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Rev. 0

108-F Biological Laboratory D&D Project Closeout Report

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Office of Environmental Restoration

Submitted by: Bechtel Hanford, Inc.

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108-F Biological Laboratory D&D Project Closeout Report

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ACRONYMS

BARCT	best available radionuclide control technology
BMP	best management practice
CFR	*Code of Federal Regulations*
D&D	decontamination and decommissioning
DQO	data quality objective
ERC	Environmental Restoration Contractor
ERDF	Environmental Restoration Disposal Facility
FY	fiscal year
PCB	polychlorinated biphenyl
PHC	preliminary hazard classification
SHPO	Washington State Historic Preservation Office
WAC	*Washington Administrative Code*
WIDS	Waste Information Data System

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.0836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerel	0.027	picocuries

1.0 PROJECT AND FACILITY BACKGROUND

1.1 INTRODUCTION

This report documents the history, decommissioning, and demolition of the 108-F Biological Laboratory (waste site 100-F-36). The decontamination and decommissioning (D&D) work discussed herein includes the decontamination and/or stabilization of the facility, followed by its demolition and disposal. Appendix A provides various project photographs, Appendix B provides project schedule information, Appendix C contains the 108-F wall release survey data interpretation, and Appendix D contains the 108-F Building demolition site surveys for the Waste Information Data System (WIDS).

1.2 108-F BIOLOGICAL LABORATORY FACILITY HISTORY

The 100-F Area is the location of one of the nine plutonium reactors at the Hanford Site, near Richland, Washington. The nine reactors are located in six distinct areas along the southern shore of the Columbia River, where the river traverses the northern part of the Hanford Site, as shown on the vicinity map (Figure 1-1). The 100-F Area, the site of the 105-F Reactor, covers a total of 256 ha (632 ac) and is the furthest downstream of the reactor areas. Construction of the F Reactor began in December 1943, and the reactor operated from 1944 through 1965. The 100-F Area originally had several major support facilities, including structures associated with the treatment and storage of reactor cooling water and support buildings for biological experimentation. Most of the 100-F Area facilities were deactivated with the reactor and have since been demolished. Of the approximately one dozen reactor-related structures, only the 105-F Reactor building and the 108-F Biological Laboratory remained at the start of this D&D project. The 108-F Biological Laboratory is located in the 100-F Area in the 100-FR-1 Operable Unit, as shown on the map in Figure 1-2.

The 108-F Building was constructed in 1944 as part of the original Hanford Site construction (Figures 1-3 and 1-4). The original 108-F Building was a four-story, steel-frame, concrete-block structure with a reinforced-concrete foundation and floors, with a floor area (Figures 1-5 through 1-8) of about 1,858 m^2 (20,000 ft^2). The intended use of the building was to provide chemical treatment of the 105-F Reactor cooling water. Shortly after the reactor began operation, it was determined that the chemical mixing-and-addition function could be better performed elsewhere in the cooling water supply system. In 1949, the building was converted for use as a biological/radiological laboratory. In 1962, the laboratory was expanded by adding a three-story annex to the original four-story structure. The resulting laboratory had a total floor area of approximately 2,883 m^2 (31,032 ft^2). The building contained 47 laboratories, a number of small offices, a conference room, administrative section, lunch and locker rooms, and a heavily shielded, high-energy exposure cell.

Operation of the biological laboratory was originally under the General Electric Company and was transferred to Battelle Memorial Institute's Battelle Northwest Laboratory in 1965 as part of the diversification of Hanford Site operations. The biological laboratory activities at the

108-F Building were gradually phased out and transferred to other facilities primarily in the Hanford Site's 300 Area. The laboratory closed in 1973.

After the laboratory functions ended, the 108-F Building was maintained under the retired 100 Area's site surveillance and maintenance program. After inclusion in the inventory of the Hanford Site surplus facilities management program, the building was selected as one of the first major facilities for D&D.

1.3 PRE-DECONTAMINATION STATUS

As a biological laboratory, the 108-F Building used radioactive material in experiments. The laboratories and storage rooms were maintained in a controlled status and contained contaminated laboratory equipment, drains, and exhaust ducts.

In 1977, the 108-F Building underwent a housekeeping program to remove highly radioactively contaminated materials and gloveboxes. In 1983, contaminated areas in the 108-F Building were decontaminated and all remaining laboratory equipment was removed. This effort included disassembling all sinks, cabinets, and laboratory hoods. The contaminated piping was removed, except in the main pipe trench and sump system on the first floor, which were sealed. In addition, contaminated ductwork was painted to fix contamination, was cut into sections, and was removed. The building's interior was decontaminated by removing interior partitions, scabbling concrete floors, and using strippable coatings. The only pieces of equipment not removed were the elevator motor, compressor motors, hoist equipment, and the water coolant system (BHI 1996c). A total of approximately 1412 m^3 (4,722 ft^3) of contaminated material were removed and disposed in the Hanford 200 West burial site. Approximately 304 m^3 (10,840 ft^3) of noncontaminated material were removed from the facility, transported and disposed in the 183-F clearwells, and backfilled with excavated soils (UNI 1983).

A final release survey for radioactive contamination was performed that included 2,225 smear samples and 500 additional samples. The building was considered decontaminated to nonrestricted use levels in 1983 (UNI 1983).

After the laboratory functions ended, the 108-F Building was maintained under the retired 100 Area site surveillance and maintenance program. After inclusion in the inventory of Hanford Site surplus facilities management program, the building was selected as one of the major facilities for D&D due to its poor physical condition.

Figure 1-1. 100-F Area Site Map.

