observed to prevent dropping drums.

Drum lifting devices which depend on friction or hook engagement may release their load if the drum weight is relieved while the drum is being handled.

Trucks and vans used for transporting waste should not have any loose ropes attached to the roll-up door strap.

Chain buckets can prevent hoist chains from contacting loads and becoming tangled on protruding bolts.

7

287

Lessons Learned / Generic Implications NEWSLETTER

LL/GI Document Number: LL-98-002.NL
February, 1998

Equipment Rolls Off Dock
Dave Steinman

Always block or brake equipment on wheels to prevent unwanted motion.

On September 16, 1997, a piece of laboratory equipment rolled off the loading dock at Oak Ridge. The equipment was damaged beyond repair. Personnel had not blocked or secured the equipment, which was on wheels, because they believed the dock was level. By the time it was discovered that the equipment had begun to roll down the slight incline of the dock, it was too late to stop the accident.

Other incidents have been reported where failure to block or secure equipment has resulted in an accident: an unoccupied forklift parked on an incline rolled backwards when the brakes failed; a vehicle, parked without the emergency brake engaged, rolled down a hill damaging the vehicle; unsecured equipment on wheels rolled off a truck-bed during transport.

For your safety, and the protection of equipment for which you are responsible, don't assume any surface is level, and always secure rolling or wheeled equipment when unattended.

Source: DOE Lessons Learned List Server, Item: L-1997-OR-LMES-ETTP-1201

Good Practices Pay Off
Dave Steinman & Jim McLaughlin

Good work habits and procedural adherence are important tools for personal safety.

Item 1:

At RFETS, on December 22, 1997, activities commenced for consolidating and re-containerizing historic environmental non-radioactive samples stored in a cargo container. As a precaution, the Preliminary Hazard Analysis/Activity Hazard Analysis specified surveys and personnel monitoring be performed. During the work evolution, a container was discovered with the handwritten words "High Level" on it.

Surveys found elevated levels of alpha contamination.

8

288

A pause work was initiated, personnel monitored out of the immediate area, and Radiological Engineering was contacted to evaluate conditions and identify appropriate radiological controls. RMRS management issued a Stop Radiological Work order pending further evaluation.

Source: F. P. Hughes letter, FPH-151-97.

Item 2:

On January 10, 1998, Electrical workers at Savannah River discovered 120 volts on terminal blocks while performing voltage checks prior to replacing terminal strips in an electrical cabinet. Workers recognized the difference between what they found (120v) and what they expected to find (0v). Work was stopped at the appropriate time-before getting hurt. The Lockout Tagout (LO/TO) on the Work Clearance Permit was inadequate.

Source: ORPS Notification Report SR--WSRC-ITP-1998-0003

Summary

By following procedures and carefully comparing observations with expectations, personnel in these two situations were able to avoid significant consequences. It may be tempting, at times, to assume all hazards are neutralized, or that all eventualities have been considered, especially when time is short. However, there have been too many instances of equipment being found in unexpected conditions to justify such an assumption on your part.

The people involved in these two cases acted properly, stopping work until the hazards were abated. These good work habits and procedural compliance actions are examples of the safety attitude we desire at RFETS.

For additional information contact:
KAISER-HILL LL/GI PROGRAM TEAM

Bob Dichard	*Mgr. LL/GI & OR Oversight*	X3112
Jim McLaughlin, Sr.	*LL/GI Analyst*	X3471
Dave Steinman	*LL/GI Analyst*	X5986

Lessons Learned / Generic Implications

KAISER • HILL

INFORMATION DISTRIBUTION

Date: 2/23/98

Document ID: RL--BHI-DND-1998-0001 (2-14)

SD-98-569

Subject: ARA Entered Without Respiratory Protection

CHANGING WORK CONDITIONS WERE NOT INCORPORATED INTO WORK PACKAGE LEADING TO A NEAR-MISS SITUATION.

Description:

On February 18, 1998,at the Hanford Site, two workers inadvertently entered a posted Airborne Radiation Area (ARA). Two electricians were relocating temporary power cables, which required them to pull the cables through a room posted as an ARA. Neither worker recognized the posting prior to entry. One of the workers noticed the posting the next day when they were preparing to resume work on the same task.

The original work scope did not require entry into an ARA. Equipment failure necessitated a change in the work plan, which required workers to enter the room posted as an ARA. Change to the work package was not conducted per the established procedures. As a result of this problem, radiological engineering was not given the opportunity to review the revisions

Generic Implications / Lessons Learned:

Walking down jobs prior to commencing work could help identify conditions that have changed since the task was planned.

Taking time to review postings before entering different rooms or areas, especially in nuclear facilities, may prevent potential serious consequences.

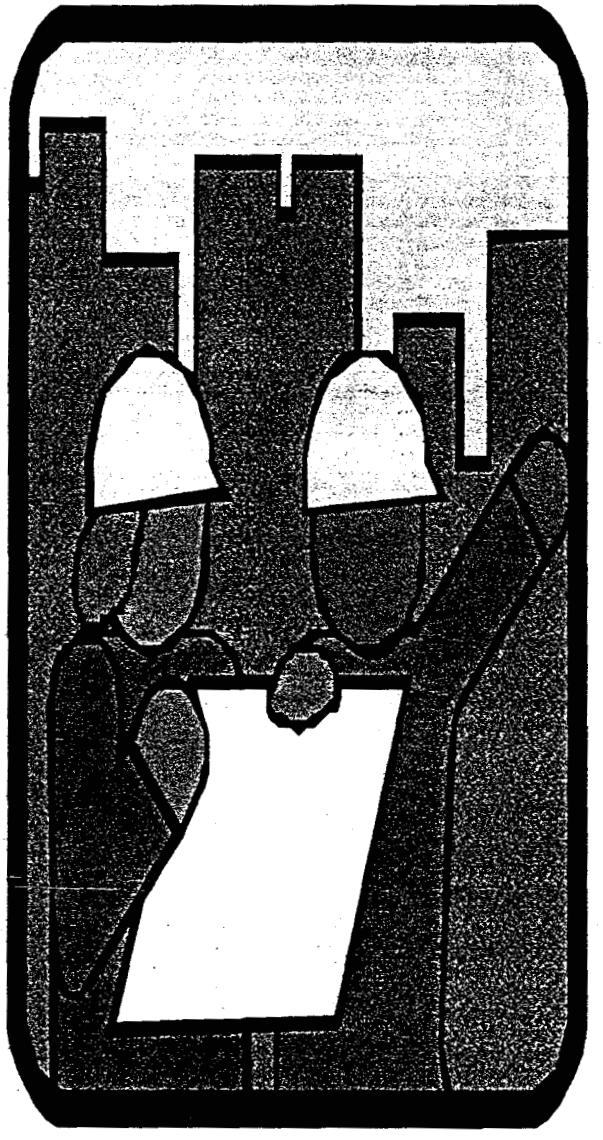
Questions? Contact K-H LL/GI Program Personnel: Jim McLaughlin, X3471 Dave Steinman, X5986 FAX: 4960

The information contained in this document was released pursuant to the duties of disclosure as required by Federal and State laws and regulations, or DOE Orders

10

290

Project Safety Status



- First Aid Cases
- Reason to Panic, No !
- The Positives
- How Close Are We ? Glass Half Full or Half Empty
- Keep Marching Ahead
- TTR Program
- The Future

779 CLOSURE PROJECT SAFETY GOALS AND INCENTIVES

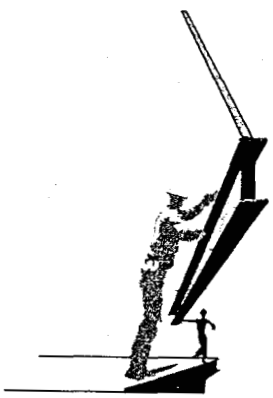
Each week we go with (0) first aids and (0) recordables - We will have a cake/coffee party the following week at the 750 cafeteria after the all hands meeting

Each month we go with (2) first aid cases or less and (0) recordables we will have a pizza party for all 779 Project employees in room 115

Each quarter we have (4) or less first aids and (0) recordables we will have a prime rib dinner in the cafeteria !

Remember : We win as a team and lose as team !

Mike Korenko
Kelly Trice
Charlie Wolf



Safe Sites of Colorado & Rocky Mountain Remediation Services

779 Closure Project

INTEROFFICE CORRESPONDENCE

DATE: February 9, 1998

TO: Distribution

FROM: H. C. Wolf, Deputy Manager, 779 Closure Project, Bldg. 779A, X7184
K. D. Trice, Deputy Manager, 779/886 Closure Projects,Bldg. 779A, X6383

SUBJECT: LESSONS LEARNED FROM TRAINING PERFORMED ON GLOVEBOX 225 - HCW-007-98

A Lessons Learned session was held at 12:30 on Tuesday, February 3, 1998, regarding training performed on Glovebox 225 in Room 157, Building 779, as part of the 779 Cluster Closure Project. The following comments were provided by Teams and Job Supervisors performing training:

1. Tape openings on coveralls (sleeves): the gloves slide down on the coverall so recommend taping sleeves.

2. Size Reducer for Air Mover: The air mover outlet is larger than the hose. Have asked sheetmetal to adapt the air mover outlet.

3. Label Air Mover - Direction: The air movers are not labeled with directions. Have asked the painters to place directions on air movers.

4. Metal Springs - be aware: All boxes will have metal springs in the back of the box, ensure all personnel are aware they are there.

5. Metal Grinding - Full Face: Even though all workers are wearing safety shields and glasses with side shields, recommended to do in full face because of the airborne "dust" that occurs with grinding.

6. Sharp Edges - holder: There are such sharp edges when cutting with the nibbler, have asked the carpenters to fashion a holding device made with a hockey puck. We will put a deep groove in the hockey puck to hold the cut edge of the stainless steel.

7. Housekeeping: We need to clean chips up as soon as possible so the nibbler tool can work properly. Need to clean the box before and after a job.

8. Padding sharp edges at the end of an evolution: This is a very good practice and we need to keep padding sharp edges with kemwipes and tape.

9. Stick to Plan - Competition: It is very important for each individual to know what their role is at the pre-ev and then stick to the plan. Any personnel changes should occur from higher Supervision and be kept to a minimum.

10. Design Pattern on the Box: It is recommended that we set out a basic design pattern for cutting the boxes.

11. Communication: This is a problem with the tents. Can't hear from outside to inside the tents. Hoss Brown is checking with some vendors to see if a wireless communication would be available to go into our PPE. It will be important to check with the RFETS Fire Department to ensure that any new equipment is acceptable for use at RFETS. It is also important to have complete communication between the teams. For the training, it wasn't clear where one team ended and one began. It is important to communicate between teams as well to let other teams know when you've had a problem or success with a particular way of doing business.

12. Staging Items: It is important to get everyone on the Team in the back area where they are going to work and stage any tools they may require before starting to work.

13. Follow Pre-ev Assignments: This is connected to the "stick to the plan." We need to follow them so everyone is aware what everyone else is going to be doing.

14. Invite Proper Personnel to Pre-Evs (Rad Ops): It is important that all individuals associated with the evolution be present at the Pre-Evs. It is extremely important for Rad Ops supervision to be present. They need to interface with the RCTs to ensure they are aware of what is going to be done. It is proper to invite the RCTs as well.

15. Plastics pens for Nibbler: Recommend obtaining plastic to be put under the Nibbler so the chips would fall into the "pen" and be contained. It would eliminate stepping on them and grinding into the floor.

16. Spray Nibbler with soap (cooling): The Nibbler gets hot and needs to be cooled with a mist.

17. Tool use (sawsalls, nibblers, 18 tooth blades): Watch your usage, if you don't fully understand how to use a particular piece of equipment, ask. In particular, it was observed that users would wiggle the nibbler when it got into a bind--this is improper usage. Just let the nibbler work for you, don't try to hurry it in any way.

18. Job Supervisor/Rad Supervisor Air Mover: It is was observed that the air mover was shut on and off during evolution. If someone wants a change in the air mover, notify their supervisor and have the supervisor make the decision to change.

19. Check extension cords: Check cords for the correct amperage, if not correct, we will ensure you get correct cord for the job.

20. Strap box to lift tables before size reduction: The job works better if box is secured, ensure this is done before starting work.

21. Wire valves shut: Valves should be locked out/tagged out, handles removed, or wired shut before starting job to ensure their is no inadvertent change of handle location.

22. Cords - Buddy System: Use the buddy system to ensure no one gets tangled up in the cords being used on the job. Each of you that are working with the equipment should have an individual behind you making sure cords are moved as operator moves.

23. Place work at easy access level: Place any work you will be doing at the proper access level so there is no unnecessary bending before working.

24. Inadequate Surveys: Ensure points and materials are verified during survey.

25. Tent - RCTs: Be sure that there are two RCTs located inside the tent. It works better for workers.

26. Loose items: It would be extremely beneficial if any loose items, capital equipment, etc. were removed from the rooms where work is to take place. Some of the rooms, like Room 160, are so crowded with capital equipment (which is tagged for removal) that it is difficult to move around.

27. Training on Gloveboxes: Several team members and some supervisor's felt they did not have enough training on the glovebox before starting any hot. Would like more time to train on gloveboxes and conducting Pre-Evs for jobs.

28. Tape wheels: When wheeling from one room to another, it is important to tape the wheels to ensure any contamination is not being spread.

29. Walkdowns: Ensure teams talk amongst themselves during walkdowns to explore all possibilities and work the job through during the walkdown.

30. IWCP Missing Pages: Some pages were missing from the IWCP. This is a waste of time for the team members and it is important to ensure the pages are all present in the packages.

31. Tasks: It was recommended that Teams finish the tasks in one room before going into another.

The following comments were provided by Management evaluating the training and observers present:

1. It is warm in the back area and it is easy to wipe your brow, etc. Ensure you have an RCT check your hands before touching an area of your body.

2. There will be several people working in a small area together. Ensure you are aware and know what everyone is doing all times. Don't hurry and be safe.

3. There was a miscommunication between Rad Ops supervisors and RCTs and the intent of certain steps or actions. Rad Ops needs to be present at all Pre-Evs to preclude this from happening. We don't want any misinterpretation of the RWP. If RCTs are not exactly sure of the situation and what is expected of them, ask supervision.

4. If you notice any CSOLs on boxes or wherever, ensure you notify your job supervisor or management to get in touch with the proper individuals to de-post that area or box.

5. When developing the IWCP packages, some steps have been left up to the Job Supervisor to determine. However, it was a concern if this had been communicated and if steps are indeed taken by supervisors to ensure safe work. One of the instances of this is work with leaded gloveboxes. Are you going to remove lead from the gloveboxes inside the tents or outside in the size-reduction room. The general consensus was that this should be left up to the Team and Job Supervisor to determine on a case-by-case basis. This action will be accomplished as the Team desires to do it. Just be aware that if situations change (i.e., contamination found underneath lead) that you are prepared and have a plan for changing your strategy as well.

6. Ensure any Hold Points are identified in the packages--where Rad Ops needs to be notified, etc. All personnel working with the package need to know where these Hold Points are.

7. Management observed that the turnover between Crew Leaders and Foreman was not as good as it could be. It is important in these instances to have face-to-face time or sit-down time with the turnover supervision.

8. When Foreman are conducting their Pre-Evs, management recommends that the Pre-Ev be more detailed to the work being conducted. It is necessary to understand what is realistic and what is not. It is important to also understand what did work well, as well what didn't.

9. While doing bagouts in Room 220, Glovebox 463, a HEPA filter fell out. Be sure to check the magnehelics and exhausts before starting work.

10. Rad Ops Supervision announced that they will start planning drills for emergency situations while in glovebox training. On the spot remediation will be conducted so that the drills are "training" as well.

Questions were raised from the floor and included the following discussion:

1. It was understood that the training box would be totally set up like a hot box. Recommend that it be more realistic if this is the case. For this particular training, it was agreed to by management before starting training to relax some of the requirements to save individuals from heat stress, etc. This apparently wasn't communicated to all individuals doing training. Management still feels that subjecting personnel to full face when just practicing is exposing them to the risk of heat stress unnecessarily; however, it will be possible to incorporate more of the other tasks into this training to make it more realistic. As these decisions are made by management, it is extremely important to communicate to the individuals exactly what is simulated and what is not.

2. There was a concern expressed about the asbestos contained in the glue used in the gloveboxes. Even though past experience on Site indicates the asbestos level is very low, recommend that samples be taken of the glue before going any further. Safety Supervision assured that this would happen.

3. Fall Protection: Can we acquire additional man-lifts? If we do acquire man-lifts, ensure that training is properly performed on them. The requirements states that it must be a trained operator and trained spotter below for operation. It was also pointed out that training must be accompanied by a medical surveillance.

4. Nibbler, can we build a deflector? It was explained by others experienced with working with the Nibbler that deflectors do not work. It was suggested using fire retardant mats to put on the floor under the grinder and saws. They would be inexpensive and could be destroyed after the job. Management is going to check this out.

5. Several comments were made about the excess capital equipment located in the rooms in which the Teams will soon be working. It was requested that we be able to remove that from the building, certainly from the area because it adds to the congestion.

6. Team members asked about the tents. One of the tents is here and will be set up in Room 150, the first room for size-reduction use.

7. The filters on the housing were questioned. Are they the same size as in J-Mod? Yes. Hoss explained that they are doing some research filters in the houses. They are going to pull pre-filters to see what kind of airflow occurs. We could go to 24X24 filters but they are hard to get rid of. The plan is to have two air movers on a house to pull air down to the bottom.

8. Are RCTs going to be assigned to Teams. Yes that is the plan. The only exception will be when starting work with Supplied Air. There may be some movement between Teams at that time due to the experience of RCTs with Supplied Air.

7. Can we order scaffolding. Hoss reported it has already been ordered.

The Lessons Learned discussion was a successful interchange of information and good information has surfaced. This letter will be distributed to all of the D&D workforce. The training rosters of attendees will be filed in the official file with this letter, along with a copy of the Activity Oversight Report from Kaiser-Hill. If you have any questions, please contact Rick T. Von Feldt at extension 6830.

ras

Distribution w/o Atch:

J. A. Bahl, SSOC	T. Goff, SSOC	C. Lee, RMRS	E. P. Schweinsberg
M. E. Brown, RMRS	K. Harrawood, SSOC	D. L. Mott, SSOC	K. Trice, RMRS
L. A. Burke, SSOC	M.E. Hickman, RMRS	T. Sangaline, RMRS	R. T. Von Feldt, SSOC
B. Fricks, RMRS	M.K. Korenko, SSOC	R. A. Schommer, File	H. C. Wolf, SSOC

297

Safe Sites of Colorado & Rocky Mountain Remediation Services

779 Closure Project

INTEROFFICE CORRESPONDENCE

DATE: February 24, 1998

TO: H. C. Wolf, Deputy 779 Closure Proj Manager, Bldg. 779A, X7184
K. T. Trice, Deputy 779 Closure Proj Manager, Bldg. 779A, X6383

FROM: R. T. Von Feldt, D&D Manager, Bldg. 779A, X6830

SUBJECT: MINIMUM REQUIREMENTS FOR D&D ACTIVITIES INVOLVING GLOVEBOX GLOVES AND BAGOUT BAGS - RTV-003-98

This memorandum is to define minimum requirements for working in gloves while performing D&D activities in Building 779. To minimize the risk of contamination incidents from glove and bag failures, the following precautions shall be taken:

1. All gloves identified as having defects while performing 4-D18-FO-0010, Section 6, will be changed prior to use. This procedure is a prerequisite prior to performing glovebox activities.

2. All gloves used to perform size-reduction activities greater than 2-years old will be changed prior to use.

3. Gloves not intended for size-reduction activities, i.e., bagouts of loose materials (combustibles, metals, etc.) will be changed after a 5-year period.

4. Gloves not intended to be used for size-reduction activities or bagout operations will be removed from service, i.e., taped or blanked over.

5. Bagout bags on gloveboxes that do not currently have a date of when installed will be changed prior to performing bagout operations. Bagout bags with a change date will not be required to be changed for a period of two years from the change date.

ras

cc:
J. C. Hamrick, SSOC
M. E. Hickman, RMRS
T. T. Sangaline, RMRS
E. P. Schweinsberg, SSOC
Official File

298

Safe Sites of Colorado & Rocky Mountain Remediation Services

779 Closure Project

INTEROFFICE CORRESPONDENCE

DATE: March 27, 1998

TO: M. K. Korenko, Project Manager, Bldg. 750, X5488

FROM: R. T. Von Feldt, D&D Manager, 779 Closure Project, Bldg. 779A, X6830

SUBJECT: LESSONS LEARNED FROM THE REMOVAL OF GLOVEBOXES 2115 AND 6120 IN ROOMS 270 AND 272 - RTV-021-98

J. A. Bahl, foreman for this removal, held a lessons learned and they listed the following items:

- Length of sleeving should be verified. Implemented immediately, J. Bahl, 3/27/98
- When disassembling glovebox for nuts, screws, bolts, have a bag ready to put them in. Implemented immediately, J. Bahl 3/27/98.
- We need some flat carts to haul material around. Order by 3/31/98, R. Von Feldt.
- We need an A-Frame or lifting device to lift the heavy parts into the waste crates. Will assemble A-Frame lift by 3/31/98, J. Bahl and M. E. Brown.
- When we drain the crit drains, we need to use a peristaltic pump and drain from the inside of the box. Implement on next glovebox, J. Bahl.
- Before starting job, verify that we have the right tools for the job. Implemented immediately, J. Bahl, 3/27/98.

cc:
J. A. Bahl, SSOC
M. E. Brown, RMRS
L. A. Burke, SSOC
B. Fricks, RMRS
J. C. Hamrick, SSOC
K. E. Harrawood, SSOC
C. Lee, RMRS
J. H. McAllister, RMRS
S. McNitt, SSOC
T. T. Sangaline, RMRS
E. P. Schweinsberg, SSOC
K. D. Trice, RMRS
H. C. Wolf, SSOC
Official File

Safe Sites of Colorado & Rocky Mountain Remediation Services

779 Closure Project

INTEROFFICE CORRESPONDENCE

DATE: March 23, 1998

TO: Distribution

FROM: R. T. VonFeldt, Decommissioning Mgr., Bldg. 779, X6536

SUBJECT: LESSONS LEARNED FROM REMOVAL OF "PIGMA" WELDER 003
ROOM 150 - RTV-019-98

B. Fricks, Foreman for Pigma Welder, held a Lessons Learned session with his team and the following comments are submitted.

1. To ensure all tools and materials are in the work area before starting the breech.

2. Wrap sleeving as tight as possible before we make the sleeve cut.

3. See about getting some clear sleeving.

4. Do opposite pigtail-capping it first with vinyl tape and work towards the negative pull.

5. Have your waste bag ready to receive your waste right at the flange contained underneath.

gs

cc:
J. A. Bahl. SSOC
M. E. Brown, RMRS
L A. Burke, SSOC
B. Fricks, RMRS
J. C. Hamrick, SSOC
M. K. Korenko, SSOC
C. Lee, RMRS
J. McCalister
E. P. Schweinsberg, SSOC
K. D. Trice, RMRS
H. C. Wolf, SSOC

300

Safe Sites of Colorado & Rocky Mountain Remediation Services

779 Closure Project

INTEROFFICE CORRESPONDENCE

DATE: March 13, 1998

TO: Distribution

FROM: R. T. Von Feldt, D&D Manager, Bldg. 779A, X6830

SUBJECT: LESSONS LEARNED FROM GLOVEBOXES 222, 022, AND 9858 - RTV-016-98

M. E. Brown, Foreman for Glovebox Removal of 222, 022, and 9858, held a Lessons Learned session with his team and the following comments are submitted:

1. Communications to each person in the tent.
2. Need hot taps for draining lines
3. On one-quarter inch or small lines, crimp the line and then but with bolt cutters.
4. Use rubber vacuum caps to seal lines instead of tape.
5. Use B-Box to remove valves and place flange on pipes.
6. Order smaller bags, i.e., 4-liter and under
7. Longer skirts on the lift tables are needed to prevent contamination
8. Larger paper hoods with plastic around face piece required.
9. Break all nuts on flange first before removing them.
10. Install new nuts and bolts to hold flange together when removing valves.

ras

cc:

J. A. Bahl, SSOC
M. E. Brown, RMRS
L. A. Burke, SSOC
B. Fricks, RMRS
C. Lee, RMRS
J. McCalister
J. C. Hamrick, SSOC
M. K. Korenko, SSOC
E. P. Schweinsberg, SSOC
K. D. Trice, RMRS
H. C. Wolf, SSOC

301

779 Closure Project
Health and Safety Notes and Quotes
February 1998
Volume 1, Issue 2

Glovebox Cut-Out Begins

Removal of glove boxes in rooms 157 and 160 started on schedule for the 779 Closure Project. After workers performed the IWCP walkdowns, helped prepare the AHA's and performed the final walkdowns, the cutting began in a safe manner !

The beginning and continuation of the 779 Closure Project cold box cut started on January 15th and has continued into February . Lots and lots of preparation went into beginning the box cut out on schedule. Workers spents hours and hours preparing for the first cut out as it was imperative that all of the right checks and balances be in place. Although this was a "cold box" cut out, it was treated as a "hot box" cut out in alot of instances to allow workers to feel and aclimate to the PPE that is to be utilized for future hot box cutouts.

In preparation for this first cut out, K-Hill appointed a special team of asseors headed up by Tony Buhl to provide oversite and review of the project team and concur with project team management (Kelly Trice, Charile Wolf and Mike Korenko) that readiness was assured. This occurred and the project team marched ahead !