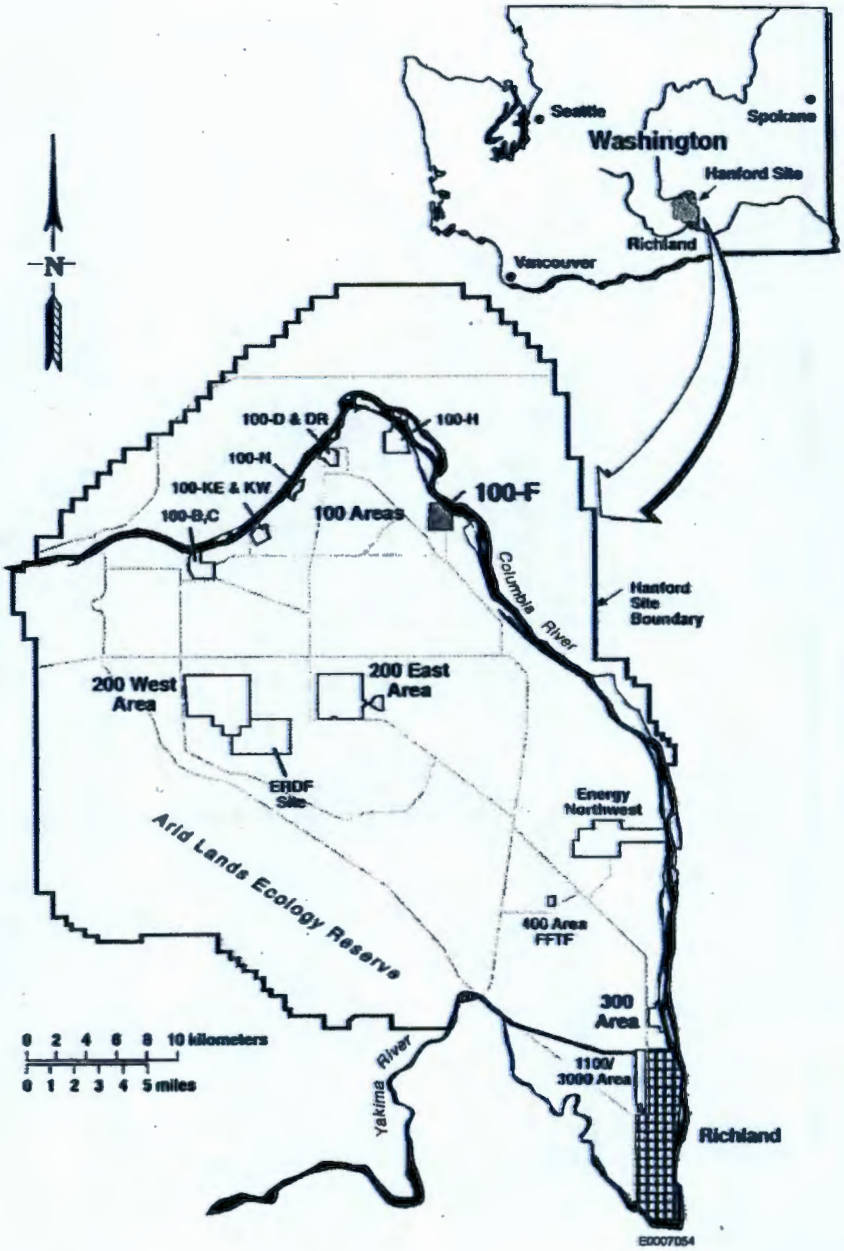


Figure 1-2. 108-F Location Map.

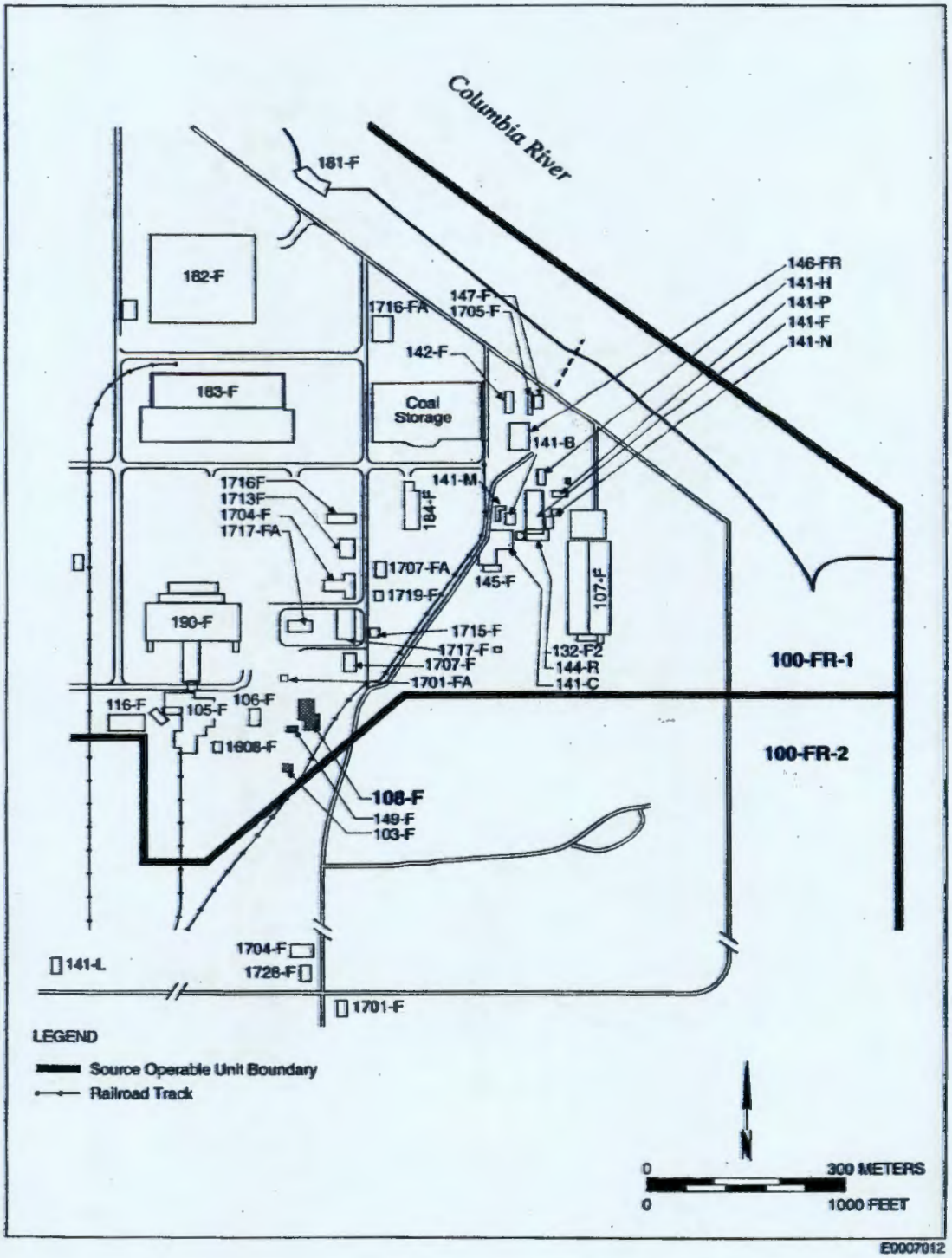


Figure 1-3. Photo 1 of 108-F Building.

Figure 1-4. Photo 2 of 108-F Building.

Figure 1-5. Floor Map First Floor.

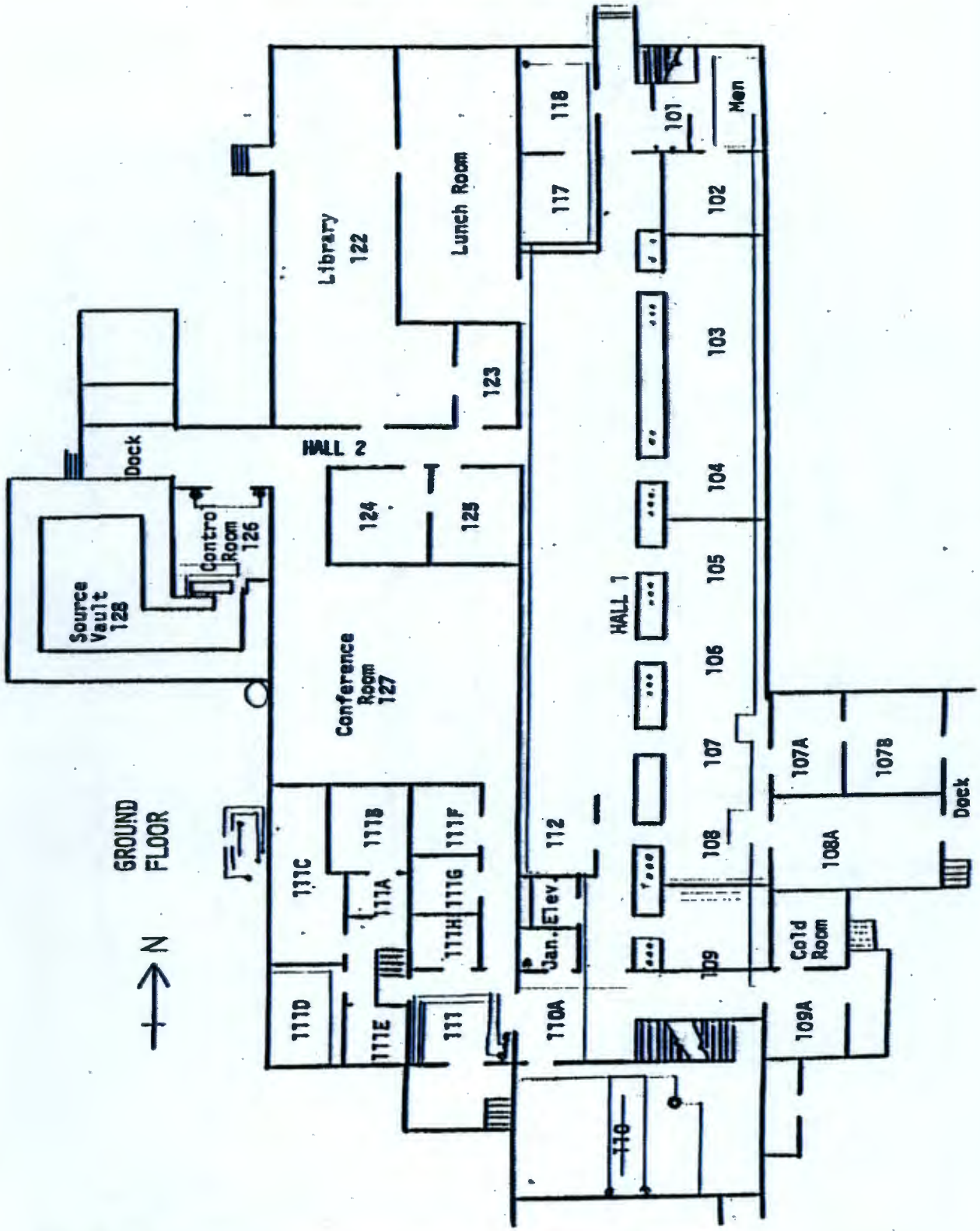


Figure 1-6. Floor Map Second Floor.