Alot of lessons learned occurred after the first box removal and a special debriefing occurred with all workers involved to cover and document these "lessons learned". As we all know, lessons learned can be invalubale for future D&D activities as they provide assurance that industrial, radiological and chemical safety measures can be checked / improved and work techniques modified where necessary. It was very encouraging to watch and participate in the feedback the workers shared. Where else can you obtain the best feedback but from the workers themselves. Some of the major lessons included:

(1) Allow more mock up time for all workers, (2) Improve communications between all work groups, (3) Pad all sharp edges (4) Plan your work and work that plan - stick to it ! (5) Pick up or tape down cords to avoid tripping hazards (6) Improve turnover between crew leaders and foreman (7) Ensure the specific tasks for the day are covered in the pre-ev, not for the whole job (8) Inspect hand tools before each use for cracks, broken bits/ handles or frayed and damaged cords (9) Place work task at easy access level to avoid bending or stretching concerns (Good ergonomic catch !)

These are just a few of the many recommendations recieved. A complete copy of this document is being distributed to various areas of the building. If you want a copy contact Tonya, Steve or Mark.

Good job guys and gals !

News Flash !

Recently the project recieved approvals from the fire department to begin utilizing room 121 as a permissable welding area (again). To use this area certain criteria must be met and maintained. The criteria are: (1) The area remain free of combustables, (2) A minimum rated 10 ABC dry chemical fire extinguisher is available within 25 ft of each station, (3) welding screens must be used to isolate the room, (4) welding, cutting or burning is not permitted when fire sprinklers are inoperable (5) job supervision must inspect the area weekly to ensure good housekeeping is maintained, (6) combustables and flammable liquids are not permitted in the area when welding, cutting or burning is being performed and (7) a copy of the fire department approval must be posted at the work area. A complete copy of the approval letter can be obtained from Steve Cordova, IH&S or your supervisor. Remember this is an approval that can be revoked at any time if we do not live up to our end of the bargain, so let's make sure we stay on top of this.

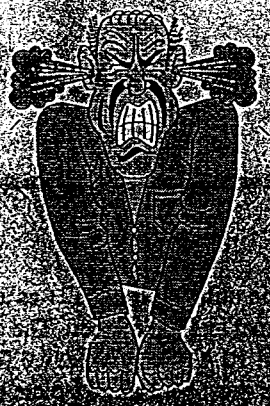
OSHA Regulations in the Final Rule Stage

Respiratory Protection, Confined Space, Forklift operator safety training, Injury / Illness recorkeeping and Glycol ethers are all in the final stage for new changes !

All of the aforementioned topics are very close to becoming law in the next several months. Respiratory Protection is being revised to modernize the existing standard. Confined space is being revised to allow greater flexibility in rescue equipment and worker access to atmospheric testing information. Forklift training is being revised to add specific operator training elements for initial and requalification training. Injury/ recordkeeping is being completely revised to update OSHA's older recordkeeping system. Glycol ether standard is being revised to reduce the PEL for four glycol ethers. Other areas being reviewed in the proposed stage is : Safety and Health program requirements, PELs for air contaminants (updating the 470 PELs ,PELs have not been updated since their adoption by OSHA in 1971), Ergonomics and access/ egress standards. **Stay tuned and we'll let you know !**

Heat Stress - We Gotta Respect It ! Part 1

As we prepare to cut out "hot boxes" one thing we have to key in on is heat stress to the worker. Proper preaparation and awareness are the key



As workers we all deal with heat stress on a daily basis. It is an area sometimes we forget about due to wanting to complete our work task on time or some of us overestimate our bodies ability to cope. Heat stress affects all types of workers and athletes. Yes, that's right, even athlete's in premo shape are affected by heat stress.

One of the biggest things we can do to help ourselves is understanding and coping with the hazards of heat stress. As workers we must understand the effects of heat stress, know the symptoms and treatment and take personal precautions against these disorders.

Conditions that affect our body heat are :

Our surroundings
Level of physical activity
Type of work
Time spent working
Recovery time between work periods

How does our body gain heat or loose heat, have you ever considered that ? Basically there is four ways for this to occur :

Convection - which transfers body heat to or from air moving over the skin,
Conduction - direct contact with objects that are colder or warmer than the body,
Evaporation - cooling when air absorbs body moisture from the lungs or skin,
Radiation - transfers heat to or from surrounding objects that are not in direct contact with the body.

That's all until next month when we will concentrate on the effects of heat stress, your body's cooling system and minor heat stress disorders. **Until then - stay cool !**

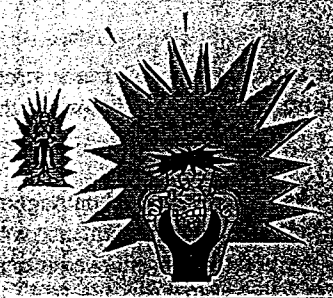
Others Effects of Heat Stress :

Have you ever wondered what some of the other effects of heat stress are ? Are there really secondary effects before full heat stress systoms take place that can cause accidents, You bet there is ! Some of the direct effects of heat stress hazards are :

DIRECT CAUSES	INDIRECT CAUSES
Fogged glasses	Physcial discomfort
Sweat in the eyes	Irritability and anger
Slippery hands	Poor judgement
Dizziness or fainting	Diverting attention from job and slower reactions

Hearing Protection

Remember when working with heavy equipment, machinery or D&D hand tools always check with IH&S to determine if hearing protection is required ! A full supply of hearing protection PPE is available for use !



Duty To Have Fall Protection

OSHA standard 1926.501 requires employers to evaluate and monitor any working surfaces that might required fall protection. Specifically (excluding steel erectors) fall protection is required when any work activities are 6 feet or greater off the ground (excluding the use of ladders). Our site HSP also requires similar criteria as the OSHA standard for fall protection. If you review the Operating Experience Summary booklet for Jan. 30th thru Feb. 5 th, several examples exist that display fall protection errors at various DOE facilities including Rocky Flats. In some cases workers fell as much as 15 -17 feet with one case being fatal to the worker. In one of future all hands meetings we will review some of these events with all project personnel involved in the 779 Closure Project.

"Each year on the avg. between 150-200 workers are killed and 100,000 more are injured due to falls"

Remember fall protection systems can take the shape of many criteria. A fall protection program includes : The use of full body harnesses, safety monitoring systems, baricades, warning lines and guardrails. **(Note: As of January 1, 1998 body belts are no longer allowed for use as a fall arrest systems.)**

If any questions at all arise in regards to fall protection issues, notify your foreman or lead right away as they can contact Tonya or Mark to ensure the correct fall protection system is instituted.

In March the project is going to have one of the Denver area fall protection companies come on site and demonstrate some of the various fall protection equipment they have and the consequences of using it properly or improperly. **Remember when you get to six - you need a fix !**

First Aid Cases - A Review of Our Lessons Learned

As most of you are aware our Project has had some first aid cases as of late and we thought it would be a good time to review the first aid cases that occurred while we had work in progress. (Of course we have also had first aids due to slips on ice, falling out of chairs and walking through the PACs, but we believe those type of first aid cases are preventable through the state of mind the workers are in when coming to and from work. We discussed this in our last newsletter.) Back to our most current working first aids and let's review what happened. In two cases workers were performing D&D tasks and accidently bumped their heads. In our fact finding meetings we found in discussions with workers that lack of awareness of surrounding conditions and the non use of PPE (bump caps or hard hats) contributed to these injuries. Can these problems or errors be corrected? You bet! It comes with awareness and with the project providing the necessary PPE. As alot of you know, after each first aid case we have a fact finding meeting to see how we can improve. To date these meetings have been very successful and the workers have been very open. That is appreciated as this is the only way we can improve and relay these ideas to the rest of the work force. As a result of our head bumping incidents, in the near future we are going to provide all personnel with bump caps to use when working in tight configurations. This was based on worker feedback. In our other situation when two workers smashed their hand and thumbs, we found out in the fact finding meeting that communication and awareness were the keys. Keep the feedback coming and we will continue to spread the word via this newsletter, lessons learned meetings, all hands meetings and flyer type letters left in the breakroom (s). Feedback is the only way we can continue to strive for contionous improvement in our safety programs and YOU are the key ! **Be safe and Be aware !**

OSHA Round - Up

This month we wanted to share with you a tragic situation in it's entirety and show you when things get out of hand - they really get out of hand !

News Release USDL 97-204
Wednesday, June 18, 1997
Contact: Frank Kane, (202) 219-8151

Houston Company Agrees To Pay $1.8 Million, Safety To Improve In Five Facilities Following OSHA Investigation Of Fatal Accident

Wyman-Gordon Forgings, Inc., has agreed to pay $1,803,500 in penalties proposed by the Occupational Safety and Health Administration (OSHA) following an investigation of a catastrophic accident at its Houston, Texas, facility that killed eight workers and injured two others. The company and its affiliate, Wyman-Gordon Company, Inc., also agreed to make significant safety improvements at five plants nationwide.

"The terrible tragedy that occurred just before Christmas serves as a reminder to all of us how important safety and health programs are," said Secretary of Labor Alexis M. Herman. "The company not only lost valuable workers, but more importantly eight families lost their loved ones in a senseless accident that could and should have been prevented. We must insist that safety and health be as important to a company as earnings and market share."

Wyman-Gordon Forgings, Inc., manufactures technologically advanced forgings, investment castings, and composite airframe structures and is a major supplier to the aircraft/aerospace industry. It has 865 employees at the Houston forgings plant, also known as the "Cypress facility."

The catastrophic accident occurred Dec. 22, 1996, when employees were performing maintenance work that required lockout/tagout of a large hydraulic press and related equipment. (Lockout/tagout calls for turning off equipment during servicing and maintenance work and locking or tagging the energy sources so it cannot be restarted until the lock or tag is removed by the person who attached it to the system or by a supervisor and all stored energy is released before work begins.) Full implementation of a lockout/tagout program would have significantly reduced the probability of an unexpected release of stored energy in the equipment. There was no specific lockout/tagout procedure in place for this maintenance operation.

At the time of the accident, Wyman-Gordon Forgings workers were replacing seals on pressurized vessels containing nitrogen pressurized at 5,000 pounds per square inch. An unexpected release of the pressurized nitrogen occurred at a vessel, killing four production and four maintenance workers and injuring a production worker and the maintenance supervisor. Some of the workers who died had only been on the job a few weeks. The force of the released pressurized nitrogen was so great that it propelled a 3,000-pound valve assembly more than 200 yards, where it dug into the ground more than five feet.

"Wyman-Gordon Forgings has agreed to resolve this matter as quickly as possible and to eliminate the safety deficiencies that led to this tragic accident—both in Houston and in another facility in Brighton, Michigan," said Acting Assistant Secretary of Labor for Occupational Safety and Health Gregory R. Watchman, who announced the agreement at a news conference in Houston following a meeting with families of the victims. Watchman also noted that "the settlement avoids the burdens of possible prolonged litigation and furthers the efforts of both the company and OSHA to provide safe workplaces."

Wyman-Gordon Company agreed to apply the same terms in the settlement agreement to other forging facilities in North Grafton, Mass., Worcester, Mass., and Millbury, Mass.

Under the terms of the settlement, Wyman-Gordon Forgings agreed to establish an effective safety and health program in its Houston and Brighton facilities. The company will provide a written affirmation of management commitment to and supervisory responsibility for workplace safety and health goals, sufficient resources for the effort, including a full-time certified safety and health professional at the Houston facility, employee training and additional measures to ensure employee participation in safety and health issues, comprehensive safety and health audits at each of the facilities, and a comprehensive, ongoing energy control program in full compliance with OSHA's lockout/tagout standard.

OSHA is issuing the penalties and citations today. Wyman-Gordon Forgings has agreed not to contest the citations.

OSHA Round Up - Continued

Wyman-Gordon Company, Inc., with headquarters in North Grafton, Mass., has more than 3,000 employees worldwide in 11 plants.

SUMMARY OF CITATIONS
Wyman-Gordon Forgings, Inc.
Houston/Cypress Facility

•Failure to provide training to ensure that the purpose and function of the energy control program (lockout/tagout) are understood by employees authorized to do maintenance and that the knowledge and skills required for the safe application, use, and removal of the energy controls are acquired by the employees, as required by the lockout/tagout standard.
•Failure to provide retraining for other authorized and affected employees when there was a change in their job assignments, machines, equipment or processes that presented a new hazard, or when there was a change in the energy control procedures, as required by the lockout/tagout standard.
•Failure to have lockout and tagout procedures that clearly and specifically outlined the scope, purpose, authorization, rules and techniques to be utilized for the hazardous energy, and means to enforce compliance, as required by the lockout/tagout standard.
•Failure to conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of the lockout/tagout standard were being followed.
•Failure to lock out hydraulic pumps and power apparatus when maintenance was being performed on the hydraulic forging press, as required by the lockout/tagout standard and the forging standard.
•Failure to provide training to ensure that the purpose and function of the energy control program (lockout/tagout) are understood by employees working in the area or affected by the maintenance operation and that the knowledge and skills required for the safe application, use, and removal of the energy controls are acquired by the employees, as required by the lockout/tagout standard. •Employer failed to meet requirement of Section 5(a)(1), the general duty clause of the Occupational Safety and Health Act and provide a place of employment free from recognized hazards that were causing or likely to cause death or serious physical harm. Employees were exposed to the hazards of an unexpected release of nitrogen at 5,000 psi or greater pressures. The employer failed to insure that pressure vessels were not isolated from the pressure gauge. The employer also had the pressure relief valves set too high and the pressure relief valves discharged in employee work areas.
•Failure to train production employees in emergency evacuation procedures.
•Failure to ensure the adequacy of employee-owned protective equipment.
•Failure to post warnings about the existence, location and danger of permit-required confined spaces.
•Failure to train members of the rescue service about the equipment necessary to rescue persons from confined spaces.
•Failure to train employees assigned to the rescue service about their duties in rescuing persons from confined spaces.
•Failure to provide hardware necessary to isolate, secure or block machines from hazardous energy sources.
•Failure to meet requirements for filling out the log and summary of occupational injuries (OSHA Form 200 or its equivalent) and for providing supplementary records for each occupational injury or illness in detail (OSHA form 101).

TOTAL OF PROPOSED PENALTIES $1,803,500 (PAID IN FULL BY THE COMPANY)

One More for the Road.....

Nordyne Inc.'s facility in St Louis , Mo. received a penalty totaling 159, 500.00 dollars stemming from an accident in which a worker had seven fingers amputated while working on a mechnaical punch press. OSHA cited the company for : Unguarded pinch points at the point of operation of equipment and eight serious violations including means of egress, storage of flammable liquids and electrical hazards. **(Remember it is in our moments of decision that our destiny can be shaped !)**

779 CLOSURE PROJECT SAFETY GOALS AND INCENTIVES

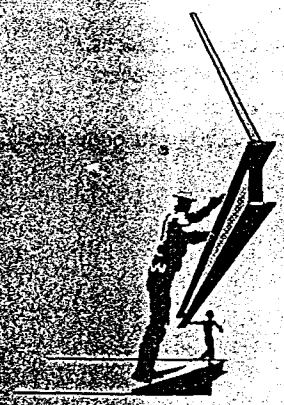
Each week we go with (0) first aids and (0) recordables - We will have a cake/coffee party the following week at the 750 cafeteria after the all hands meeting

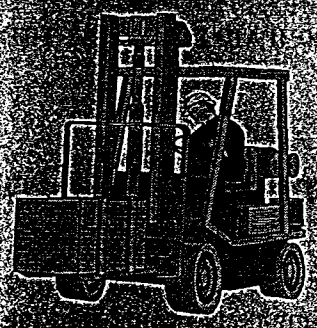
Each month we go with (2) first aid cases or less and (0) recordables we will have a pizza party for all 779 Project employees in room 115

Each quarter we have (4) or less first aids and (0) recordables we will have a prime rib dinner in the cafeteria !

Remember : We win as a team and lose as team !

Mike Korenko
Kelly Trice
Charlie Wolf





LESSONS LEARNED - OCCURRENCE REPORTS

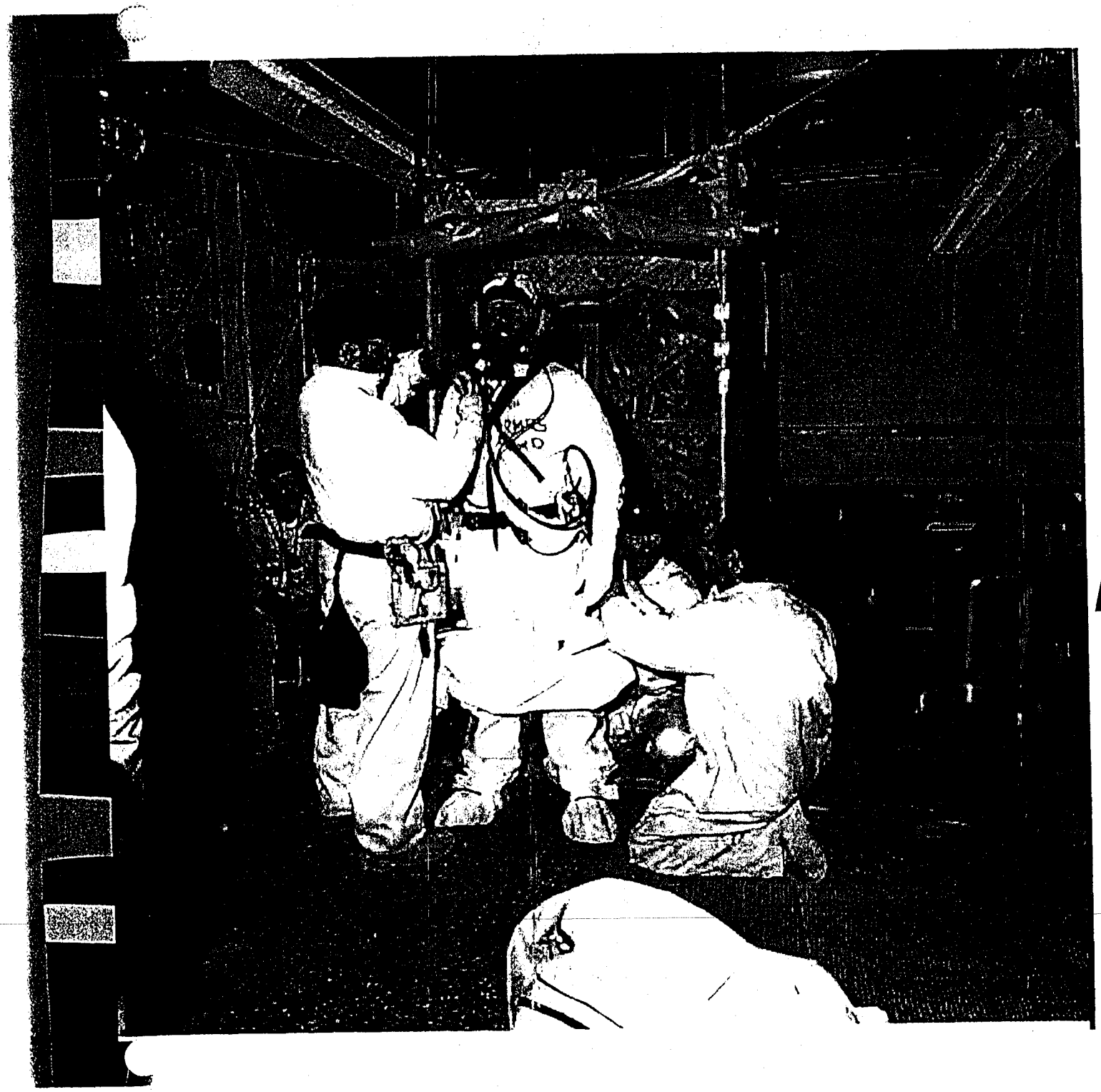
E. P. SCHWEINSBERG
WATM

368

BREATHING AIR LINE DISCONNECT

- USERS AND SPOTTERS WERE REMINDED TO BE AWARE OF TWISTING HAZARD OF AIRLINES.
- LIMIT MOVEMENT WHICH CAUSES TWISTING OF AIRLINES.
- INSPECT ALL FITTINGS ON PREMAIRE UNITS
- TWO INCH PIECE OF PIPE INSULATION

309



Building 779 Room 222

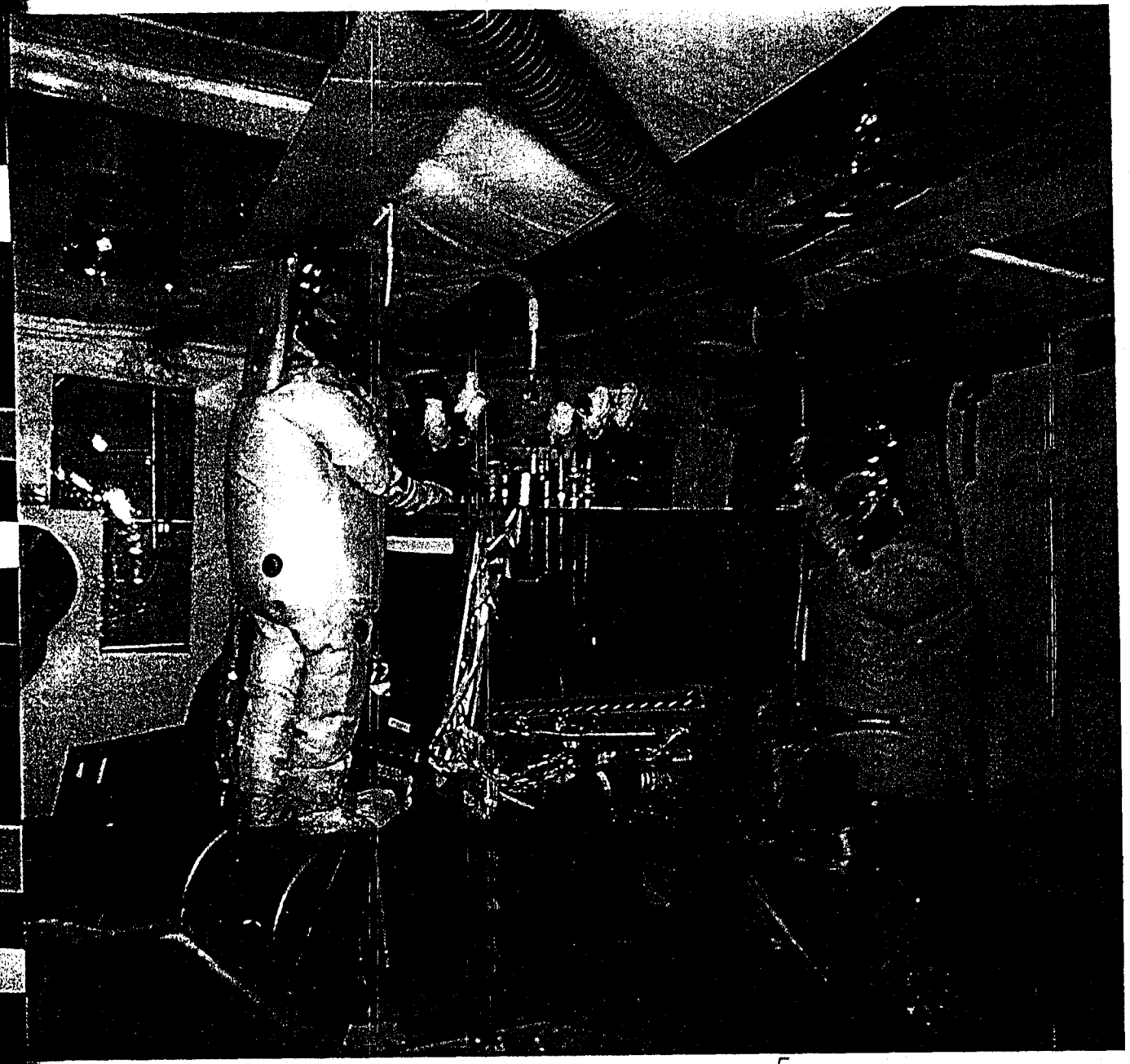
PremAir Dressing for entry to work Glovebox 045

310

BREATHING AIR WORKER CUT HAND

- CAUSE WAS INADEQUATE LEATHER GLOVES
- BARTLETT TLC USE CAUSED TAPE TO NOT STICK TO SHARP EDGES
- HOISTING & RIGGING MUST BE CONSIDERED DURING ENGINEERING OF SIZE REDUCTION TENTS
- ENSURE GLOVES UTILIZED ARE LONG ENOUGH
- FIXATIVES USED MUST BE CONDUCIVE TO THE JOB (ABC/3M FIRE DAM)

311

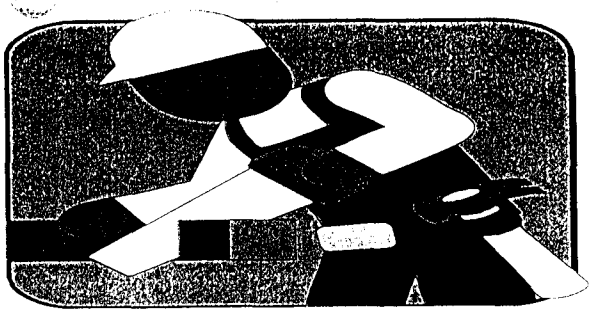


Building 779 - Room 140

Workers Dis-mantling Glovebox in Pre-Fab Tent

312

BUMP CAPS

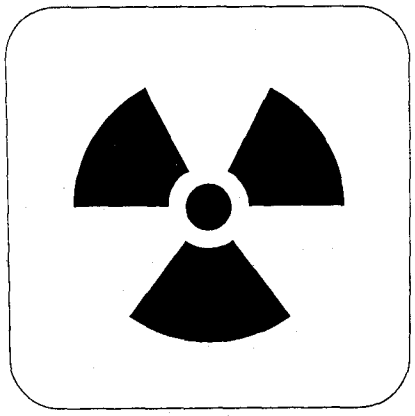


- IMPLEMENTED IN FALL OF 1997 DUE TO NUMEROUS HEAD INJURIES
- RMRS ISSUED OPERATIONS DIRECTIVE - 019
- REQUIRES USE OF BUMP CAPS IN INDUSTRIAL AREAS
- THE USE OF BUMP CAPS MUST BE CONTROLLED (CA/RBA)
- BUMP CAPS VS. HARD HATS

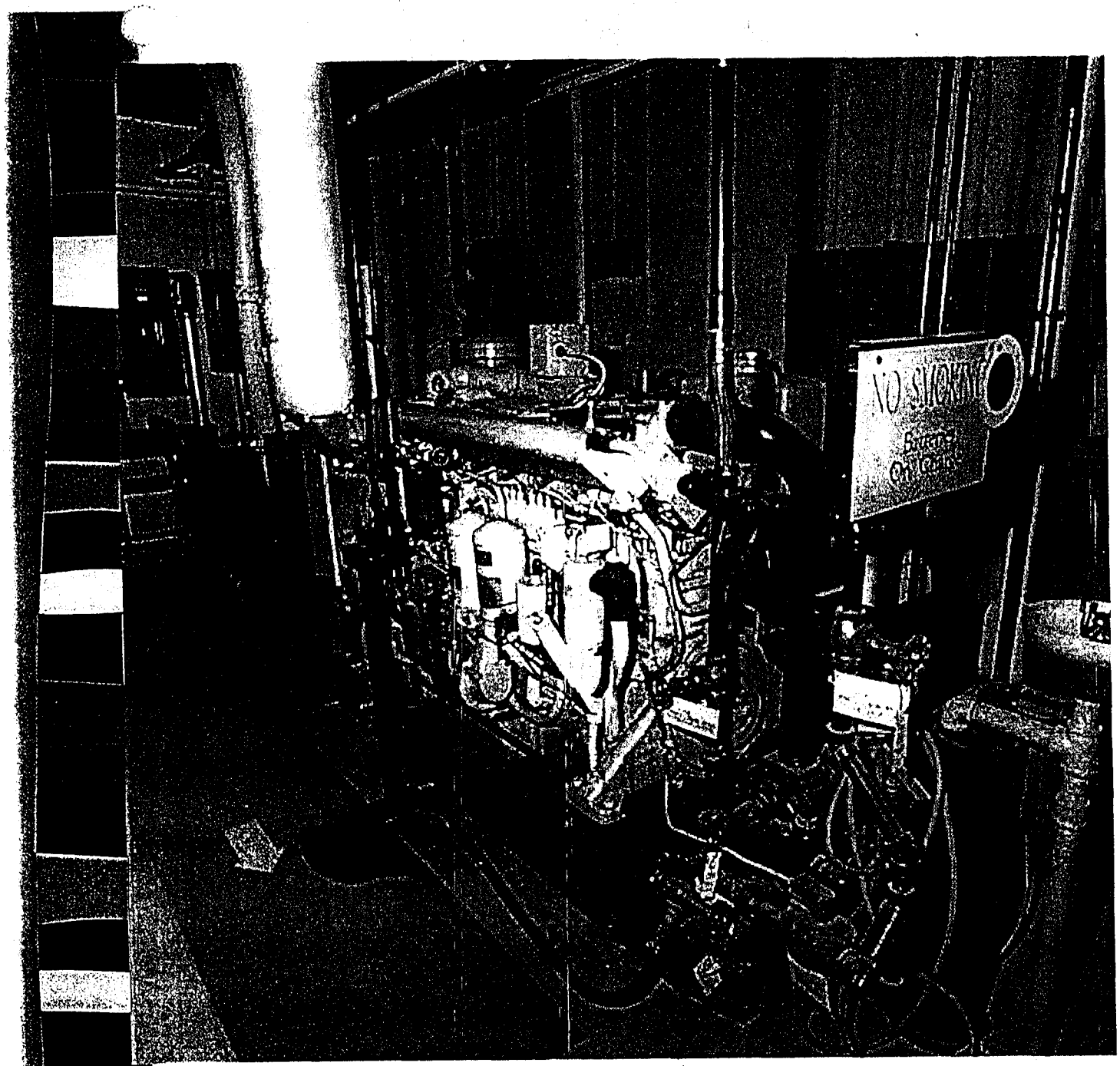
303

CONTAMINATED EQUIPMENT SHIPPED FROM FACILITY

- RAD OPS AND PROPERTY CUSTODIANS MUST BE CONSERVATIVE IN DISCERNING PROCESS HISTORY OF EQUIPMENT
- WHEN THE PROCESS HISTORY IS IN QUESTION, ASSUME IT HAS BEEN CONTAMINATED
- REMEMBER THE LINK



314



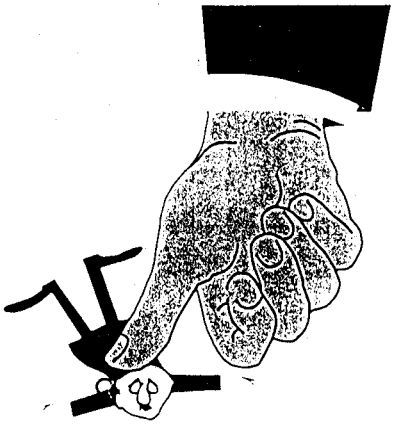
Building 779 - Room 117

Emergency Generator Before Removal

315

BERYLLIUM CONTAMINATION

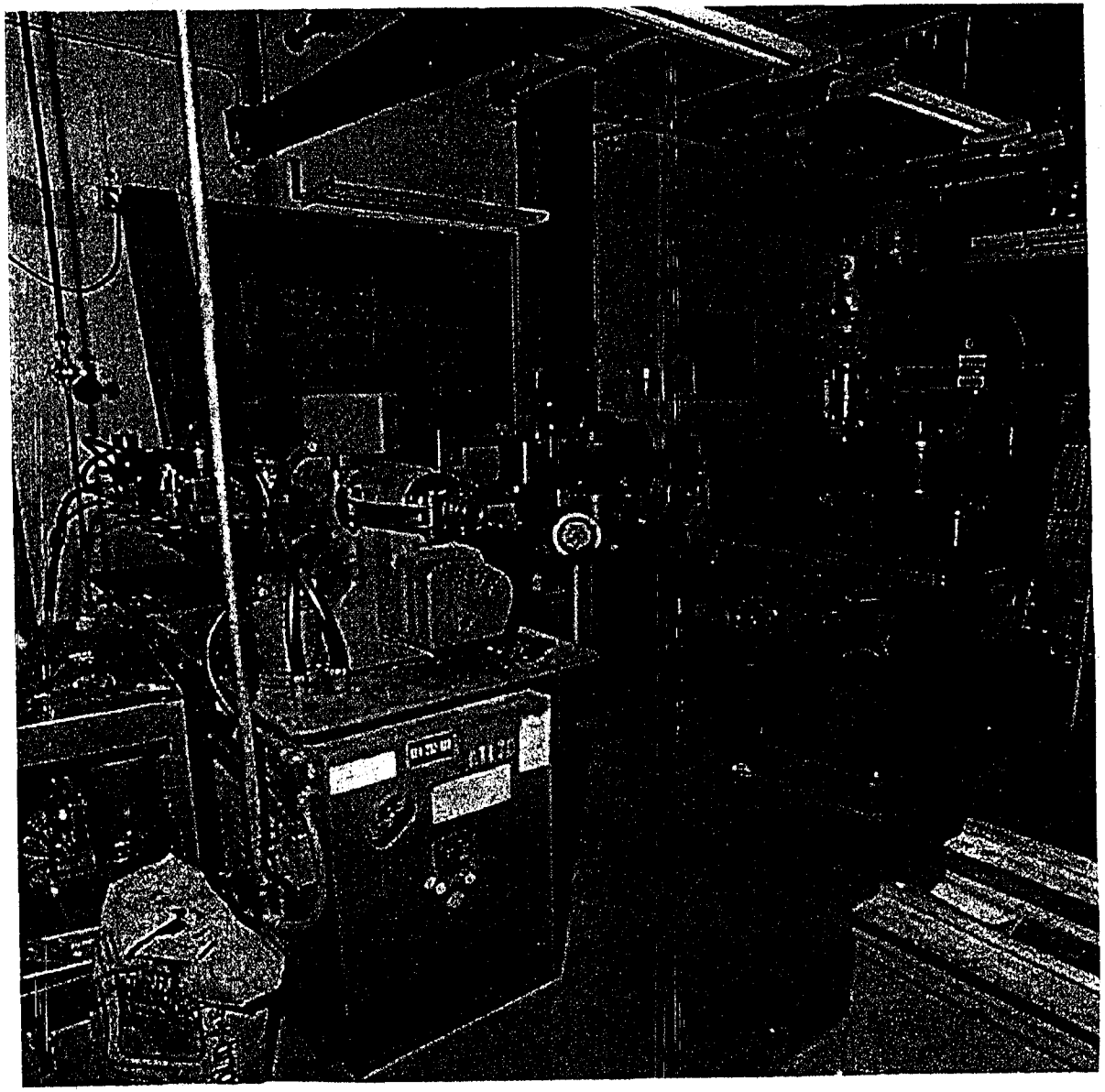
- PERFORM THOROUGH BE SURVEYS AND POST YOUR HAZARD AREAS
- GOOD DOCUMENTATION - A Be PLAN
- COMMUNICATION WITH THE WORKFORCE



November 16, 1999

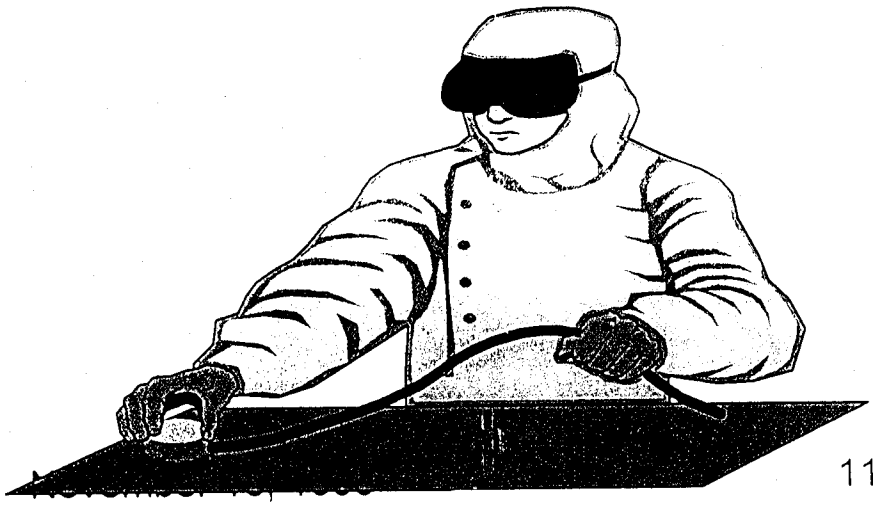
Building 779 - Room 162

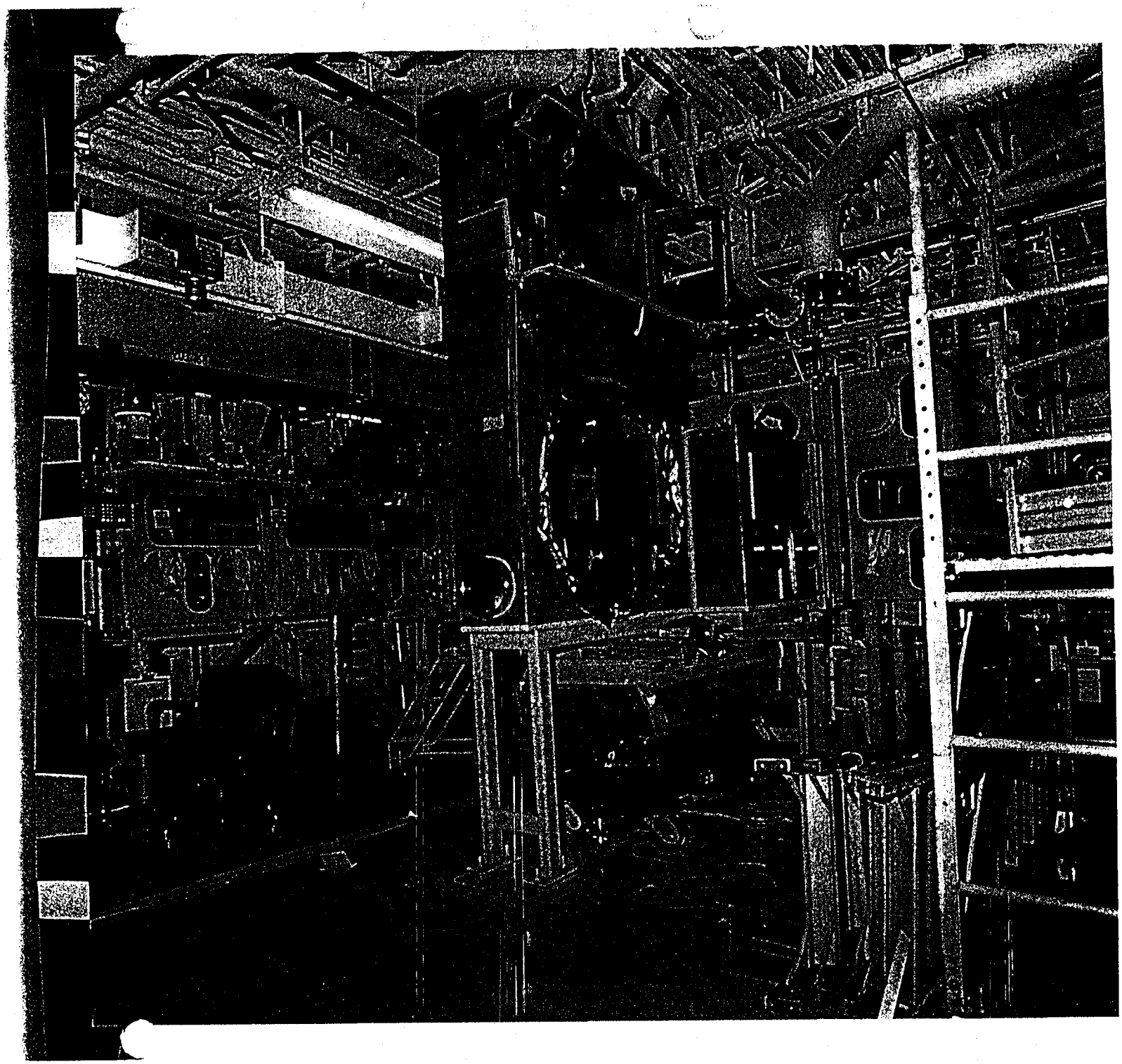
Beryllium Machine Shop Equipment and Workers



GLOVE-BOX FURNACE DOOR FELL

- IMPLEMENT AND PRACTICE EWP/ISM
- ENGINEERING WITH THE WORK FORCE





Buildin 779 - Room 160 Glovebox 864 Before Removal

319

BEST MEMBER AIDS CO-WORKER

- TEACH/TRAIN ATTENTIVENESS & ALERTNESS
- HAVE BEST TEAM MEMBERS AVAILABLE DURING SIZE REDUCTION ACTIVITIES

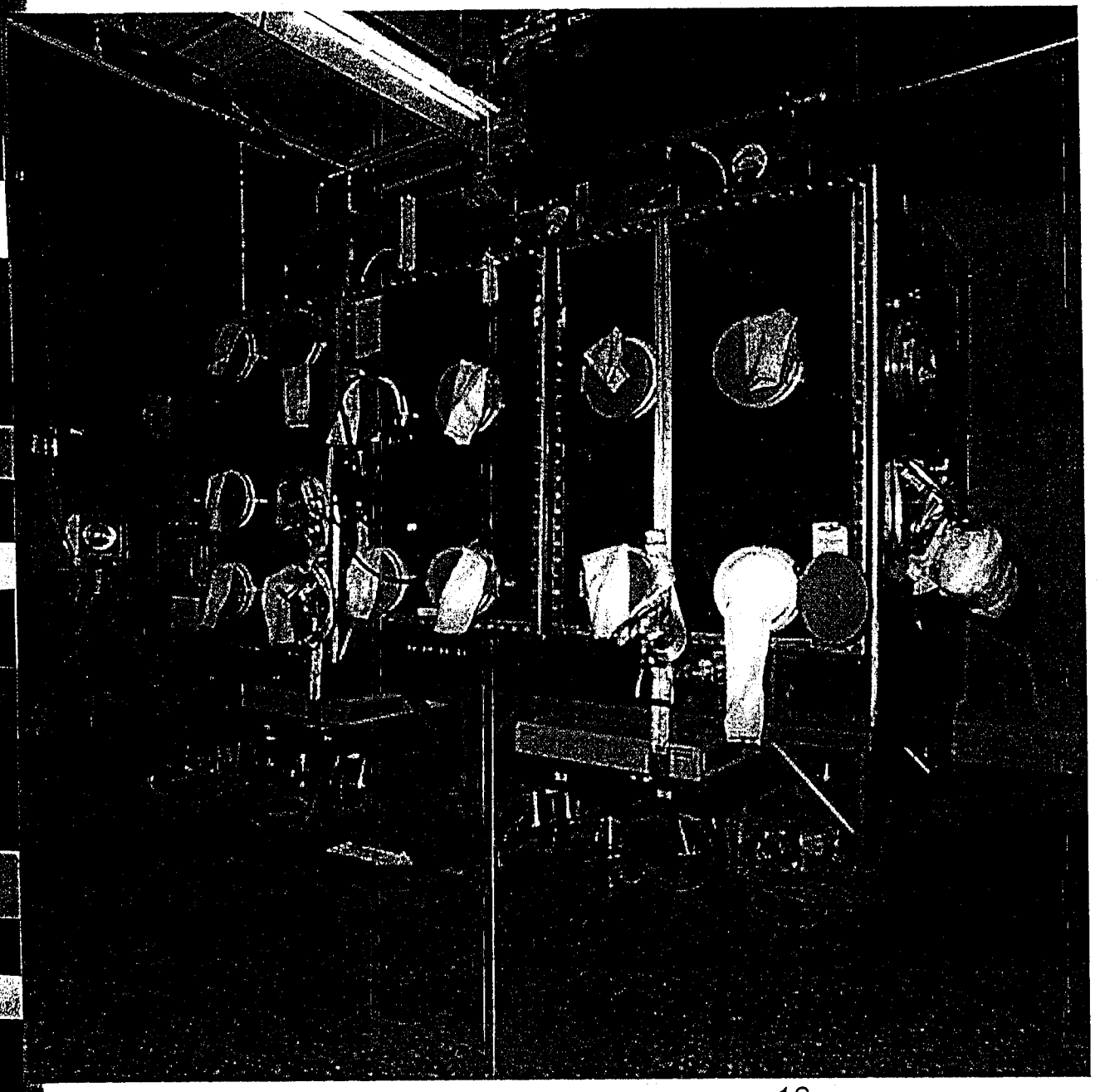
320

Building 779 Best Team

MANUAL FIRE PHONE ACTIVATED DURING GLOVEBOX MOVE

- WORK PACKAGES SHALL INCLUDE SPECIFIC MOVING INSTRUCTIONS
- MOVE PLANS REQUIRED FOR EACH GLOVE-BOX MOVE
- ENGINEERING INPUT WITH MODIFICATIONS

322



Building 779 Room 228

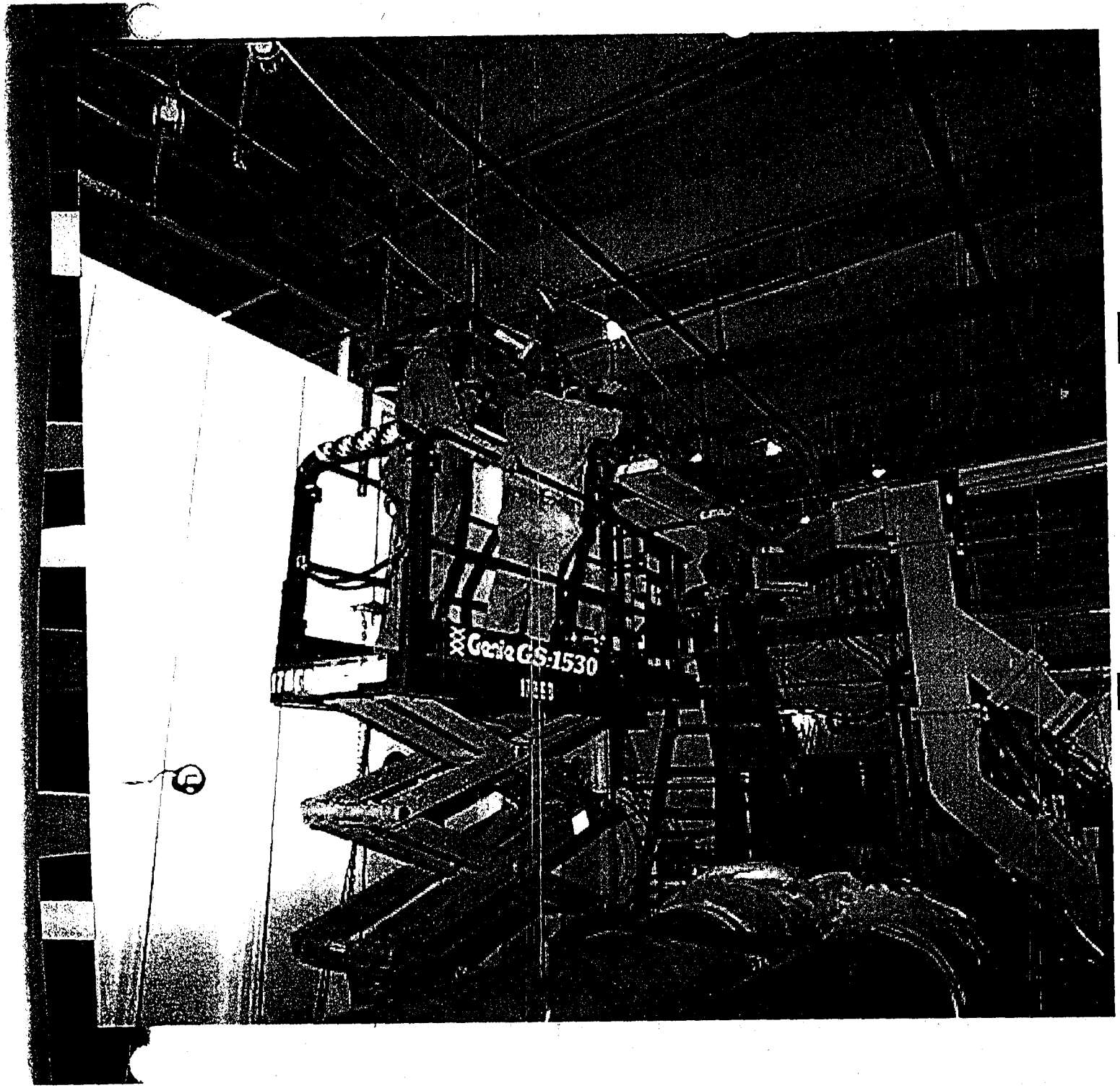
Glovebox 192

Dual Lifts

WALL PENETRATION 18 INCHES OFFSET FROM EXPECTATION

- BE AWARE THAT FACILITY DRAWINGS MAY NOT BE ACCURATE
- ESPECIALLY IN A FACILITY THAT WAS BUILT IN SEGMENTS
- MAKE EVERY ATTEMPT TO LOCATE COMPLETE HISTORY OF STUCTURAL DRAWINGS

324



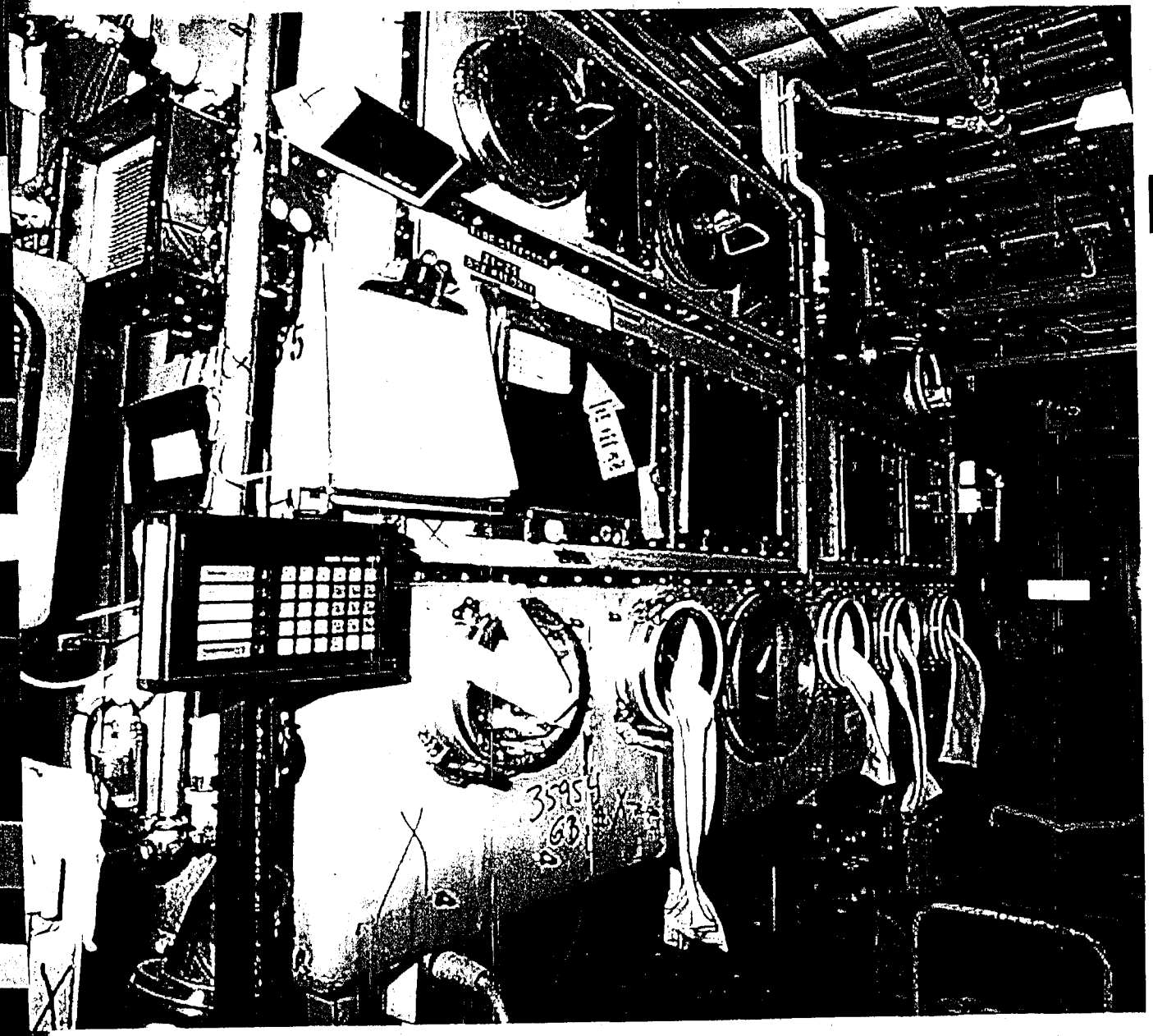
Building 729 Plenum Dis-mantling

325

PYROPHORIC REACTION DURING SIZE REDUCTION

- EXTENSIVE PRE-PLANNING DONE BY D&D TEAM PREPARED THEM FOR THE WORST CASE SCENARIO. ALL PERSONNEL RESPONDED APPROPRIATELY TO THE INCIDENT.