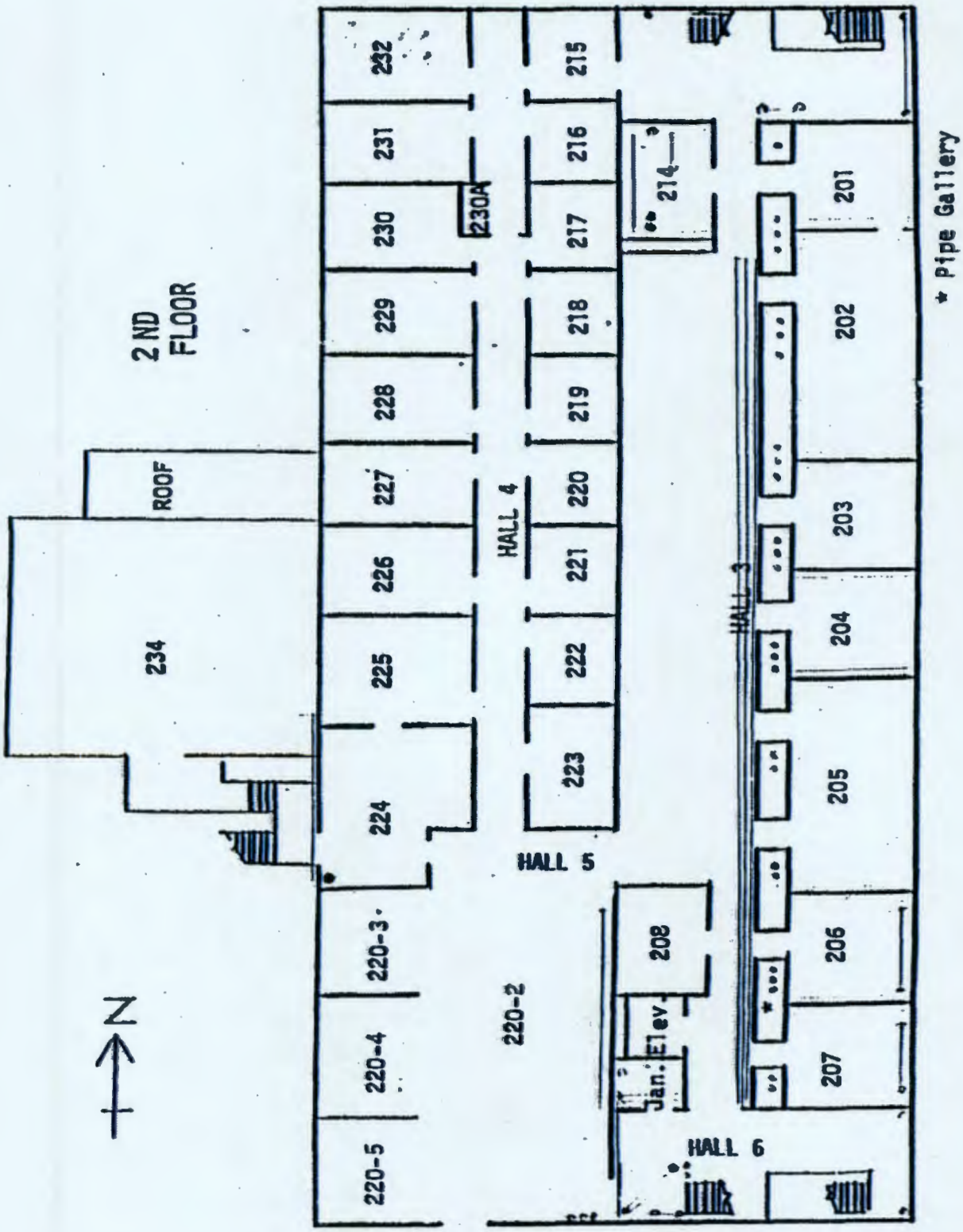
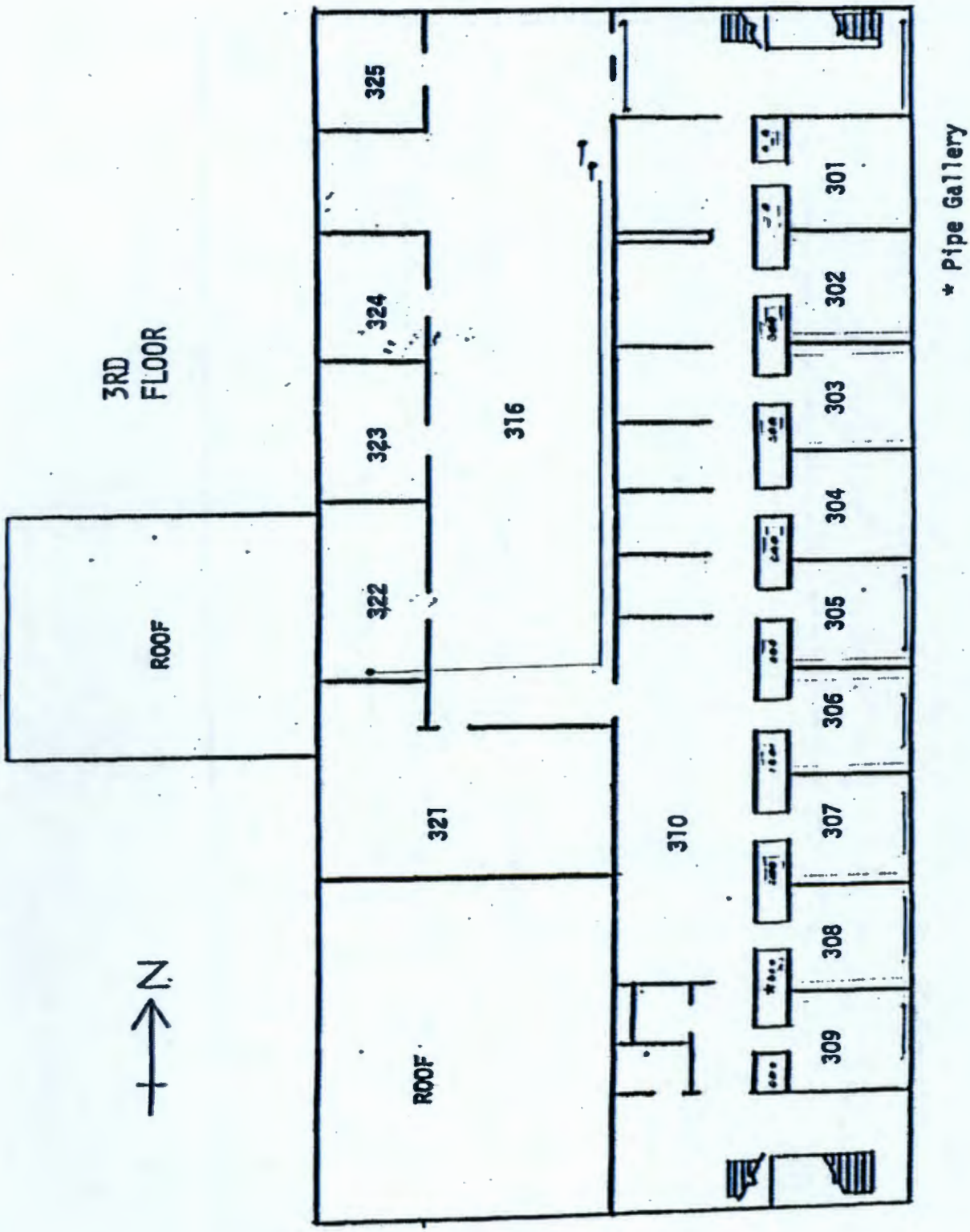


Figure 1-7. Floor Map Third Floor.



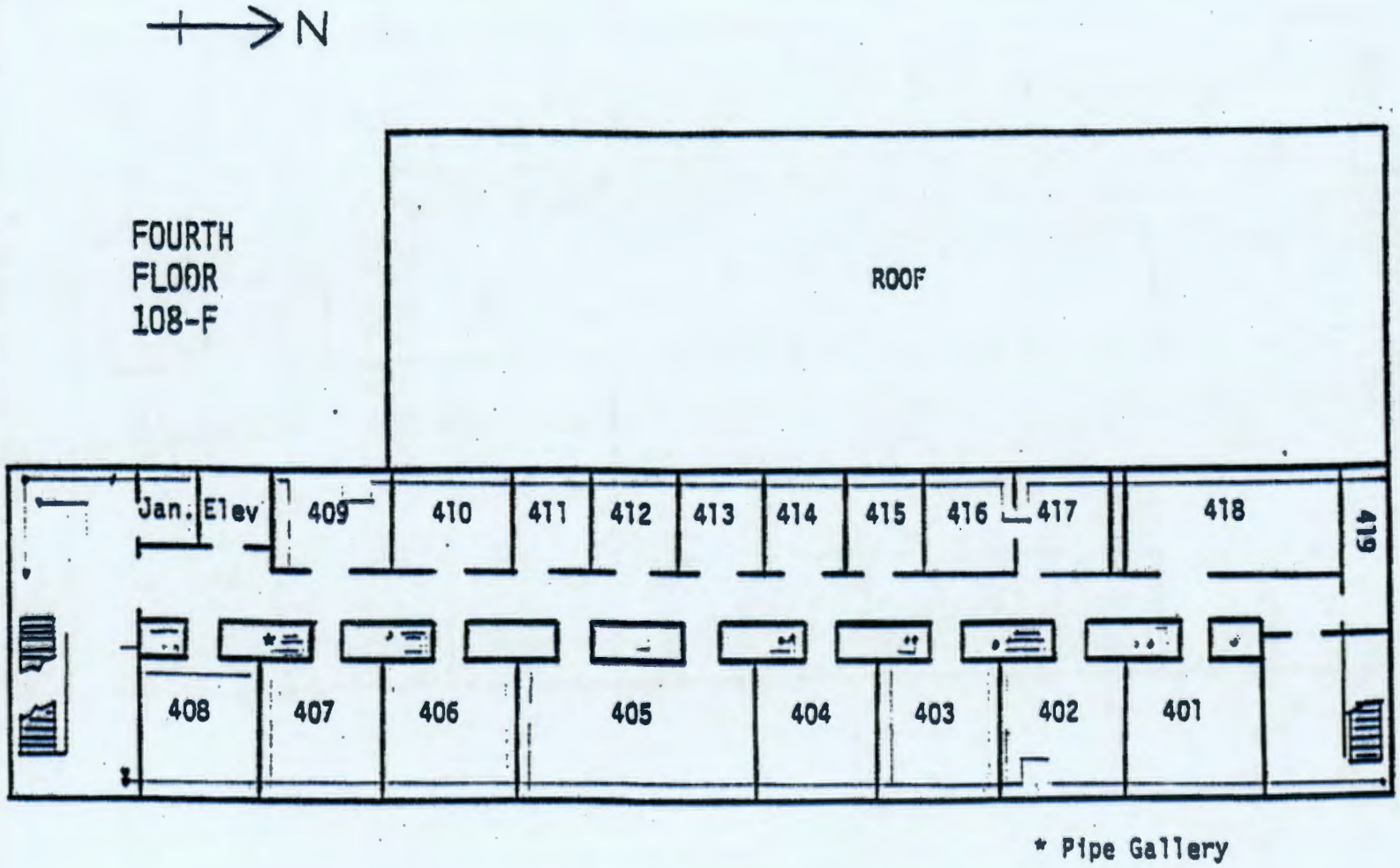


Figure 1-8. Floor Map Fourth Floor.