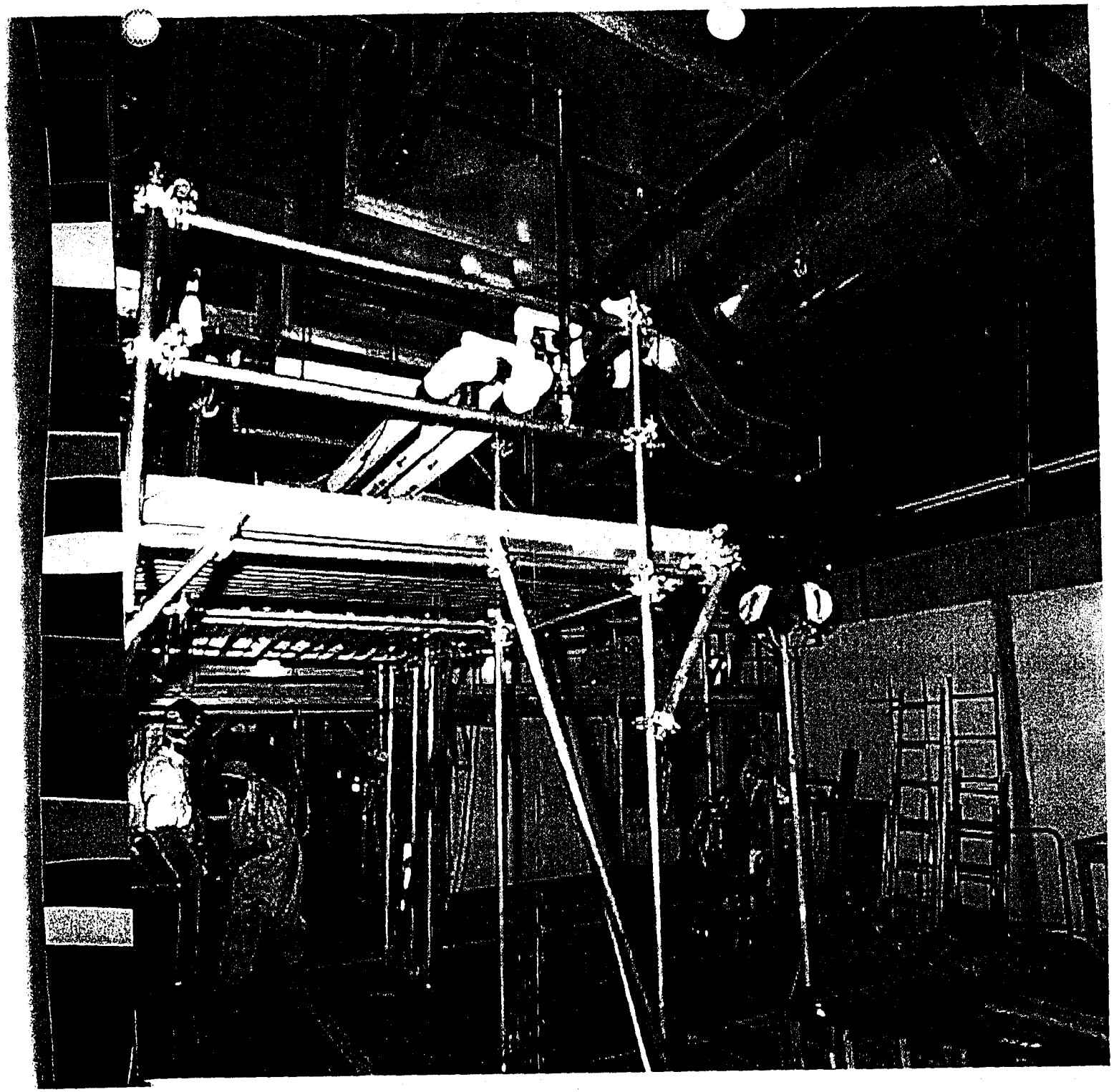
326



Building 779 - Room 154 Glovebox 1363 Before Removal

SEVERED SIO CABLE

- IT IS IMPERATIVE THAT SYSTEM BOUNDARIES ARE IDENTIFIED CLEARLY AND SUCCINCTLY.



Building 779 - Rooms 146 & 151

Ceiling, Beginning Removal and Walls Gone

SHIFT TURNOVER ADEQUACY - COMMUNICATE

- PROPERLY LABEL ALL SYSTEMS RELEASED FOR DEMOLITION-AND THOSE THAT ARE NOT.

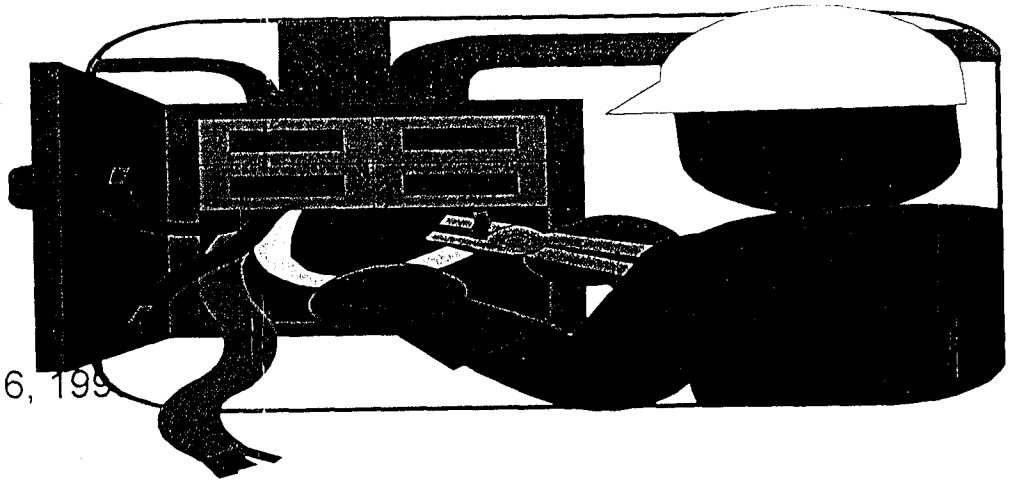
Building 779 Room 228

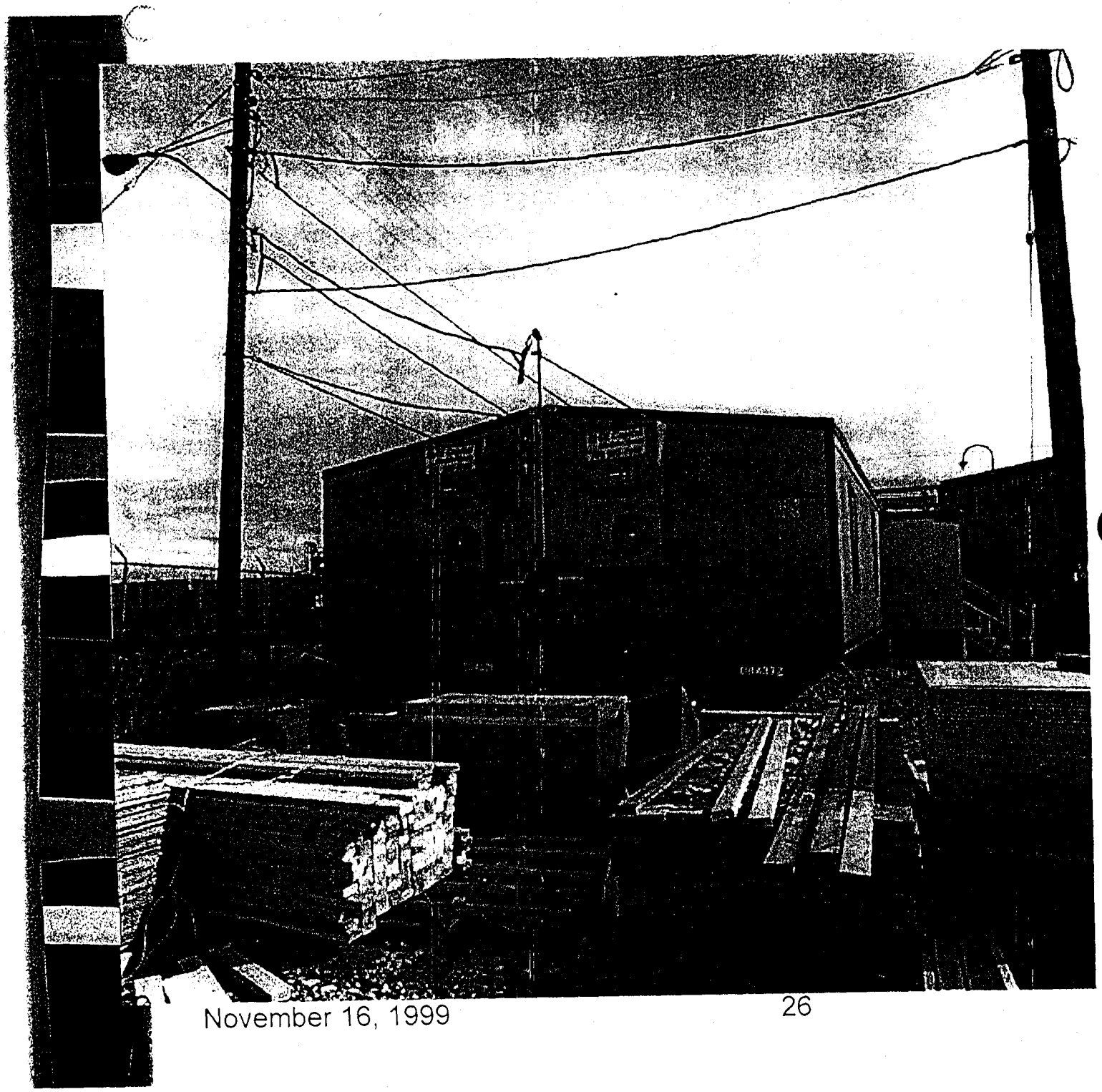
Pre-job Preparation on PAPR Suit Operation

331

TELECOM TECH DRILL INTO ENERGIZED LINE

- ALL OUTSIDE GROUP INSTALLATIONS MUST INCLUDE A JHA/AHA
- UTILITY LOCATE SHALL BE USED PRIOR TO INTRUSIVE ACTIVITIES



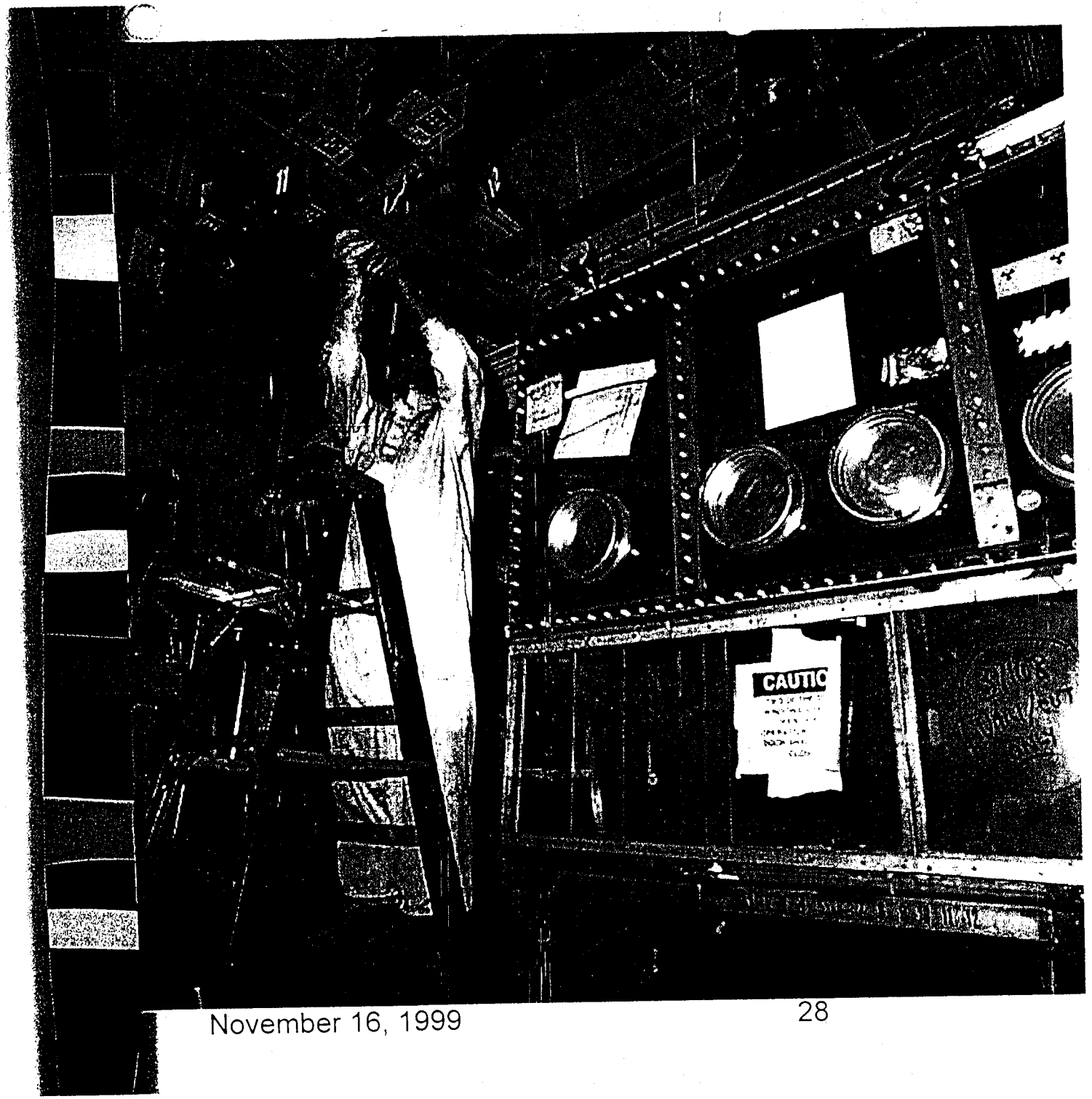


T-779-E

DWRC Contractors Trailer Installed

INITIAL PRE-EV BRIEFS

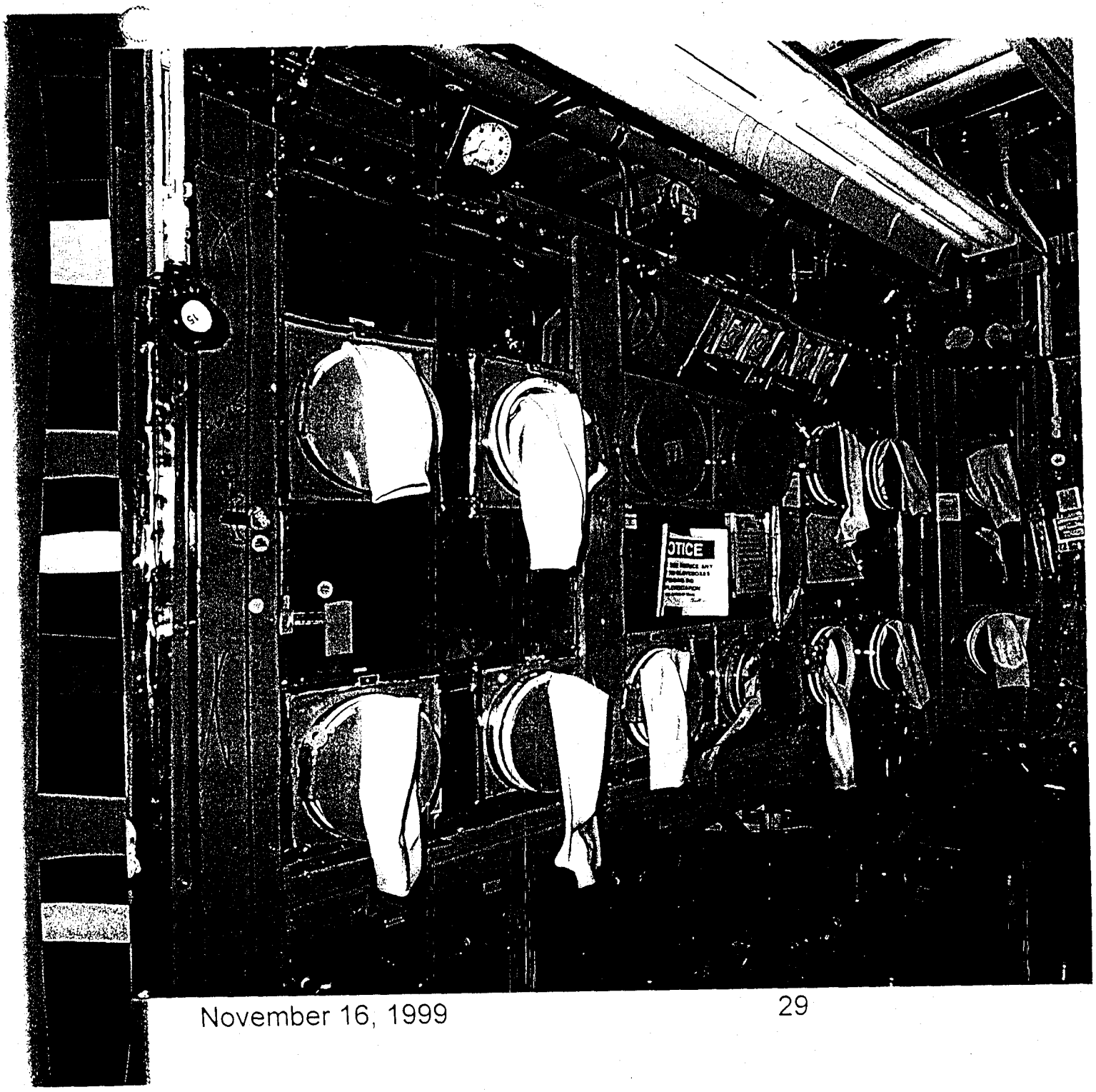
- ENGINEERS/PLANNERS SHOULD ATTEND THE FIRST PEB WITH THE WORKERS TO ENSURE COMMUNICATION IS ADEQUATE



Building 779 Room 228

Electricians Performing Lock/Out Tag/Out

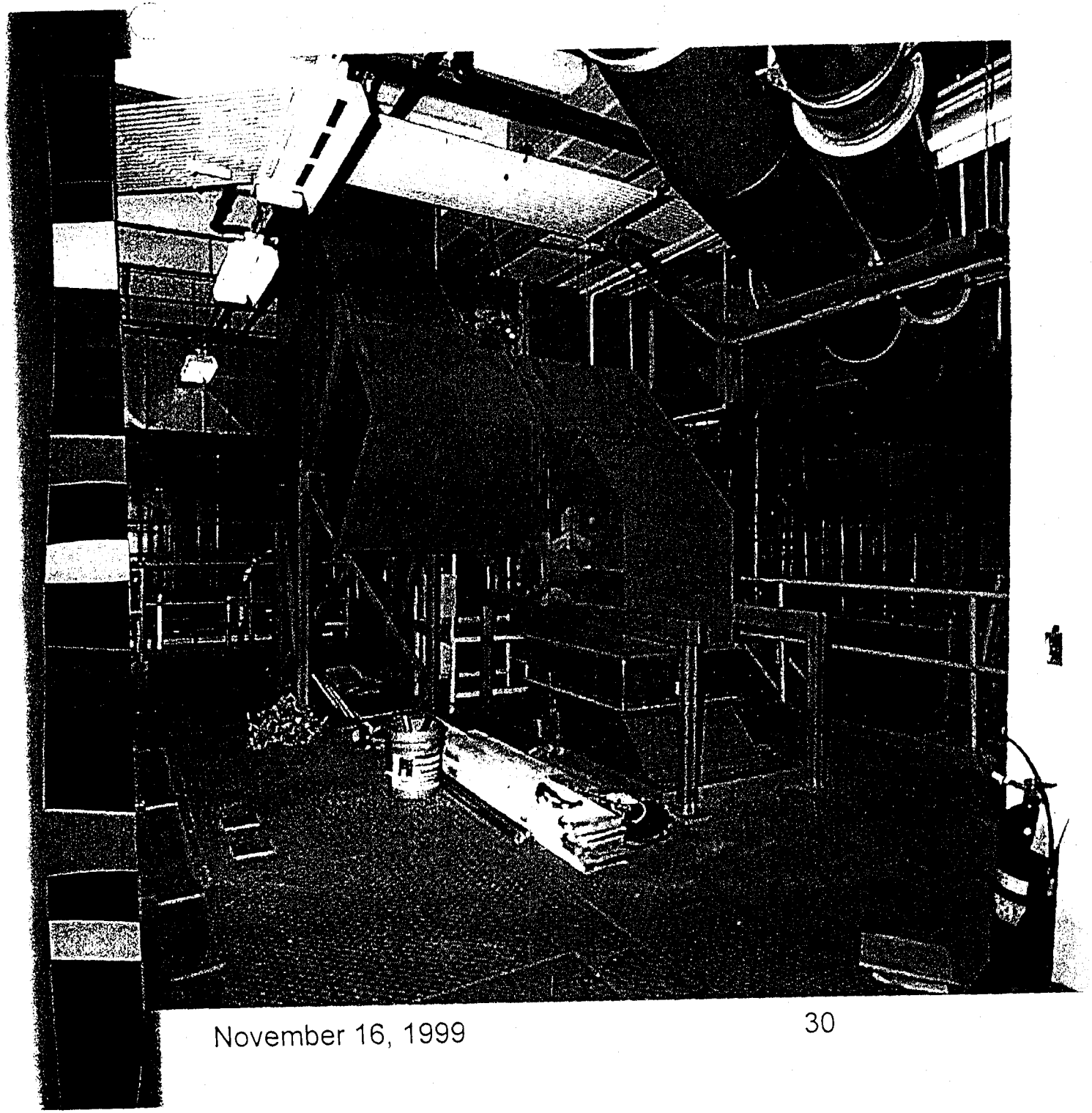
335



Building 779 - Room 133

Glovebox 956 Before Removal

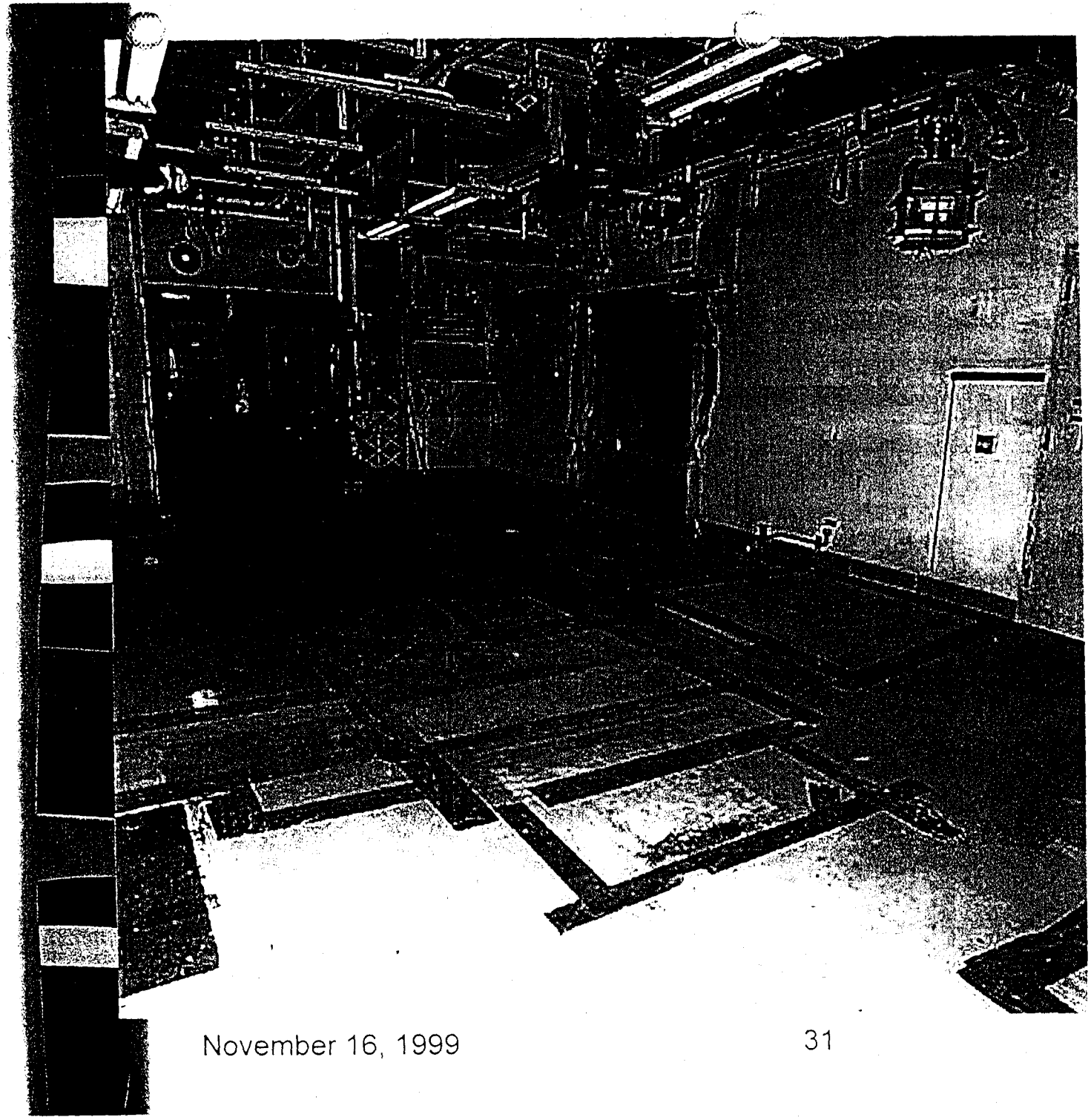
336



Building 779 - Room 142

Supply Air Fan Before Removal

337



Building 779 - Room 154

All Gloveboxes Removed Room Empty

338

SPECIFIC LESSONS LEARNED FOR WORKERS

- TAPE OPENINGS ON COVERALLS (SLEEVES): THE GLOVES SLIDE DOWN ON THE COVERALL, SO RECOMMEND TAPING SLEEVES.
- METAL GRINDING -
  - FULL FACE:
    - EVEN THOUGH ALL WORKERS ARE WEARING SAFETY SHIELDS AND GLASSES WITH SIDE SHIELDS, RECOMMENDED TO DO IN FULL FACE BECAUSE OF THE AIRBORNE "DUST" THAT OCCURS WITH GRINDING.

339

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont)

- **HOUSEKEEPING:**
  - NEED TO CLEAN CHIPS UP AS SOON AS POSSIBLE SO THE NIBBLER TOOL CAN WORK PROPERLY.
  - NEED TO CLEAN THE BOX BEFORE AND AFTER A JOB.
- **PADDING SHARP EDGES AT THE END OF AN EVOLUTION:**
  - THIS IS A VERY GOOD PRACTICE AND WE NEED TO KEEP PADDING SHARP EDGES WITH KEMWIPES AND TAPE.

340

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- **DESIGN PATTERN ON THE BOX:**
  - IT IS RECOMMENDED THAT WE SET OUT A BASIC DESIGN PATTERN FOR CUTTING THE BOXES.
- **COMMUNICATION:**
  - THIS IS A PROBLEM WITH THE TENTS. CAN'T HEAR FROM OUTSIDE TO INSIDE THE TENTS. WIRELESS COMMUNICATION WAS INVESTIGATED.
  - IT IS IMPORTANT COMMUNICATE BETWEEN THE TEAMS TO LET OTHER TEAMS KNOW WHEN YOU'VE HAD A PROBLEM OR SUCCESS WITH A PARTICULAR WAY OF DOING BUSINESS.

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- PLASTIC PENS FOR NIBBLER:
  - RECOMMEND OBTAINING PLASTIC TO BE PUT UNDER THE NIBBLER SO THE CHIPS WOULD FALL INTO THE "PEN" AND BE CONTAINED. IT WOULD ELIMINATE STEPPING ON THEM AND GRINDING INTO THE FLOOR.
- SPRAY NIBBLER WITH SOAP (COOLING):
  - THE NIBBLER GETS HOT AND NEEDS TO BE COOLED WITH A MIST.

342

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- TOOL USE (SAWSALLS, NIBBLERS, 18 TOOTH BLADES):
  - WATCH YOUR USAGE, IF YOU DON'T FULLY UNDERSTAND HOW TO USE A PARTICULAR PIECE OF EQUIPMENT, ASK. IN PARTICULAR, IT WAS OBSERVED THAT USERS WOULD WIGGLE THE NIBBLER WHEN IT GOT INTO A BIND--THIS IS IMPROPER USAGE. JUST LET THE NIBBLER WORK FOR YOU, DON'T TRY TO HURRY IT IN ANY WAY.

343

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- **EXTENSION CORDS:**
  - CHECK CORDS FOR THE CORRECT AMPERAGE. IF NOT CORRECT, ENSURE THE RIGHT CORD IS PROVIDED FOR THE JOB.
- **LIFT TABLES:**
  - STRAP GLOVEBOXES TO LIFT TABLES BEFORE SIZE REDUCTION. THE JOB WORKS BETTER IF BOX IS SECURED, ENSURE THIS IS DONE BEFORE STARTING WORK.

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- **SHUT WIRE VALVES:**
  - VALVES SHOULD BE LOCKED OUT/TAGGED OUT, HANDLES REMOVED, OR WIRED SHUT BEFORE STARTING JOB TO ENSURE THERE IS NO INADVERTENT CHANGE OF HANDLE LOCATION.
- **CORDS - BUDDY SYSTEM:**
  - USE THE BUDDY SYSTEM TO ENSURE NO ONE GETS TANGLED UP IN THE CORDS BEING USED ON THE JOB. EACH PERSON WORKING WITH THE EQUIPMENT SHOULD HAVE AN INDIVIDUAL WORKING BEHIND THEM TO MAKE SURE CORDS ARE MOVED AS OPERATOR MOVES.

3.45

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- **WORK AT EASY ACCESS LEVEL:**
  - PLACE ANY WORK AT THE PROPER ACCESS LEVEL SO THERE IS NO UNNECESSARY BENDING BEFORE WORKING.
- **TENT - RCTs:**
  - BE SURE THERE ARE TWO RCTs LOCATED INSIDE THE TENT. IT WORKS BETTER FOR WORKERS.

3476

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- **LOOSE ITEMS:**
  - IT WOULD BE EXTREMELY BENEFICIAL IF ANY LOOSE ITEMS, CAPITAL EQUIPMENT, ETC., WERE REMOVED FROM THE ROOMS WHERE WORK IS TO TAKE PLACE. SOME OF THE ROOMS, WERE SO CROWDED WITH CAPITAL EQUIPMENT THAT IT WAS DIFFICULT TO MOVE AROUND.
- **TAPE WHEELS:**
  - WHEN WHEELING A LOAD (GLOVEBOX) FROM ONE ROOM TO ANOTHER, IT IS IMPORTANT TO TAPE THE WHEELS TO ENSURE CONTAMINATION CONTROL.

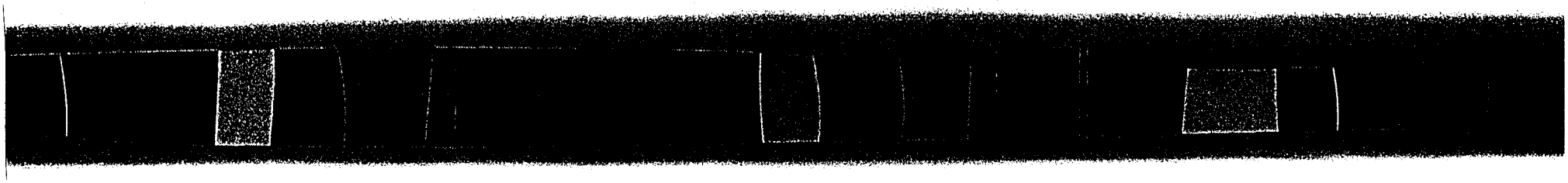
347

SPECIFIC LESSONS LEARNED FOR WORKERS (Cont.)

- **WALKDOWNS:**
  - ENSURE TEAMS TALK AMONGST THEMSELVES DURING WALKDOWNS TO EXPLORE ALL POSSIBILITIES AND WORK THE JOB THROUGH DURING THE WALKDOWN.
- **PRE-EVOLUTION BRIEFS:**
  - WHEN FOREMEN ARE CONDUCTING PRE-EVS, MANAGEMENT RECOMMENDS THAT THE PRE-EV BE MORE DETAILED TO THE WORK BEING CONDUCTED. IT IS NECESSARY TO UNDERSTAND WHAT IS REALISTIC AND WHAT IS NOT. IT IS AS IMPORTANT TO UNDERSTAND WHAT DID WORK WELL AS WELL AS WHAT DIDN'T.

348

LESSONS LEARNED
Building 779 Engineering and Planning



Brian Henderson, Engineering

349

TOPICS

- Pre-Planning Activities
- Planning Activities
- Use of Standard Work Packages
- Configuration Management
- Other Observations

350

PRE-PLANNING ACTIVITIES

- Work Package scope definition
  - Identify the size of the bite
  - Make the bite digestible
- Authorization Basis personnel involvement
  - Preliminary identification of:
    - Methodology
    - Anticipated Controls
    - Prohibited Activities
- Fire Protection Engineering involvement
  - Anticipated Controls
  - Prohibited Activities

PLANNING ACTIVITIES

- ISM IMPLEMENTATION
  - 779 initially had little worker involvement
    - Hard to sell methodology
    - Plan did not suit actual methods to be used
- Involvement in Pre-Planning not necessarily beneficial
  - Need a draft to get constructive input from the craft
  - Helps organize the thought process

352

PLANNING ACTIVITIES (Cont)

- Started ISM with good draft IWCP
  - Received good, constructive input from the majority of the participants
  - Reduced the volume of the packages
  - Reduced the number of field changes necessary to work the packages
  - Bonded the Team
    - Craft began to Trust the E&P staff
    - E&P staff began to appreciate the craft effort necessary to complete the activities

353

PLANNING ACTIVITIES (Cont)

- Work Package Uniformity
  - Expedites review process
  - Work performed in field as uniformly as possible
  - Used standard appendices for repetitive activities

354

USE OF STANDARD WORK PACKAGES

- Tight definition of scope and requirements to use SWPs.
  - Used for tasks such as Tent Construction and Encapsulation of Gloveboxes

355

CONFIGURATION MANAGEMENT

- Used the DES-210 procedure for completing as-built drawings only at the end of a project
- Keep accurate working redlines
- Void drawings in blocks
  - Expedites the process
  - Minimizes Document Control hours

356

OTHER

- Work SIO issues early
- Keep work instructions simple and flexible

AB
Lessons Learned From BUILDING 779

Brian Voelz / Julia Hamrick

Nuclear Safety and Technical Support

358

Objective

- Summarize AB Lessons from 779
  - Things that worked well in 779
  - Things that didn't work well (Problems)
  - Changes required to complete project
- Organized Items Similar to BIO
  - Activity Description
  - Hazards
  - Accident Analysis
  - Controls
  - Compliance Issues
  - Other

359

Activity Descriptions

- Have a good understanding of the methods and sequence for dismantling the building.
  - Methods are important for understanding hazards.
  - Sequence is important for understanding what hazards are left and what systems are available for accident analysis.
  - When can you remove facility from SIO loop
  - Don't credit filtration for fires while dismantling filter plenums

360

Activity Descriptions (Cont)

- **Activities that are part of facility mission and have been evaluated are not considered changes to the facility as described in the AB Document**

361

Activity Descriptions (Cont)

- Don't underestimate waste generating and handling activities
  - In-Process Containers
  - Staging Waste
  - Removing waste through airlocks, exterior doors, docks
  - Gluing, nailing, and banding LLW crates outside
  - Shuffling/juggling containers (Attended In-Process vs Unattended Storage)

362

Hazards

- Compressed gas bottles (e.g., portable breathing air backup, CO_2 bottles for freeze seals)
- Vehicles (cranes, forklifts, propane and diesel powered forklifts and cranes inside building)
- Water generated from hydrolazing
- High/Low temperature environments (heating and cooling problems)
- Consider tying hazards to the activities (e.g., hydrolazing and scabbling are associated with structural decon)

363

Accident Analysis

- Lack of useful information or guidance in DOE-HNBK or SARAH for modeling D&D activities
  - Fixative coatings
  - Waste containers (e.g., SWBs)
- Include impact of using airlocks and doors to remove waste on BLPF
- Don't credit filtration for fires when dismantling equipment in plenum areas
- Consider reliability of temporary systems (e.g., temporary electrical, airmovers)

Accident Analysis (Cont)

- Allow uncertainty for gram estimation – overmass waste containers (don't use waste packaging limits for individual waste container accidents)
- GB MAR can be significantly reduced prior to size reduction

365

Controls

- Have a method for discontinuing every control (LCOs, ACs, Design Features)
  - 779 generally used Applicability Statements
  - Relied heavily on Operationally Clean process
  - 779 submitted Page Changes for discontinuing Design Features and staffing requirements
  - Consider this approach for SC-3 systems
- Let the programs adjust to projects and be flexible enough to deal with unknowns
  - Radiation Control
  - Fire Protection

366

Controls (Cont)

- Fire Protection ACs
  - <u>Combustible Material Controls</u>
    - General Building Controls (approved fixative coatings, oxyacetylene limitations, etc.)
    - Secondary Confinement Area Controls
    - Duct/Plenum Area Controls
    - Size Reduction Room Controls
    - Controls for Sprinkler Deficiencies
    - Controls for Fire Barrier Deficiencies
    - Controls for Operationally Clean Areas
  - Implemented by workers through training and work instructions.
  - Verified by CCO through surveillances.

367

Controls (Cont)

- Fire Protection ACs
  - <u>Ignition Source Controls</u>
    - Hot Work Controls (HSP-31.10)
    - Plastic House Fire Protection (HSP-43.09)
  - <u>Plastic Tent Controls</u>
    - FPE approval of each tent
      - Size (combustible loading)
      - Location (separation distances)
      - Impact on Combustible Controls
    - Nuclear Safety approval of each tent
      - Compare configuration to accidents (e.g., MAR)
  - Implemented through IWCP Process

368

Controls (Cont)

- Get rid of unnecessary systems
  - Problems with "jumpering" out SIO Loop
  - Problems with keeping Deluge System up while cutting around detectors
- HVAC controls (filtration and pressure differential) need to be flexible to remove fans, ductwork, and plenums
- LS/DW audibility controls needs to be flexible to adjust to D&D noise
- Provide methods to handle temporary and permanent sprinkler and fire barrier deficiencies

369

Compliance Issues

- Inadvertent Conduct of Work
- Repackaging Overmass Waste Containers
- Notification of SC-3 System Removal
- Control of Operationally Clean Areas
- Control of Gram Limits in Size Reduction Tents
- Reliance on Temporary Systems (e.g., Air Movers)
- Surveillance/Compliance Procedures

Other

- Simple work instructions (IWCP Packages) that can be followed by workers and are flexible enough to get the work done
  - 779 frequently used "do loops"
  - Allow supervisors and programs to make decisions
  - Hand off to procedures as necessary
- Success requires "Blockers" and "Runners"
  - "Blockers" do advanced planning with Engineers and Planners and fix or streamline AB issues for "Runners"
  - "Runners" do day-to-day evaluations and AB support

371

Glovebox Removal
Duct Removal

M. E. (Hoss) BROWN
Building 779 D&D Manager

372

BUILDING 779 HISTORY

- Used for Research Efforts Supporting Nuclear Weapons-related Activities
- Research involved plutonium, uranium, beryllium, and various steels
- Primary Confinement through the use of Gloveboxes and Hoods (i.e., Room 133)
- Know the history of what your dealing with

373

Decontamination and Decommissioning of ROOM 133

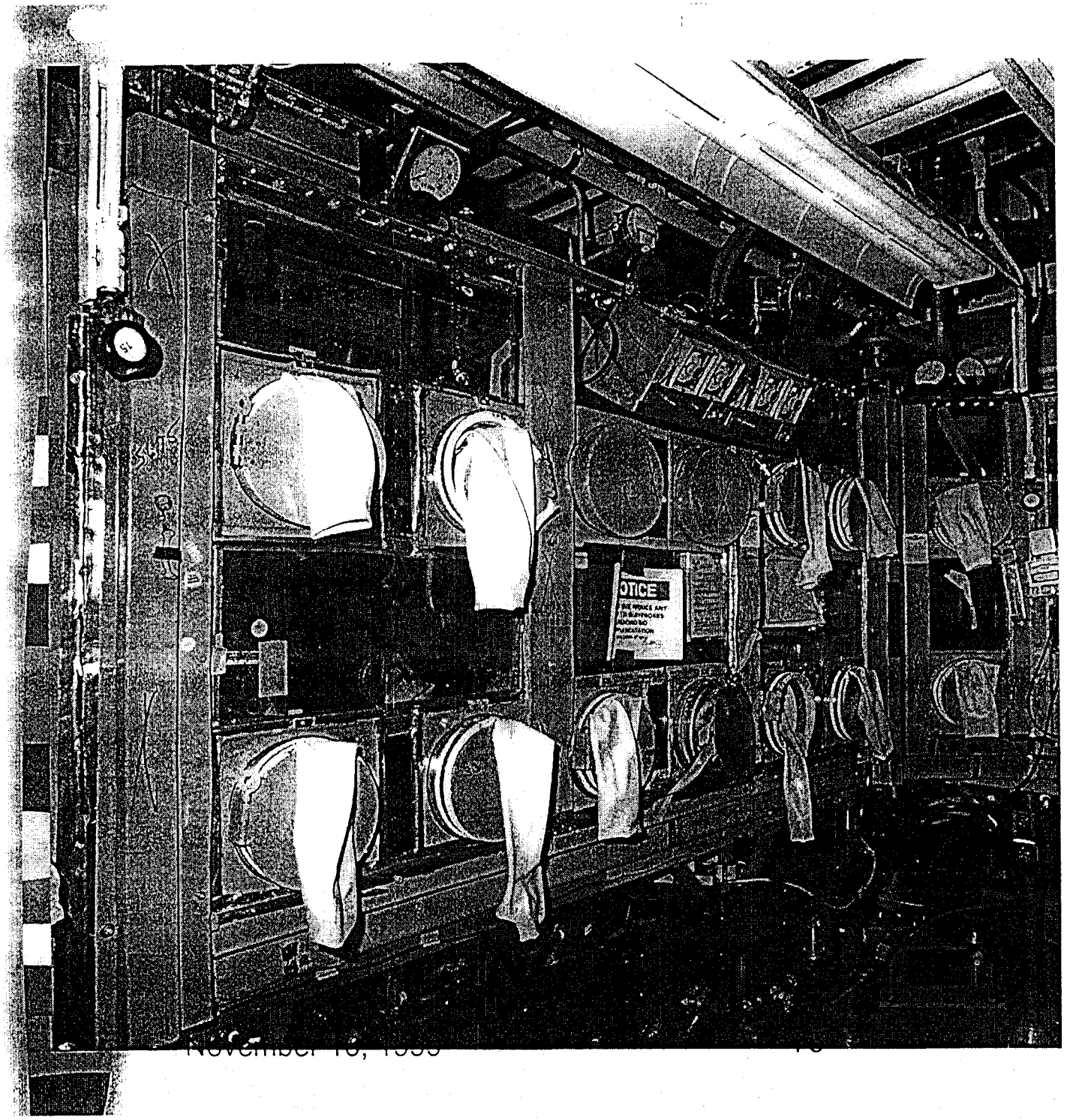
- Room 133 Contained *Seven* Contaminated Gloveboxes and Numerous Contaminated Piping Runs
- Gloveboxes used for R&D Pyrochemical Processes
  - Direct Oxide Reduction
  - Electro-Refining
  - Vacuum Melting