2.0 DESCRIPTION

This section describes radiological and nonradiological hazardous contamination found in the 108-F Biological Laboratory prior to the D&D activities.

2.1 PREDECONTAMINATION STATUS

To support D&D activities, facility characterization was performed using the data quality objective (DQO) process.

The DQO process was conducted in mid-fiscal year (FY) 1996 to identify the characterization approach for identifying facility radiological contamination and the presence of hazardous substances (BHI 1996b). The characterization plan (BHI 1996a) was based on the results from this DQO process and described the sample collection and sample analysis activities required to collect data to support worker health and safety and for disposal of demolition debris.

A report (BHI 1996c) was issued that compiled the resulting characterization data. The report identified the following.

> *Previous decontamination had decreased the presence of radiological contamination but beta-gamma and alpha contamination still existed in limited areas and small quantities within the facility. Loose surface beta-gamma contamination ranged from <1,000 dpm/100 cm^2 to 5,000 dpm/100 cm^2 while alpha contamination ranged from <20 dpm/100 cm^2 to 1,400 dpm/100 cm^2. Fixed surface contamination ranged from <1,000 dpm/probe area to 40,000 dpm/100 cm^2 for beta-gamma while alpha contamination was generally <500 dpm/probe area.*
>
> *Hazardous substances were present throughout the structure. Asbestos was present in piping insulation, floor tiles, transite panels, joint compound, and wall insulation. Equipment oils and light ballasts contained polychlorinated biphenyls. Electrical switches contained mercury. Lead was found in the form of 1/8-in.-thick sheets lining several walls, doors, ceilings, one battery, and lead-based paint. Chromate was identified in a french drain.*

A PHC was initially performed in December 1996 (BHI 1996d) to support D&D activities. This PHC classified the 108-F Facility as "non-nuclear, low hazard" based on the gross radiological and nonradioactive hazardous substance inventories identified in the characterization report (BHI 1996c) based on additional hazardous materials and radiological contamination discovered during characterization. The 1996 PHC was superceded in 1999 by a PHC for the 108-F Biological Laboratory (BHI 1999c).

The 1999 PHC reported quantities of hazardous materials including mercury, polychlorinated biphenyls (PCBs), lead, and asbestos (BHI 1999). In addition, this PHC included a small quantity (approximately 1.3 kg) of sodium dichromate containing hexavalent chromium that was discovered during earlier was superseded. The PHC also reported miscellaneous radiological contamination was found throughout the building during initial D&D activities in 1997. This included a finding of 100 dpm/100 cm^2 smearable alpha contamination on a floor tile in Room 304 and 120,000 dpm/100 cm^2 fixed alpha contamination in the building. The incident initiated a critique (BHI 1997), and lessons learned from this are described in detail in Section 8.1.

The inventory of both lead and asbestos exceeded the 40 *Code of Federal Regulations* (CFR) 302.4 reportable quantities. Radiological contamination was also inventoried, and the summed total was below reportable quantities. BHI (1999c) lists the radiological and hazardous material inventory. The 108-F Facility classification remained "non-nuclear, low hazard."

3.0 DECOMMISSIONING

3.1 OBJECTIVE

The objective of the decommissioning project was to provide a safe method for D&D of the 108-F Biological Laboratory structure while minimizing costs and schedule duration. Compliance with environmental, contractual, and legal obligations was a prime objective.

3.2 SCOPE OF WORK

The *Engineering Evaluation/Cost Analysis for the 100-B/C Area Ancillary Facilities and the 108-F Building* (DOE-RL 1996) presented four alternative approaches for future facility management and the resulting levels of safety that could be anticipated. Decontamination and/or stabilization of the facility, followed by its demolition and disposal, were selected as the most responsive approach to ensure protection of human health and the environment pending the start of the site remediation and closeout activities to the underlying and surrounding waste sites. The D&D work scope is documented in the action memorandum (EPA 1997) for the 100-B/C Area ancillary facilities, the 108-F Facility, and final disposition of waste from the 105-C Interim Safe Storage Project.

The scope of work for this project identified in the Removal Design Report for the 108-F Biological Laboratory (DOE-RL 1999) included the following:

- Performing building characterization and hazard identification.
- Performing general housekeeping and biological (e.g. removal of unneeded tools, equipment, biological feces, and rubble and sweeping floors) and health and safety radiological surveys.
- Removing and disposing nonradioactive hazardous substances (e.g. PCBs, mercury, and lead).
- Fixing radiological contamination in the building (primarily in the pipe trench) and pipe trench sump. The pipe trench sump was covered to facilitate removal after demolition of the above-grade structure.
- Removing the building foundation and all above-grade structures.
- Removing radiological material and disposing the material at the Environmental Restoration Disposal Facility (ERDF) as low-level waste.