374

Molten Salt Extraction

- Salt Scrub

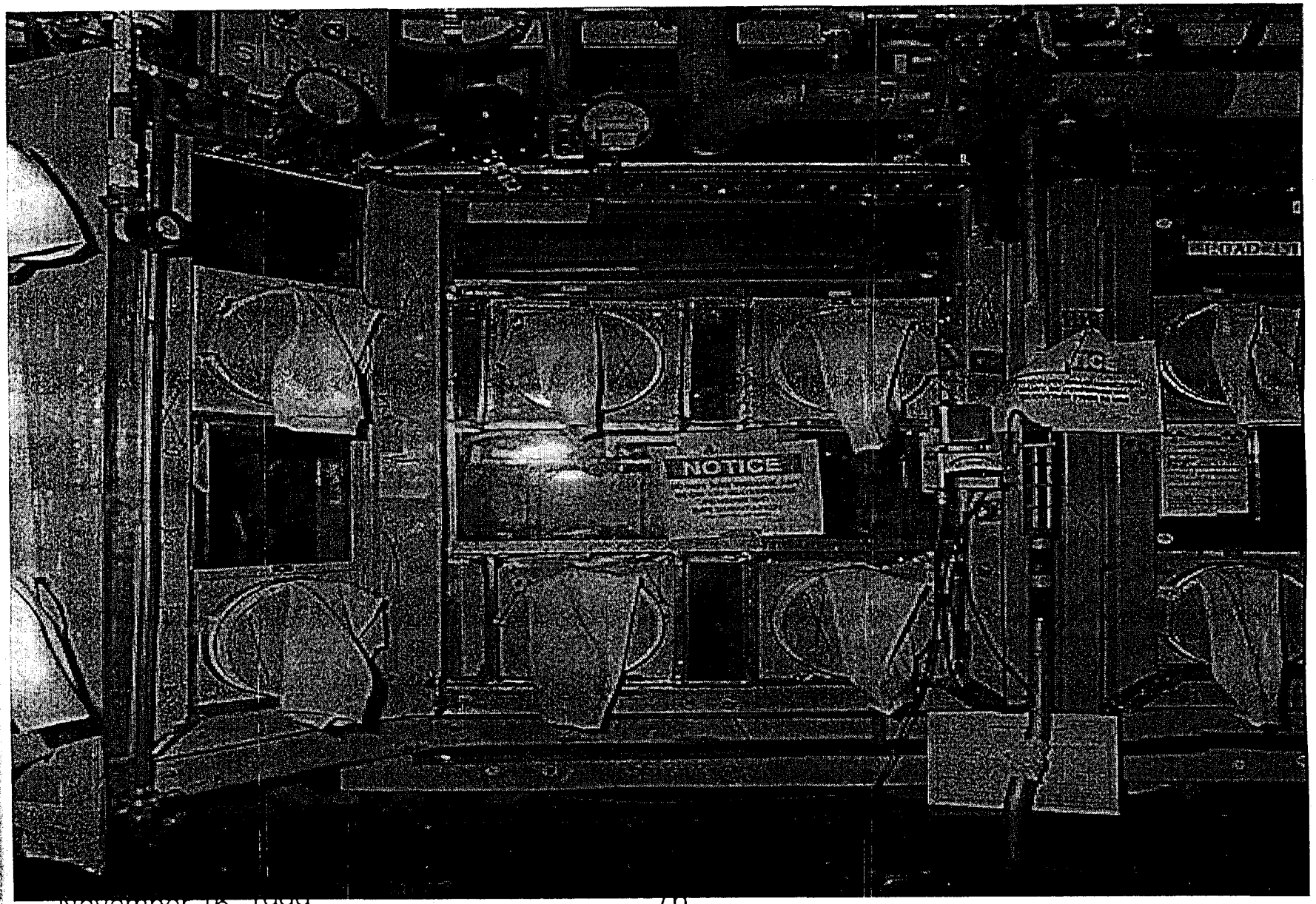
375



Building 779 - Room 133

Glovebox 956 Before Removal

B779, Room 133, Glovebox 954, Before Removal



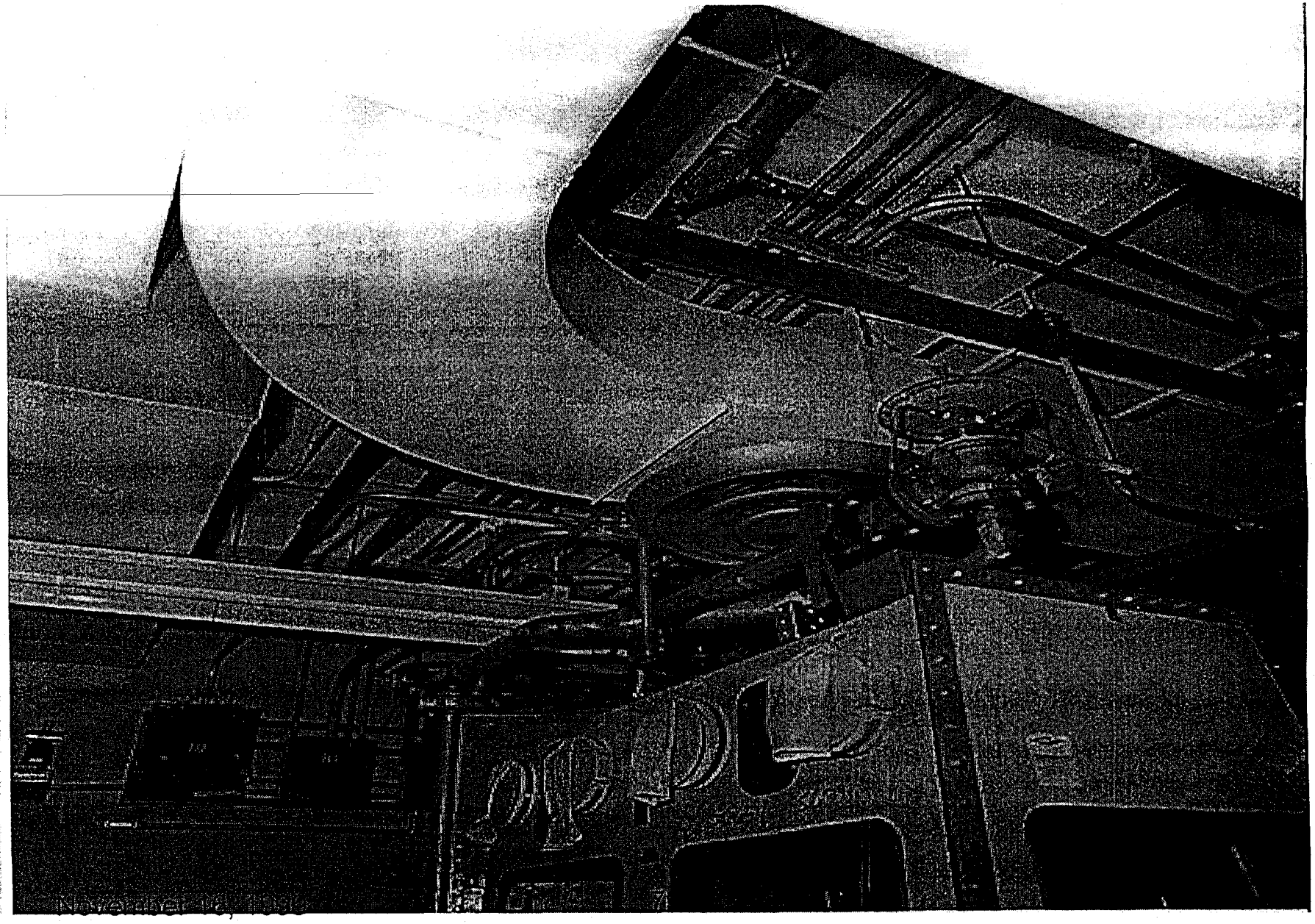
377

B779, Room 133, Glovebox 957, Before Removal

378

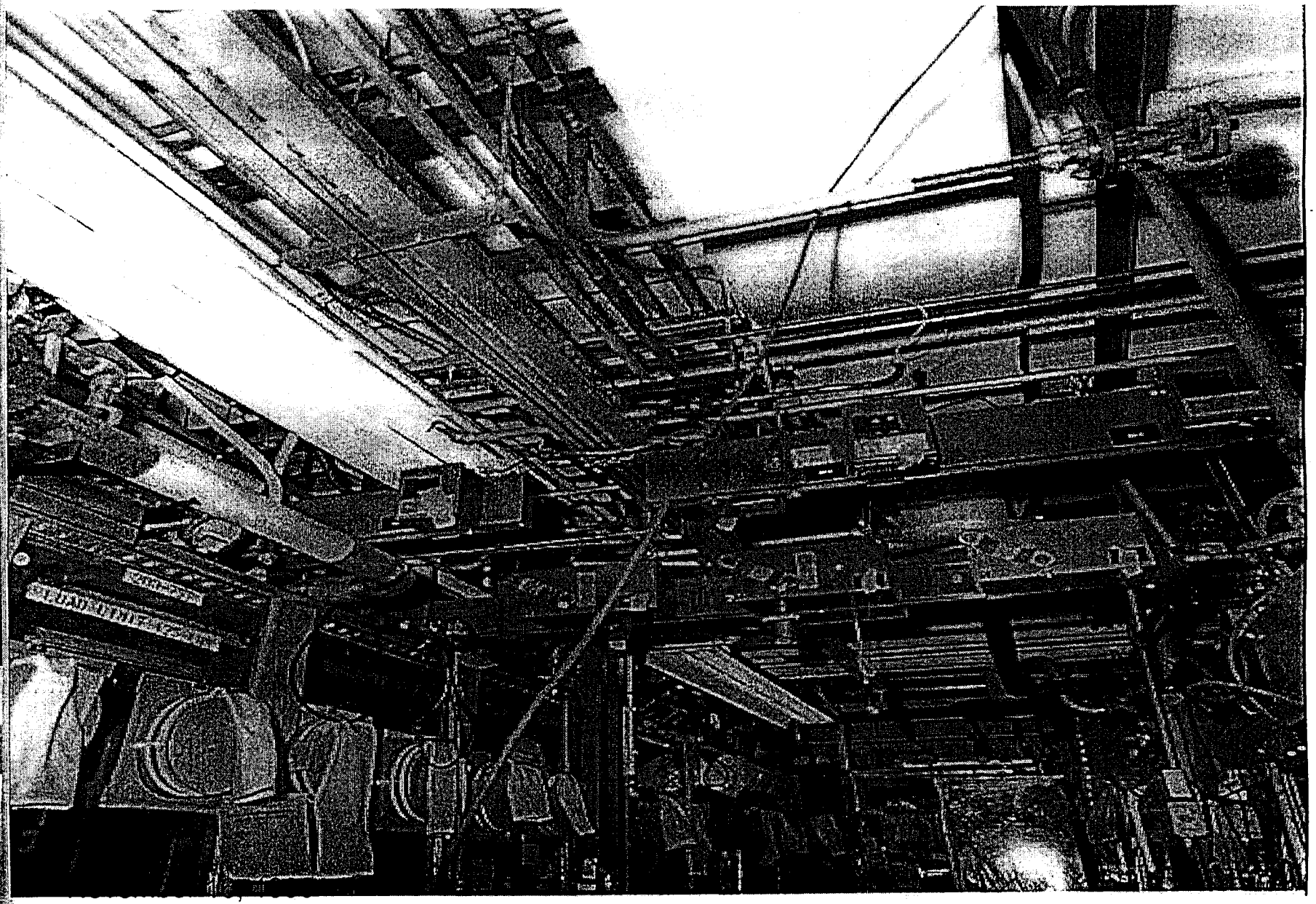
B779, Room 133, Glovebox 955 Before Removal

B779, Room 133, Piping, Duct, and Fire Boxes



380

B779, Room 133, Electrical Bus and Pipes



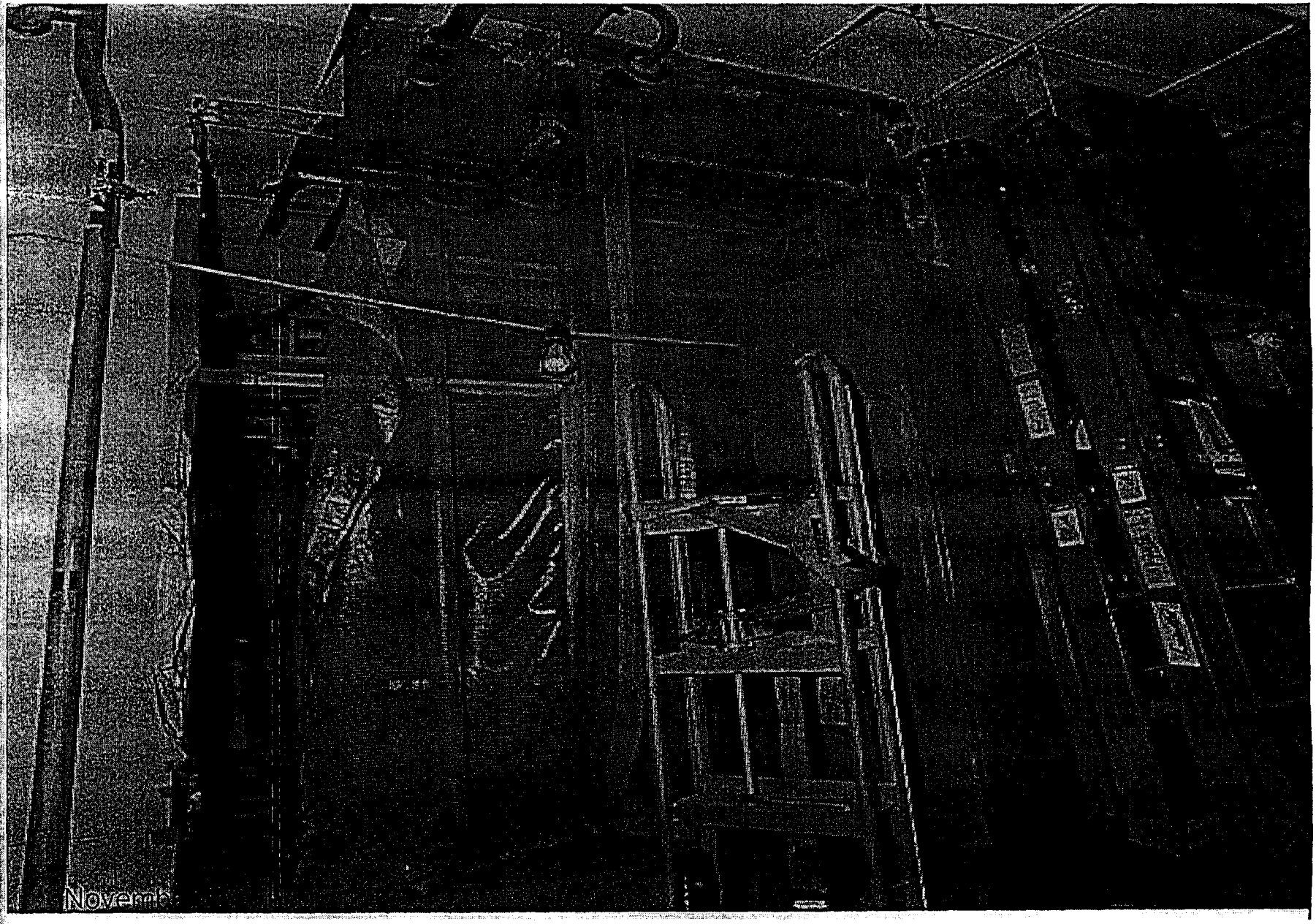
3591

MAJOR CONCERNS and HAZARDS

- Age of Components
- Congestion
- Plutonium and Americium
  - (Authorization Basis issues)
- Liquids
- Movement of Gloveboxes to Size-Reduction Tents
- Size of Gloveboxes
- Waste Issues (IDCs, Removal)

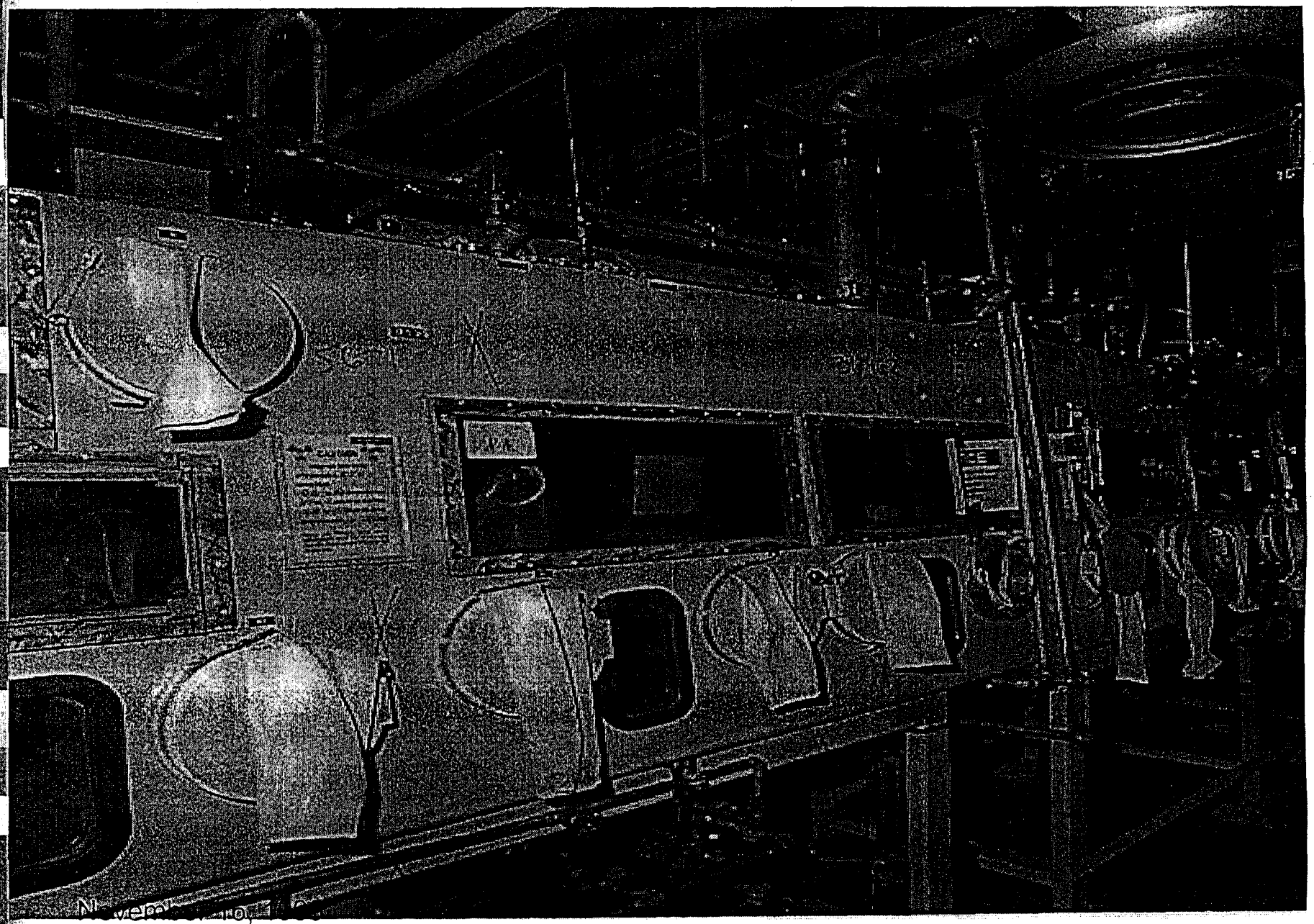
382

B779, Room 133 into 137, Hole in the Wall



383

B779, Room 133, Glovebox 959, Before Removal



384

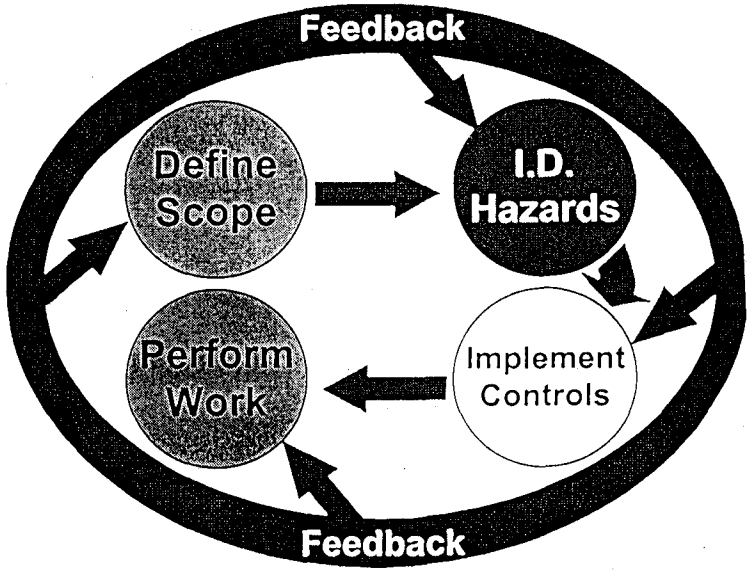
HAZARD IDENTIFICATION and CONTROL PROCESS

- History (Prior work Experiences)
- Stages of Walkdowns (Involvement)
- Teamwork
- JHA
- Brainstorming
- Lessons Learned