3.3 ENVIRONMENTAL CONSIDERATIONS AND ALTERNATIVES

Alternatives for the 108-F Biological Laboratory were evaluated in the *Engineering Evaluation/Cost Evaluation for the 100 BC Ancillary Facilities and the 108-F Building* (DOE-RL 1996). Decontamination and/or stabilization of the facility, followed by its demolition and disposal, was selected by the EPA action memorandum (EPA 1997) as the most responsive approach to ensure protection of human health and the environment.

3.3.1 Environmental Radiological Air Monitoring

Pre-demolition and demolition work, which had the potential to emit radioactive emissions, were part of the D&D activities for the 108-F Biological Laboratory facility that occurred during FY 1997 and was completed in FY 1999. Quantification of radioactive air emissions implementing best available radiation control technology (BARCT) and air monitoring were identified as substantive requirements (i.e., applicable or relevant and appropriate requirement in the action memorandum [EPA 1997]). A BARCT compliance demonstration is determined by the regulatory agency on a case-by-case basis. These substantive requirements are in accordance with *Washington Administrative Code* (WAC) 246-247-040. Attachment C of the removal design report (DOE-RL 1999) details the air monitoring plan for the D&D activities for the 108-F Building.

3.3.2 Cultural, Ecological, and Biological Resources

Most of the area surrounding the 108-F Biological Laboratory was covered with asphalt and graveled surfaces. No native vegetation existed on the site, therefore, no avoidance mitigation was required to protect native plants. At the north end of the building, near the entrance gate, juniper trees and shrubs had been planted as landscaping during the occupancy of building. An effort was made to preserve these plants as nesting and perching habitat to the extent practicable during demolition. However, some of the plants were growing in immediate contact with the 108-F Facility and were lost during demolition activities.

An ecological review of the building was conducted in November 1996 to identify ecological resources (Brandt 1996), and a second review was conducted on June 6, 1997 (Brandt 1997). The findings of these reviews indicated that bats used the building during the summer months, as evidenced by the presence of bat feces and one dead pallid bat (which is a Washington State Monitor-2 species). The review concluded that there would be no significant adverse impacts to bats. In addition, four wooden bat houses were purchased and mounted on poles adjacent to the facility to mitigate for the loss of the building as a roosting area.

The area surrounding the 108-F Facility would be impacted during the stabilization effort planned for the 105-F Reactor building and the remedial action projects planned for the associated waste sites; therefore, revegetation of the 108-F Facility site was not planned to immediately follow demolition. However, provisions were made during final site grading to ensure that suitable soils would be in place to facilitate revegetation at a later time to coincide with the 100-F Area remedial action projects.

A cultural resource review (Teel 1996) was also conducted in November 1996 that considered cultural and historic significance. The review concluded that the 108-F Facility is situated in an area of low cultural resource sensitivity and that no archeological resources have been recorded within or adjacent to the area of potential effect. Given the extensive disturbance to the area, no intact subsurface materials were found or were anticipated. Due to potential interest of Native American Tribal representatives to monitor ground-disturbing activities associated with demolition, notification was provided to the tribal representatives 1 week prior to ground-disturbing activities.

The review of the historic significance found that the 108-F Facility (as determined by the U.S. Department of Energy, Richland Operations Office and the Washington State Historic Preservation Office [SHPO]) was a contributing property within the Hanford Site Manhattan Project/Cold War Era Historic District. Pursuant to Stipulation IV (D) of the Historic Buildings Programmatic Agreement, the SHPO was notified that demolition of this property was scheduled and that the mitigation requirements prescribed under the programmatic agreement were taken.

Mitigation for the 108-F Biological Laboratory consisted of the following:

Preparation of an Expanded Historic Property Inventory Form.

Interior walk-down by cultural staff to identify any artifacts that may have interpretive or educational value (Stipulation V [C]).

Concurrence from the SHPO was not required prior to demolition, and project actions and cultural mitigation proceeded independently. The inventory form was prepared and the internal walk-down occurred.

3.4 CHARACTERIZATION

The *Final Characterization Report for the 108-F Biological Laboratory* (BHI 1996c) documents project characterization activities. These activities included conducting historical reviews, radiological surveys, facility inspections, monitoring for asbestos and mercury vapor, and sampling for other hazardous materials (e.g., oil and PCBs). Using information from the historical review, a DQO summary report and a sampling and analysis plan (BHI 1996b, Appendixes I and J) were generated for the project.

Additional monitoring was performed at the 108-F Building by Pacific Northwest National Laboratory for tritium and carbon-14 on December 11, 1997 (Brehm 1998). The additional monitoring consisted of 50 smear samples taken within the building.

Radiological surveys were performed throughout the project by full-time radiological control technicians as facility conditions and work areas changed.

3.5 DECOMMISSIONING OPERATIONS

Mobilization for D&D activities began on August 4, 1997, with the set-up of support trailers and utilities. Building decontamination activities began on August 13, 1997. Shipment of material removed from the facility to the ERDF began on December 23, 1997. All activities were suspended on January 27, 1998, due to funding issues. Demolition preparations were re-started on February 24, 1999. Demolition began on the west side of the 108-F Building on June 30, 1999. Demolition and rubble removal were completed on September 14, 1999. Site restoration was completed and the area was downposted to a surface contamination area on September 20, 1999. A series of photographs of the sequence of activities is included in Appendix A. A copy of the project schedule is included as Appendix B.