385

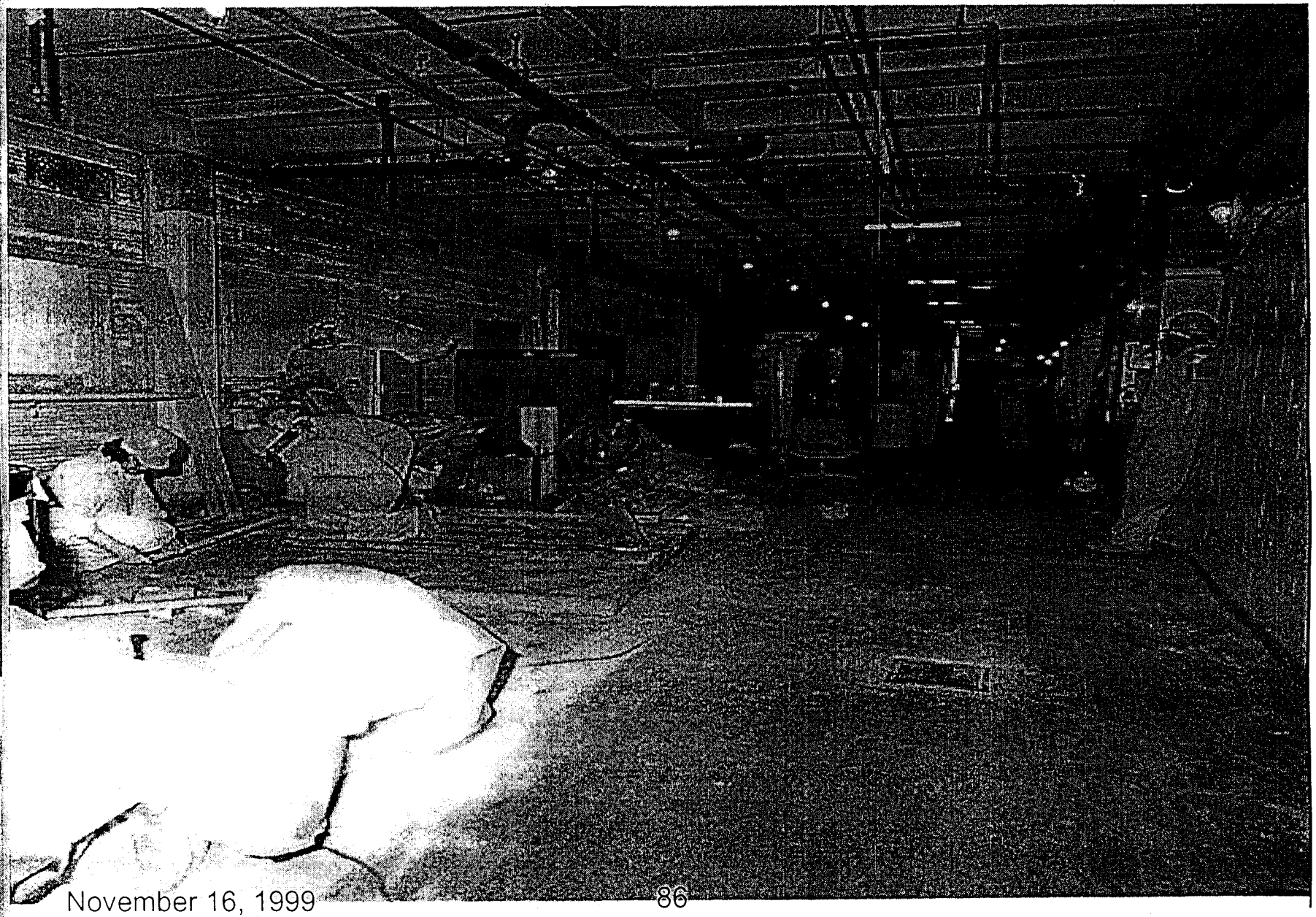
ISM DEVELOPMENT

- Early Stages
- Maturity
- Continually Evolving Process
- Conclusions



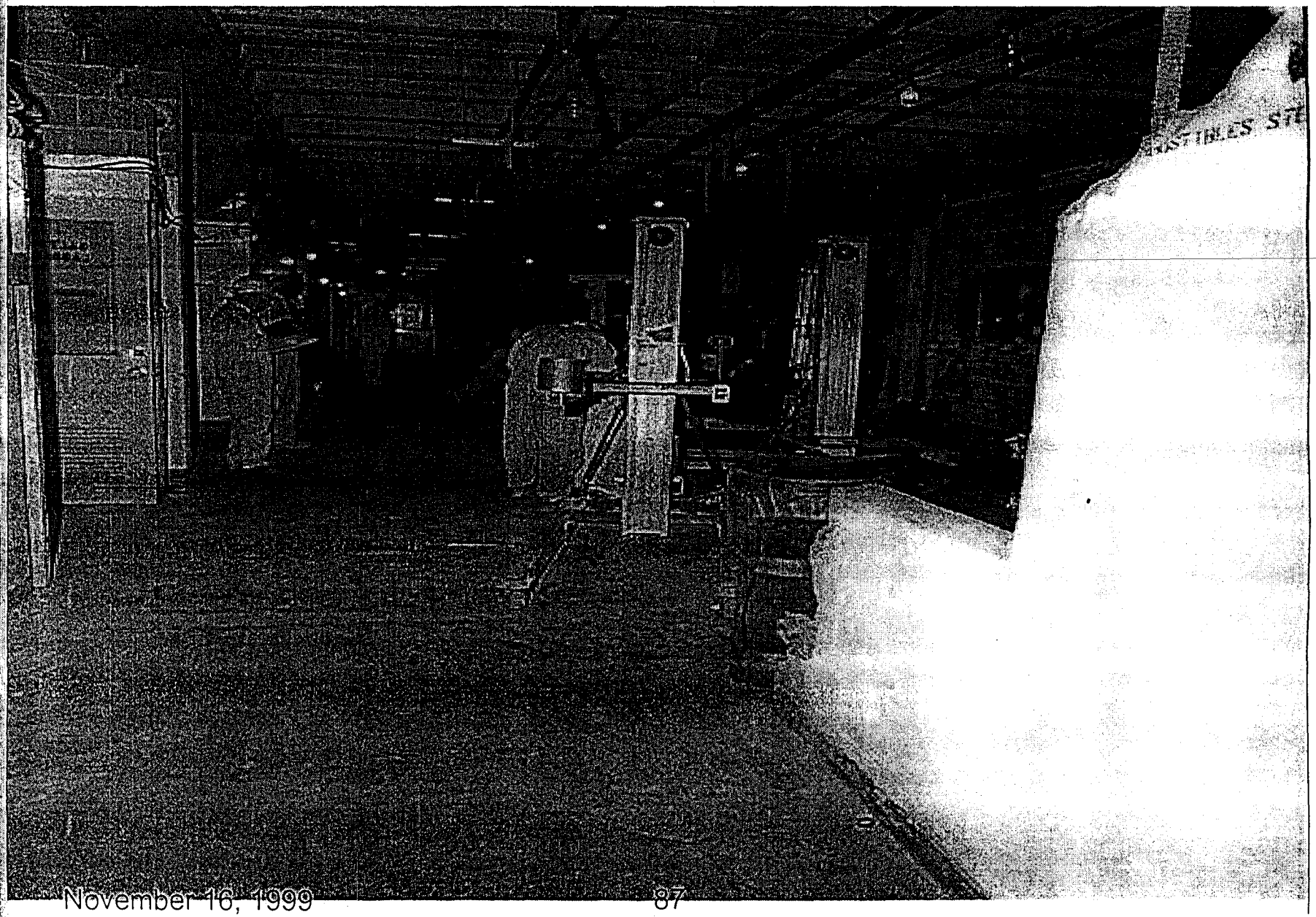
386

B779, Room 120 and 130 Series Walls Removed



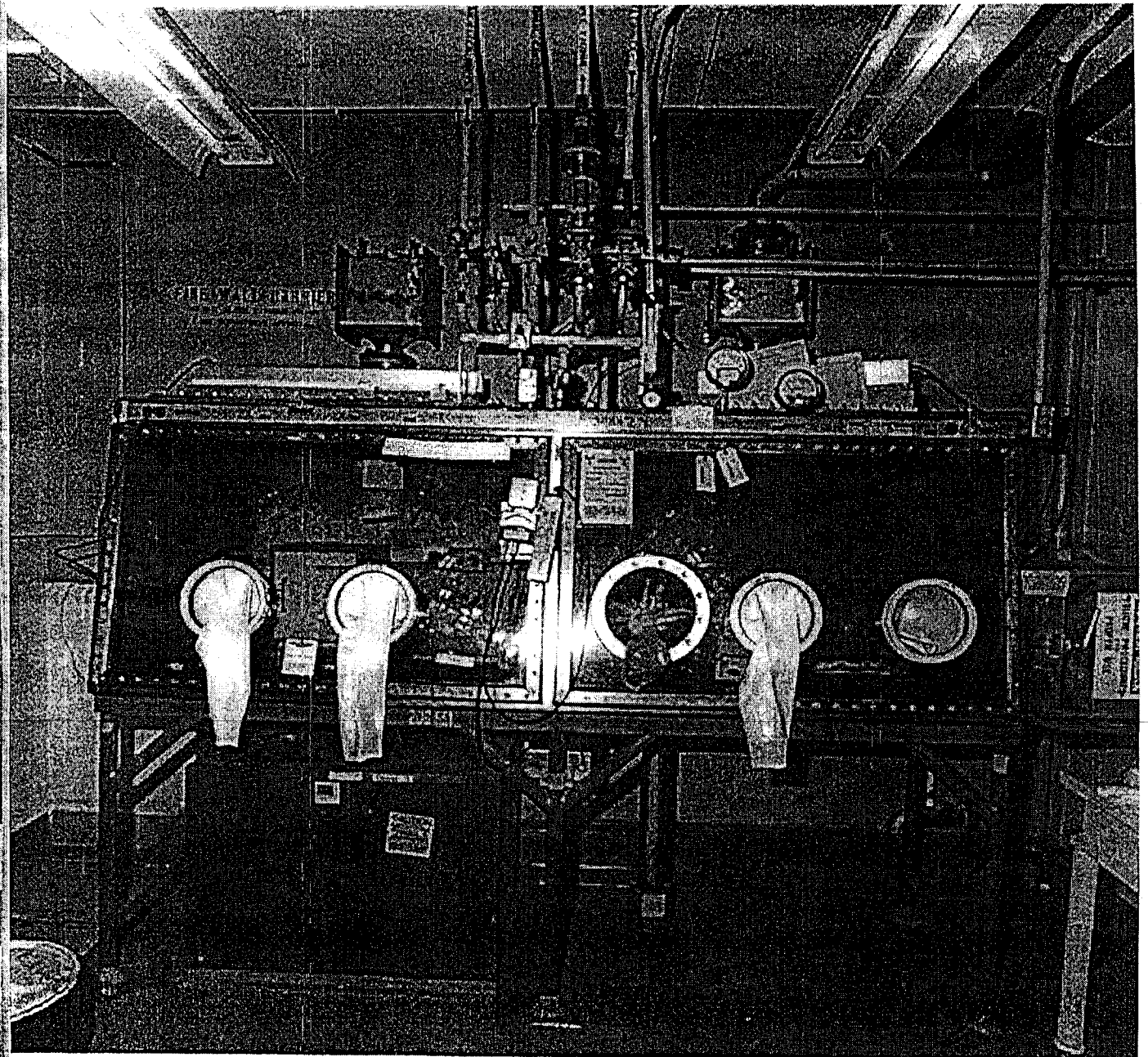
387

B779, Room 120 and 130 Series Walls During Removal



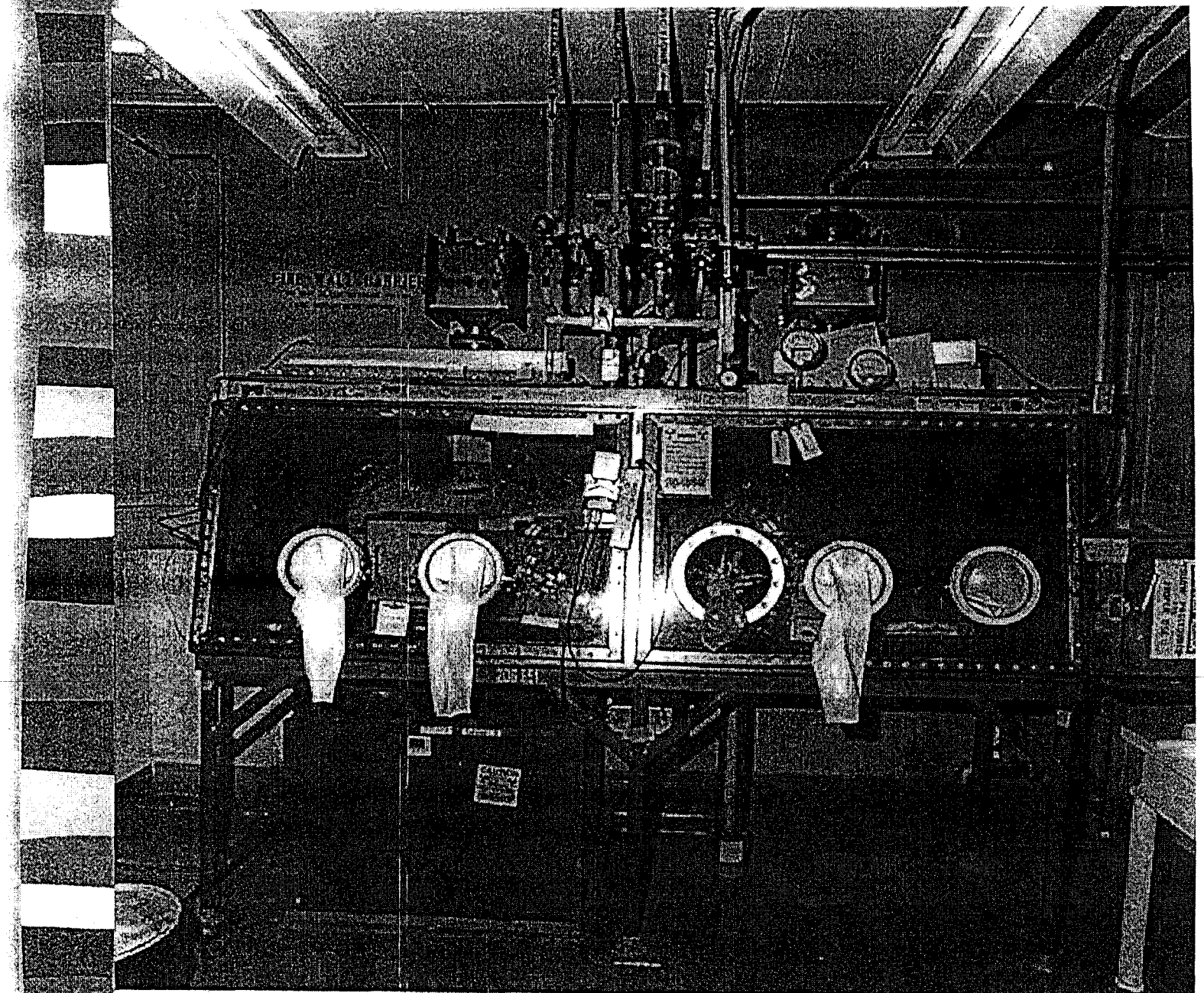
B779, Rooms 133, 137, 140, 141 Series Walls Removed

389



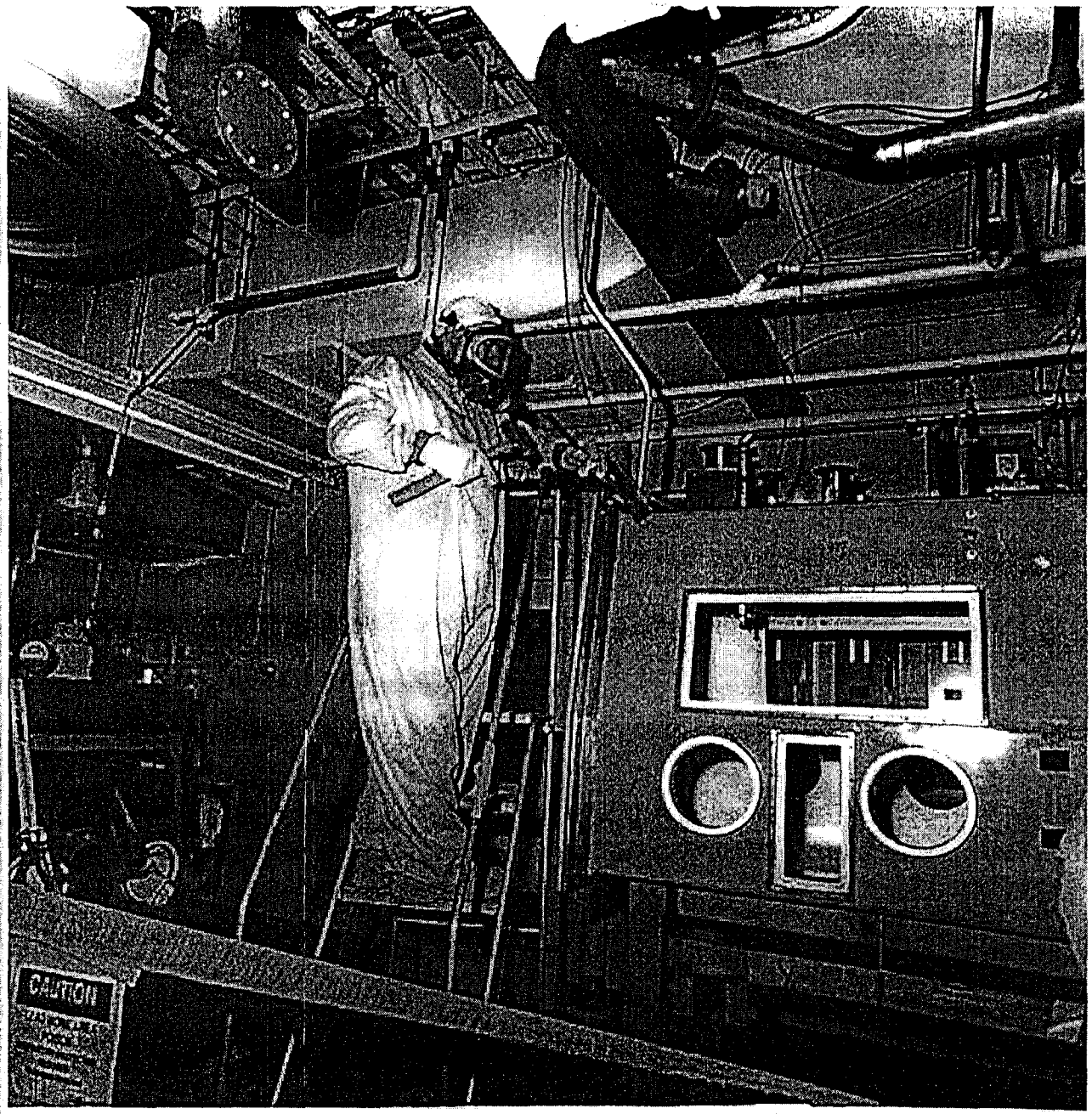
Building 779 - Room 137 *Glovebox 106 Before Removal*

390



Building 779 - Room 137 *Glovebox 106 Before Removal*

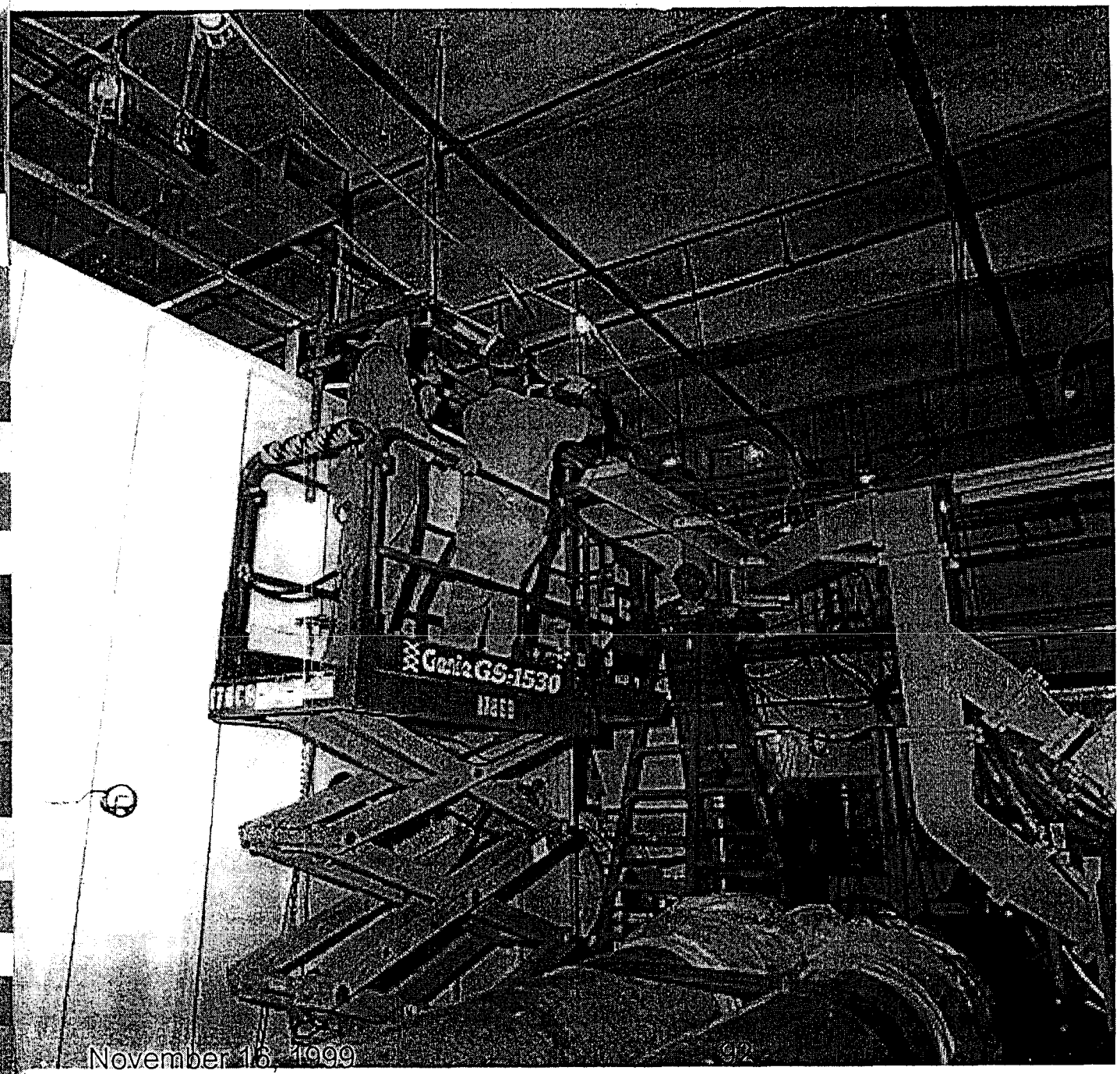
391



Building 779 - Room 222

Glovebox lead removal

392

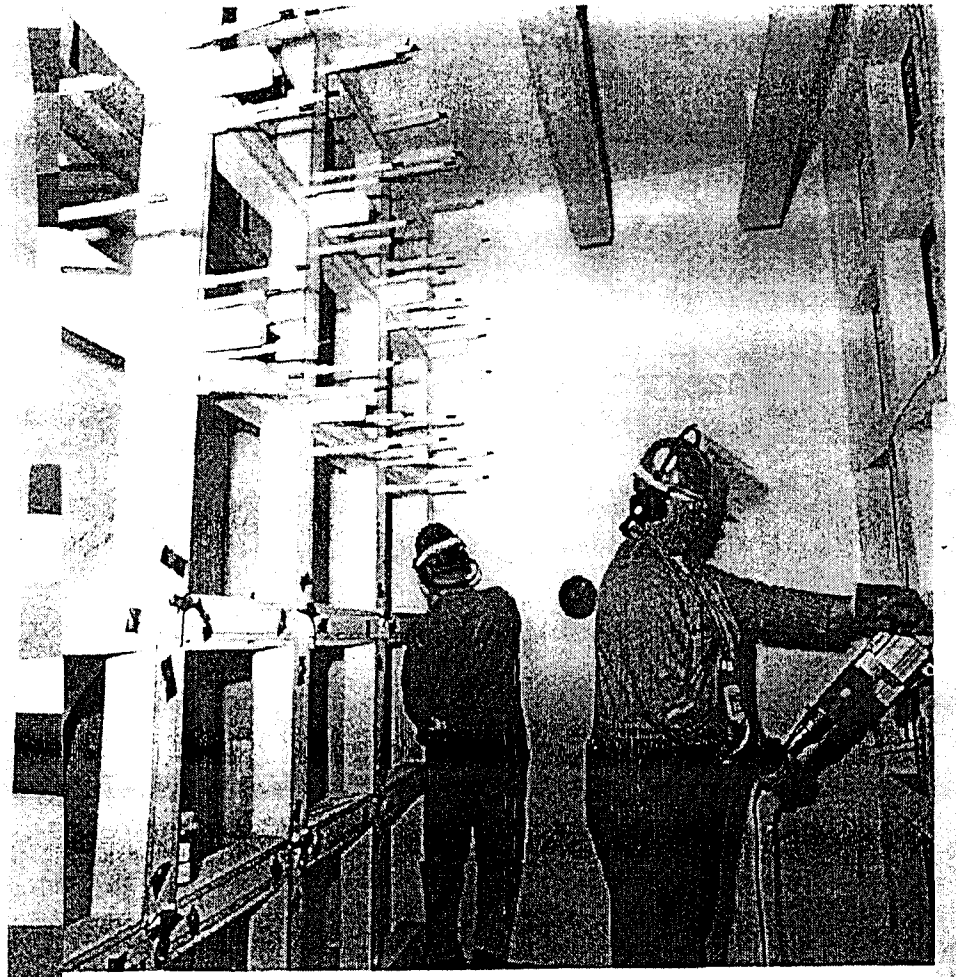


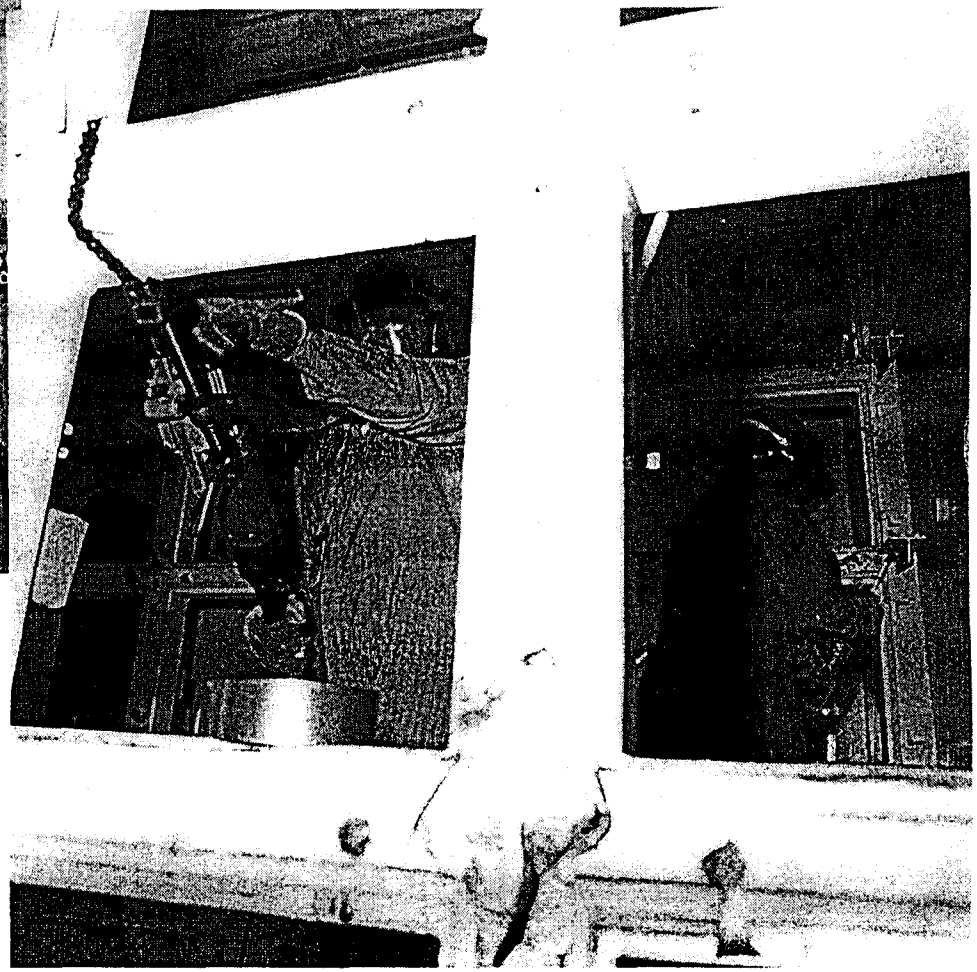
Building 729 Plenum Dis-mantling

November 16, 1999

393

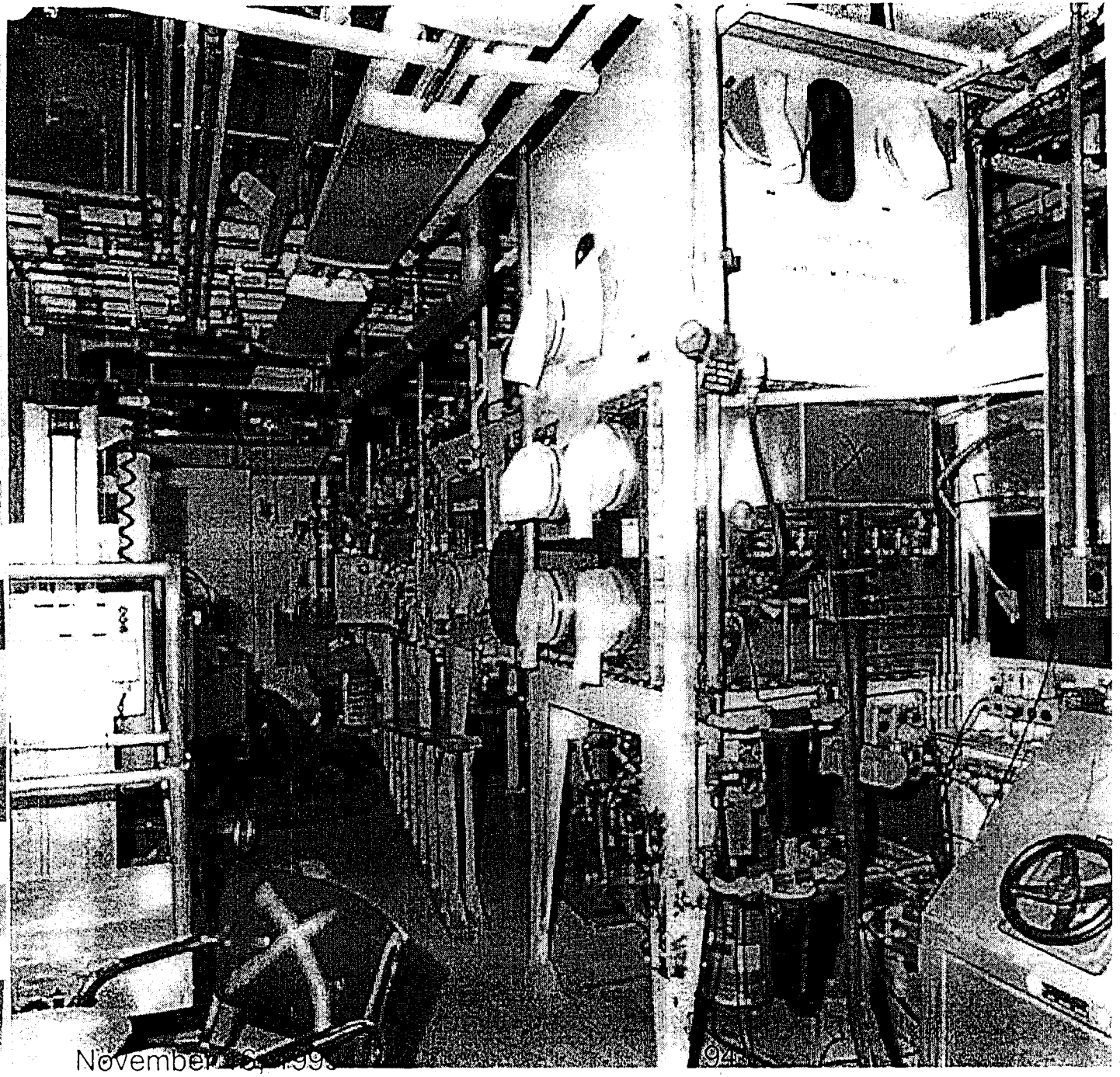
Building 729
Plenum Dismantling





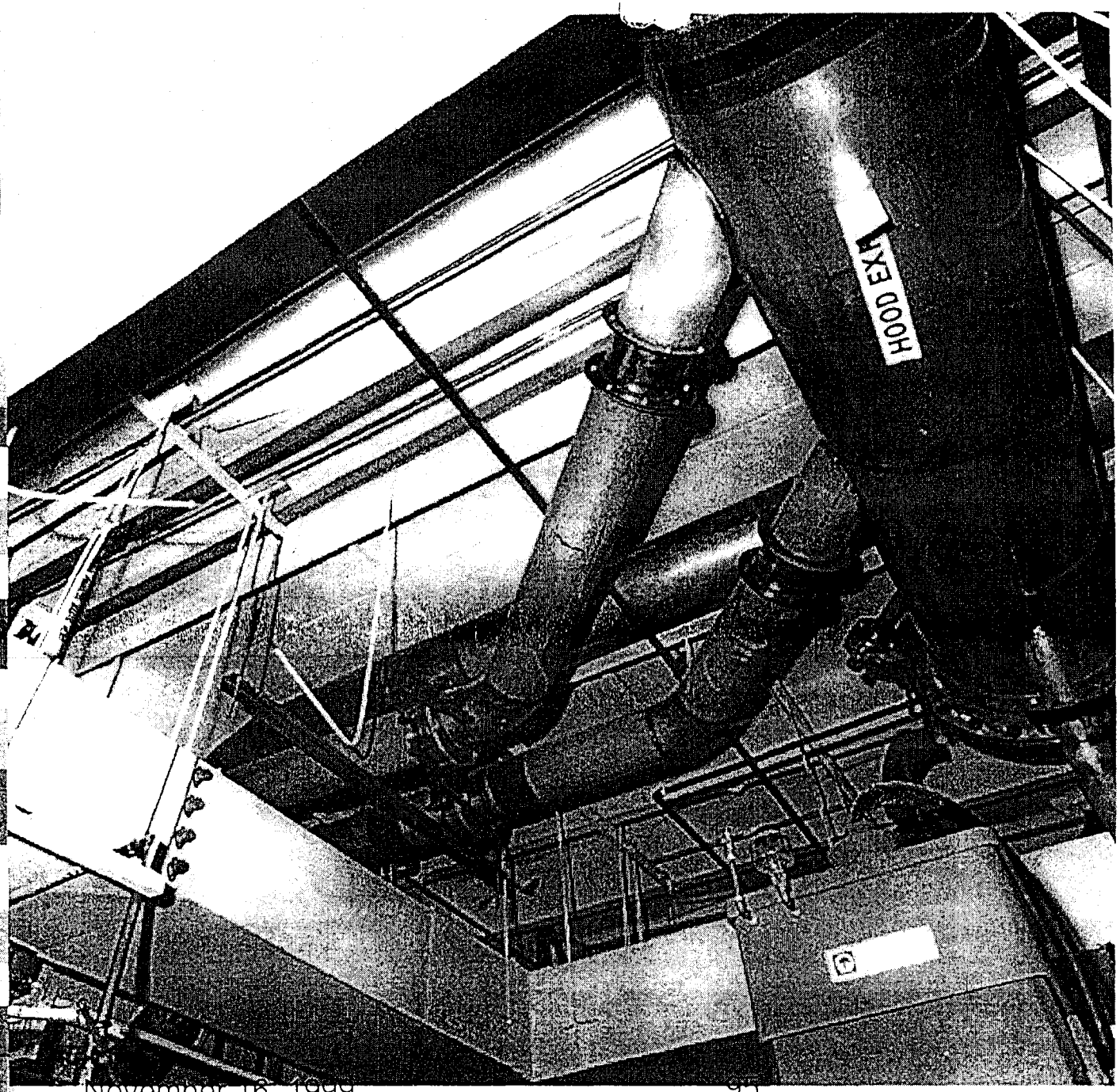
November 16, 1999

394



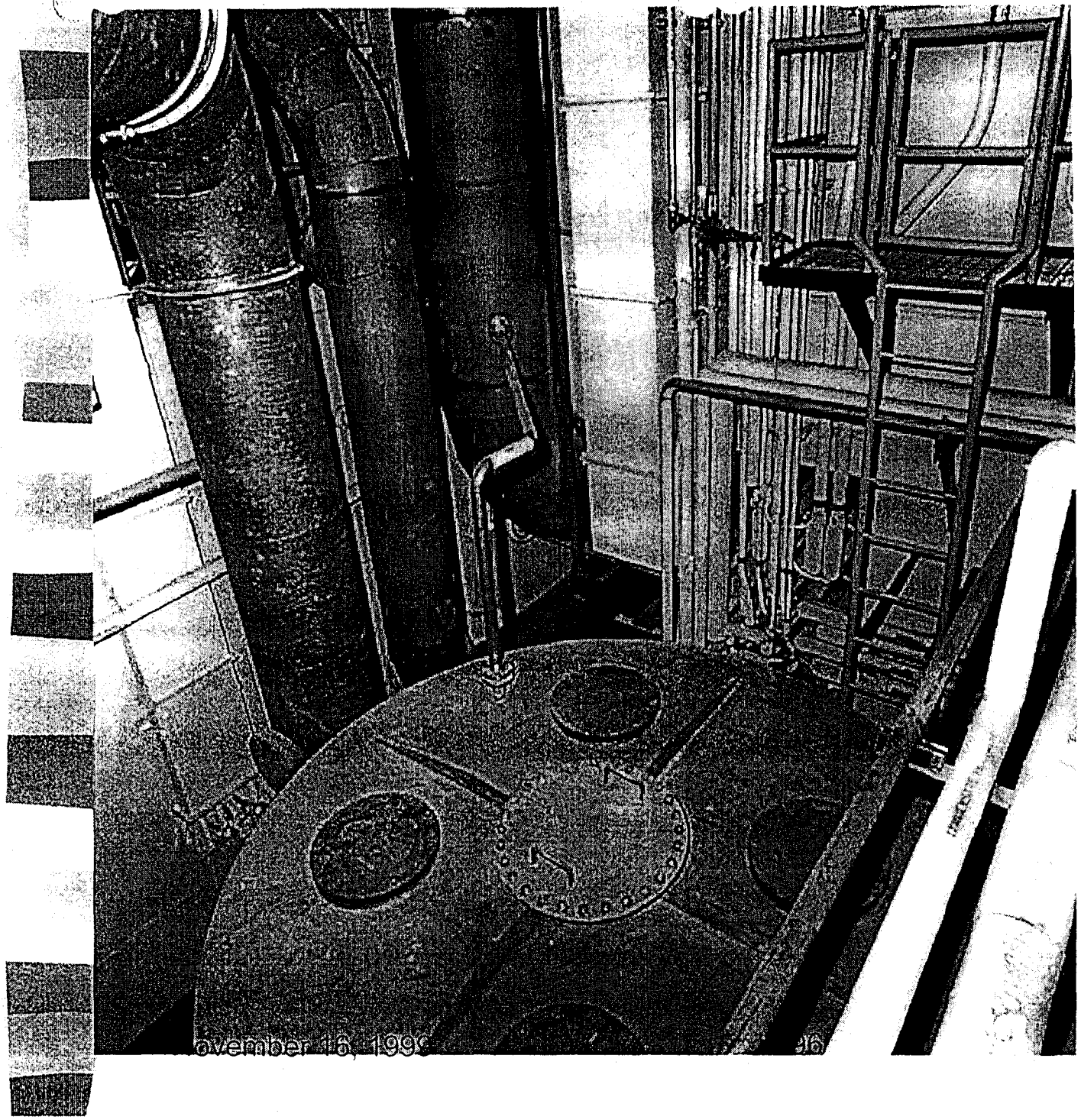
Building 779 - Room 152 GBs 208, 211 Before Removal

395



Building 779 - Room 150 Exhaust Hood and Piping

396



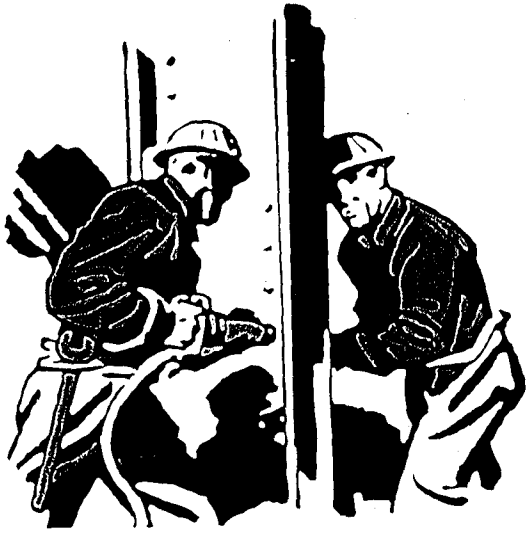
Building 782 Tank & Ductwork

397

Industrial Hygiene & Safety Lessons Learned Summit

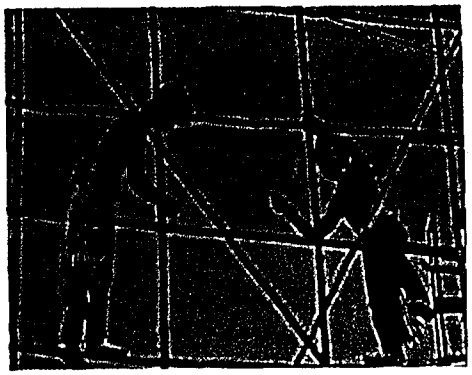
779 D&D

Mark Zachary and Ken Worley



398

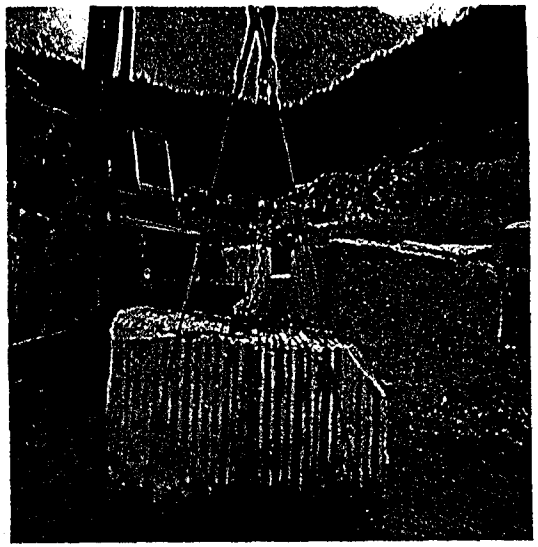
Scaffolding



- *Train more "competent" person(s)*
- *Train more scaffold erectors*
- *Utilize more scaffold than ladders to perform long duration work tasks*
- *Utilization of scaffolding tagging system "good"*

394

Hoisting / Rigging



- Ensure all future size reduction structures have hoisting & rigging ports
- Train more qualified hoisting & rigging personnel
- Inspection & surveillance programs should be easily turned over and continuously maintained
- Hoisting & rigging checklist "good"

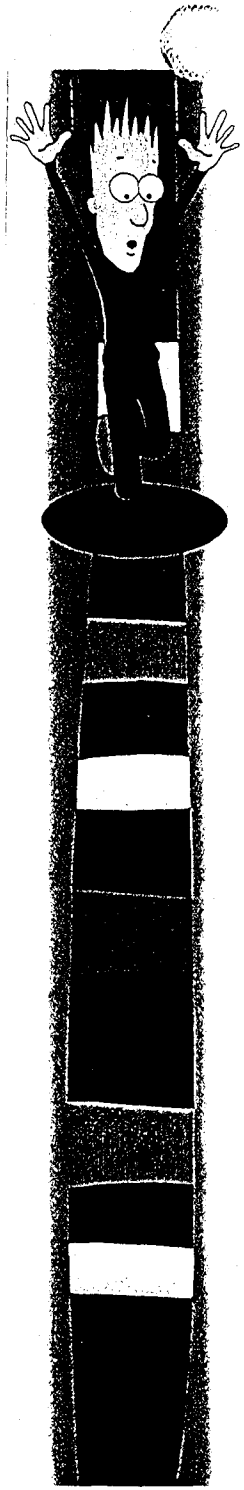
400

Materials Handling

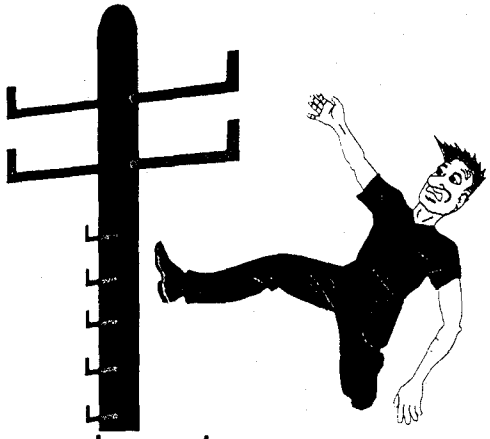
- Move checklist "a good thing"
- To much manual lifting on roof build out
- Need more options for "types of" material handling equipment
- Enhance training for all D&D workers in this area

Ergonomics

- Establish & follow through with building ergo teams
- Increase ergo awareness among the work force
- Educate workers and supervisors in the field of ergonomics
- Conduct routine ergo assessments without the fear of "retribution"

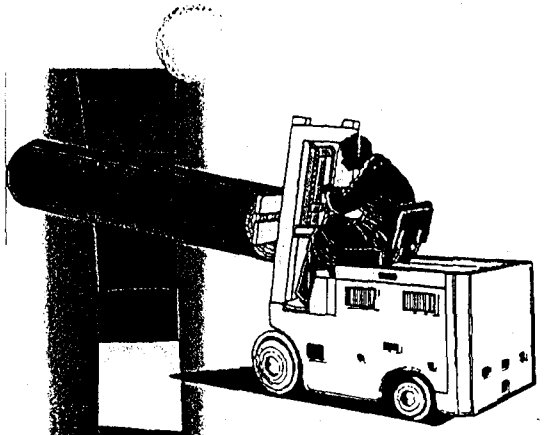


Fall Protection

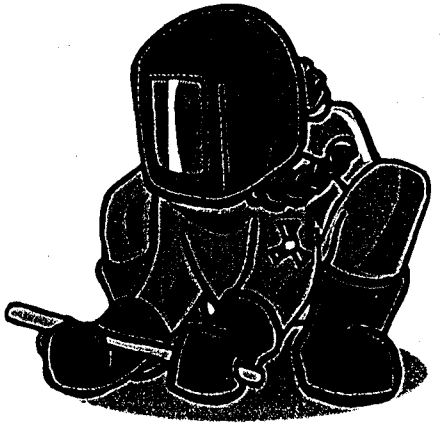


- Buildings need more evals for anchoring locations and points
- Continue to educate workers in fall protection requirements
- Garlock fencing is the "best" fall protection control for long term roof work
- Procure and maintain a good inventory for harnesses, retractable lanyards, etc.

403



Training



- More field specific training in the area of tool usage (right tool for the job)
- More training specific to hazards encountered (fall prot., scaffolding, etc)
- Increased mock up training in specialized areas with refreshers
- Monthly block training in specific areas (OSHA Outreach, 10hr, 30hr, STS program)

404

ISM

- ISM proven "to work"
- ISM inspection / audit went well
- Lessons Learned performed many times on the project
- Workers input has been continuous
- Sometimes the ISM wheel "falls off"

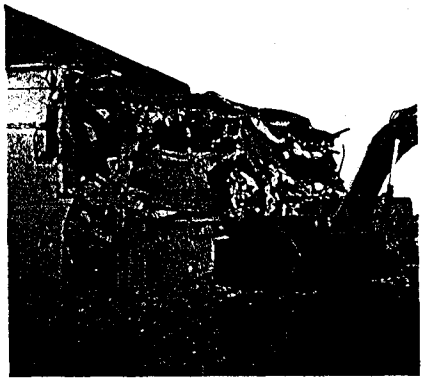
405

Administrative

- 779 utilized the AHA process in conjunction with the JHIT (Worked well for the workers)
- Recommend all workers involved in the walkdowns sign the JHA/AHA
- JHAs/AHAs need rev #'s
- Maintain a copy of all JHA/AHAs developed for future reference (779 did this - invaluable)

406

Administrative - Cont..



- Educate the work force better in the meaning of PELs & admin limits
- Utilize layman's terms as much as possible when explaining exposures to various substances / hazards when performing notifications to workers
- Communicate asbestos, beryllium, lead, silica results to all building personnel even if certain personnel are not affected

407

Ladders

- Utilization of the ladder tagging system is a good practice
- Ladder use in some cases was “excessive” for long term work
- Ladder spotter use “good”
- Additional training is needed for the proper use of ladders

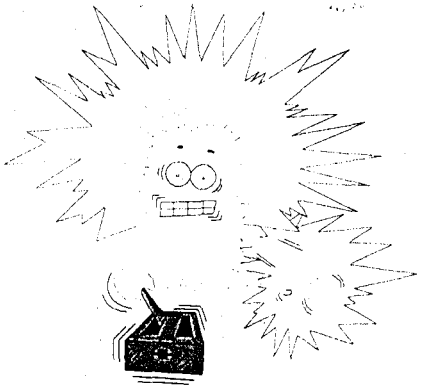
408

JCUSC Support

- Having a full time building representative " a good thing"
- Safety concerns answered at the floor level
- Safety inspections performed on a regular & routine basis with building IH&S reps
- Another set of "eyes" for the building in the safety arena

409

Electrical Safety



- GFCI usage was very successful
- Assured grounding program very successful also
- Get electrical cords "up & out of the way" in tents and work areas
- Have adequate power resources to prevent "power trips"
- In wet locations utilize weather proof twist lock connections

410

Work Controls

- Train all CCAs in the OSHA 30 hour out reach and the STS program
- "A tremendous challenge" for the CCAs to coordinate several work groups at one time especially in "safety requirements"
- Safety coordination for several groups in the same work location "challenging"
- Pre & in progress walk downs critical by supervision during work evolutions

114

Statements of Work

- Avoid ambiguous statements in the statement of work.
  - Cases in point are wall removal as a part of the scarification effort;
  - Requesting a lump sum price for additional 10,000 square feet of scarification.
- Include all elements of work in a single statement of work thereby giving the subcontractor complete control over the pace of work.

Statement of Work (cont)

- Consider including asbestos removal decontamination, decommissioning, final surveys, and demolition in a single statement of work.
- Do not include in the statement of work requirements that pertain to proposal preparation.

413

Statement of Work (cont)

- In solicitations, a section is reserved for Proposal Preparation Instructions.
  - All instructions for proposal preparation must be included in this section.
  - To include instructions for proposal preparation in a statement of work is confusing and could lead to ambiguities and conflicts.

Statement of Work (cont)

- Do not include in the statement of work any requirements that are contained in the subcontract terms and conditions, i.e.
  - Requirements for submission of schedules
  - Notification of delays
- In the event the terms and conditions are not representative of what is required
  - Let the subcontract administrator know, and the specific provision can be changed as appropriate.

415

Statement of Work (cont)

- Include in the solicitation a Subcontract Data Requirements List.
  - List will contain all data requirements to be submitted by the subcontractor, including one- time requirements as well as recurring requirements.
  - List should contain all data requirements contained in the statement of work and the terms and conditions of the subcontract.

Statement of Work (cont)

- Any incentive fees to be included in the subcontract should mirror those performance measures flowed down from the DOE through K-H to RMRS.
  - Will ensure that all parties are working to the same objective.

Statement of Work (cont)

- Avoid, if possible, working to an integrated schedule.
  - The objective should be to give the subcontractor complete control over the pace of work.
    - This objective can be accomplished by ensuring all Steelworker activities are completed prior to the Subcontractor commencing work.
    - If this is not possible, explore allowing the subcontractor to manage Steelworkers leased from Kaiser-Hill.

Statement of Work (cont)

- Include in the Solicitation a bid schedule to be completed by all offerors.
  - Wherever possible, items contained in the schedule should be tied to specific portions/paragraphs in the statement of work.
  - If exact quantities are not known, solicit unit prices and pay only for the amount completed.
- Specify clearly in the solicitation and resultant subcontract how payments will be made.

Statement of Work (cont)

- Ensure any options offered, both solicited and unsolicited, are addressed in the subcontract award documents.
- Give consideration to incorporating the subcontractor's technical proposal into the subcontract.
  - If this is done, advise offerors in the solicitation that their technical proposal will become a part of the resultant subcontract.

Project File

- Train to CERCLA and AR requirements early on
  - Integration Team
  - QA
  - Environmental Team
- Set up documentation in format for closeout reports early on
  - Beryllium Smears
  - Spill Sampling, etc.
  - Asbestos Air Monitoring/Smears

779 ENVIRONMENTAL COMPLIANCE

K. O. ZBRYK

Environmental Scientist

422

779 Decommissioning Operations Plan (DOP)

- In general, DOP relatively easy to work to
  - Single points of contact established early and have remained at the project level
- Lessons Learned primarily in CERCLA/ RCRA arena
  - CDD (Incorporated into the DOP)
    - Residuals from size-reduction or radioactive decontamination will carry the same EPA codes as the RCRA unit for TRU gloveboxes only

423

779 Environmental Compliance

- Gloveboxes that never stored hazardous waste, but were permitted, were identified for closure
  - Floor level input can solve this
- Administrative vs Substantive Requirements
  - Floor level personnel must understand this
- Self-Inflicted Constraints
  - Characterization…D002, D003, F003, and GB units

424

779 Environmental Compliance (Cont.)

- Self-Inflicted Constraints Continued
  - Temporary Units; establish the whole project area as a TU
  - Committed to quarterly inspections of RCRA units until closure
    - K-H/CDPHE agreement-inspections not required for RCRA Stable Areas not storing hazardous waste

425

779 Environmental Compliance (Cont.)

- Other Lessons Learned
  - Excess Chemicals
    - Consolidate and Control early
    - Set up "empty" tracking system
    - Set up routine inventory process
  - Characterize, Characterize, Characterize
    - Set up database and hard copy files early
    - Integrate Characterization into IWCP
    - Bottle Management
    - Drain large systems

426

Building 779 Cluster Final Status Survey Lessons Learned
02/28/00

Schedule and Planning

1) Planning personnel must understand that Final Status Survey schedules cannot be compressed to make up for lost time due to delays in the D&D schedule.
2) Perform a thorough Historical Assessment and Reconnaissance Level Characterization in order to appropriately characterize survey units.
3) Perform Final Status Survey AFTER the completion of D&D in a building.
4) Perform in-process and post D&D characterization surveys in order to account for contamination introduced during the D&D process. Biased measurements should be collected during these surveys to assure suspect areas are addressed for radiological concerns.
5) If Final Status Survey MUST be performed in a building where D&D is in-process, establish PHYSICAL isolation (i.e., locked doors, plastic/wood walls, etc.) from the D&D areas.
6) Physically separate Final Status Survey personnel from other project personnel (e.g. Radiological Building Engineers). Make a centrally located space that is large enough to house the FS REs and RCTs together.
7) Assure adequate space and computer resources are available for Final Status Survey personnel.
8) Account for the time required to perform unexpected decon and re-survey due to contamination detected during Final Status Survey.
9) Allow for deviations in the schedule due to unexpected events.
10) Need to have more clearly defined (documented) expectations from Regulators on how aggressive decontamination efforts should be. For example: Is it necessary to chase contamination in cracks down to the soil.
11) Need to more clearly define in the final survey scope of work prior to the start of final surveys. For example: pits, basements, and tunnels won't be final surveyed. The scope should be agreed upon with the Regulators and documented in the FS plan, DOP, etc.
12) Don't leave potentially clean systems or equipment in place during final survey. Stripout all systems and equipment prior to final survey such that the FS is not potentially compromised during the post–FS stripout.
13) Turnover surveys should be performed by Rad Ops prior to turning surveys over to the final survey team. Turnover surveys should consist of scans, TSAs, and smears in the highest potential areas (e.g., floors, horizontal surfaces, known spill areas, equipment and glovebox areas, etc.) An adequate amount of turnover surveys should be performed such that there will be a high confidence that contamination will not be found during the final survey.

Survey Design

1) Provide flexibility in survey design requirements to account for unexpected scenarios.
2) An investigation and reclassification criterion needs to be clearly spelled out in the survey plan.
3) Need better guidance on determining percentage of scans for roofs.
4) Don't make survey units so large that they encompass more than one room. This makes it easier to reclassify areas if problems arise during the final survey.

5) Strip paint in all Class 1 areas. This eliminates costly paint sampling.

Communication

1) Communicate to the work force and site personnel what final survey is about and why its OK to demolish buildings after final survey is complete. Share the final survey results with the work force and site personnel prior demolition to instill confidence that its OK to demolish.
2) Have regularly scheduled meetings with the Final Survey Team (e.g., weekly) to keep everyone informed or progress, changes, etc. Have regularly scheduled meetings with the Regulators and the IVC team to keep them informed and to schedule IVC surveys.

Isolation Controls

1) Utilize stringent isolation controls, including physical barriers, if D&D is on-going in adjacent areas.
2) Reinforce the importance of isolation controls to all project personnel.
3) Perform verification surveys to assure the radiological status of the area has not changed if isolation controls are breached.
4) No unnecessary equipment, materials or personnel in area should be allowed in FS areas during or after surveys. Housekeeping shall maintained during and after FS.
5) Don't paint your self into a corner. For example: Plan the completion of final surveys such that workers performing stripout/decon in adjacent areas do not have to traverse through areas that have already been final surveyed.

Instrumentation/Technical Issues

1) Assure a surplus of radiological instrumentation is available.
2) Address all technical issues prior to use of instrumentation (e.g. MDC).
3) Utilize the Tennelec to decrease smear analysis time and improve data quality.
4) Evaluate and address anomalies in data (e.g., Po-210 may contribute to elevated alpha surface activity results on roof surfaces).
5) An onsite laboratory that has the capability to analyze final survey samples in a timely manner should be considered.

Maps

1) Develop maps during the Reconnaissance Level Characterization process.
2) Provide adequate support for map development. A minimum of two (2) personnel are typically required (one person dedicated to walk-downs and one person dedicated to computer development of maps).
3) Assure maps are to scale.
4) Utilize laser range finders to establish dimensions where personnel access is limited.
5) Generate maps in order of: 1st - Facility Overview, 2nd – Survey Area Overviews, 3rd – SU Overviews, 4th – SU maps.

Building 779 Cluster Final Status Survey Lessons Learned
02/28/00

Survey/Sampling

1) Provide concise survey instructions (flowcharts recommended) in order to assure consistency in data reporting,
2) Devote laborers to support required decontamination efforts during the performance of Final Status Survey.
3) Provide dedicated, trained survey and sampling personnel.
4) The utilization of site qualified RCTs for the performance of Final Status Surveys allows for "stand-by" time that may be encountered due to delays in schedule (i.e., RCTs can support project tasks outside of Final Status Survey).
5) Assure that areas will be available for Final Status Survey prior to mobilizing an outside contractor hired to perform surveys (i.e., excess "stand-by" time results in elevated project costs).
6) Collect required samples are early as possible in order to reduce analysis costs and to reduce schedule impacts due to unexpected results. Samples can be collected prior to the establishment of isolation controls (i.e., radiological status of the surface media matrix will not be impacted by D&D).
7) Eliminate the requirement for radiological screens for Final Status Survey samples (utilize B779 documentation as justification).

Data Management

1) Assure sufficient data management tools are in place prior to commencement of survey (i.e., database, survey progress tracking mechanism, etc.).
2) Plan for the large volumes of data that will be generated during Final Status Survey.
3) Organize data files in a manner that is self explanatory to potential reviewers.
4) Develop a database to track specific comments and comment resolution.
5) Develop a shared network folder that can be accessed by all project Final Status Survey personnel. Maintain all records in this file.
6) Assure that all survey unit history files are organized and auditable.

Report Generation and Review

1) Subdivide cluster or building into distinct areas in order to generate small volume reports.
2) Do not include raw data in reports (maintain in project files).
3) Utilize B779 Cluster report format for future reports.
4) Actively involve regulators prior to and during the Final Status Survey process.

Quality Assurance/Quality Control

1) Ensure that quality controls are active and visible throughout the project life cycle; emphasize key controls with the stakeholders.
2) Perform V&V of results on both computerized data as well as hardcopy records; software quality controls should focus equally on performance criteria (e.g., measurement system outputs that result from the use of software) and elements of formatting and documentation (e.g., data reduction algorithms in spreadsheets and/or numerical models).
3) Assure subcontractor quality plans/SOPs/Records meet minimum site requirements.
4) Perform and document Data Quality Assessment for each Final Status Survey report.

5) Optimize summary graphics and tables to communicate how QC was implemented.