3.5.1 Decontamination and Decommissioning Preparation

Upon initiation of the project, mobilization personnel and procurement of consumables and equipment required for the pre-demolition and demolition commenced. The first activities performed involved terminating and/or verifying termination of all building services and utilities. These activities included isolating electrical, sewer, and water to the facility. Concurrent with these activities, waste segregation and staging areas were set up onsite to facilitate transportation of the material to its respective destination for recycling or disposal. A supervisor trailer, lunch trailer, change trailer, mobile decontamination trailer, and portable toilet facilities were mobilized at the site in preparation for D&D activities. Electricity was connected from an outside line and temporary lighting was installed. Handrails were installed where necessary to provide for a safe work environment.

Pre-demolition activities started on the fourth floor/penthouse and worked progressively downward toward the basement of the building. The first type of work activity inside the building was general housekeeping, including removing unneeded tools, equipment, biological feces, and rubble and sweeping floors. After these activities were completed, gypsum wall and ceiling boards were removed after verifying that the material was radiologically clean. Fixed radiological contamination, the pipe trench, and pipe trench sump were covered to facilitate removal after demolition of most of the above-grade structure.

Hazardous substances (e.g., PCB, mercury, asbestos, and lead) were removed. Lead contained in a battery and sheeting in drywall, PCBs, oil from motors and light ballasts, asbestos in piping covers and floor tiles, and mercury found in lighting components and switches were disposed as hazardous waste or were treated as recyclable material.

3.5.2 Structural Demolition

Upon removal of hazardous substances, the final demolition activities were started. The above-grade structure was demolished. Radiological material in the pipe trench was removed during demolition activities and disposed at the ERDF as low-level waste. Contamination in the pipe trench and sump was painted to serve as a fixative. Fixed radiological contamination was removed using baseline heavy equipment machinery. Dust suppressants (i.e., water) were used to control dust.

Decontamination necessary to allow removal of demolition equipment from contamination areas was accomplished using standard industry practices and best management practices (BMPs).

Gross equipment decontamination methods were employed to remove loose contamination within the contamination area. The BMPs for gross cleaning and/or decontaminating heavy equipment and vehicles consisted of using water and/or high-pressure water and washing down the equipment. Additional removal of caked-on dirt and grease may have involved using manual techniques such as wiping with cloths or using hand-held tools. A decontamination area was established within the areas of contamination, and additional or final decontamination was performed in this established area. Decontamination practices were documented in the daily field superintendent's log. Personnel responsible for equipment decontamination were trained in accordance with the requirements specified in the removal design report (DOE-RL 1999).

During the demolition phase, additional interior piping and equipment not removed during the pre-demolition work were exposed and removed. All building foundations were removed. Above-grade concrete was demolished, segregated, and disposed at the ERDF or was transported and disposed in the 116-B-14 sludge pit excavation (as clean backfill, as specified in the *Sampling and Analysis Instruction for the Demolition of the Masonry Block for the 108-F Biological Laboratory* [BHI 1999d]).

Sodium dichromate-contaminated concrete in one of the basement areas was sampled, found to be below ERDF and regulatory acceptance criteria, removed, and properly disposed.

Soils from the 100-F-15 french drain were removed and disposed at the ERDF between August 9 and August 10, 1999. All other french drains will be remediated during Group 4 Remediation activities during FY 2000 (BHI 1999a, BHI 199b).

Heavy equipment was used to downsize portions of rubble to facilitate loading. All material transported to the ERDF was transported using normal ERDF roll-on/roll-off containers.

3.5.3 Site Cleanup

Approximately 80 m^3 (105 yd^3) of noncontaminated masonry block were removed from the facility and transported to the 116-B-14 sludge pit site for use as clean backfill. The masonry was surveyed prior to transportation (BHI 1999a), and one confirmation sample was taken to confirm correlation between direct dose rate from the block and the contamination present (Ceffalo 1999). All building debris and the foundation were removed. All disturbed areas were graded smooth with a maximum slope of 1.5:1. Soil cement was applied to the excavation to fix any potential surface contamination. A final radiation survey was performed of the footprint of the building and adjacent areas on September 28, 1999 (Zoric 1999).

Confirmation sampling adjacent or below the building foundation was not performed, as confirmation will be conducted as part of remedial action activities. The soils underlying the first-floor trench/sump (described in the WIDS 116-F-15 site description) will also need to be sampled to verify cleanup criteria. The pipe that exits the bottom of the sump is connected with

the radioactive 100-F-19 process sewer. The 15.2- to 20.3-cm (6-in. to 8-in.) pipe encountered (100-F-19) was removed from the building footprint and was cut into sections for disposal.

Because cleanup of soils and subsurface structures from directly around the facility (i.e., french drains) was not cost effective due to future remedial action cleanup in underlying and adjacent areas, the site was stabilized in a manner not to hinder future remediation. Future cleanup will be conducted in conjunction with planned remedial actions in the 100-FR-1 and 100-FR-02 Operable Units, and characterization information for these areas will be generated to document the status of conditions at the conclusion of this project.

3.6 TRAINING

During the performance of project activities, the experience and capabilities of the operating staff were extremely important in maintaining worker and environmental safety. Day-to-day knowledge of ongoing operations, month-to-month understanding of conditions encountered, and lessons learned were vital to safe operations.

Training requirements ensured that personnel were instructed in the technologies to work safely in and around radiological areas and ensured that individual radiation exposure and the radiation exposures of others were maintained as low as reasonably achievable. Standardized core courses and training material were presented, and site-specific information and technologies were added to adequately train workers.

Health physics workers were required to have completed and be current in radiological control technician qualification training. These training courses require the successful completion of examinations to demonstrate understanding of theoretical and classroom material.

The Environmental Restoration Contractor's (ERC's) environment, safety, and health training program provided workers with the knowledge and skills necessary to safely execute assigned duties. A graded approach was used to ensure that workers received a level of training commensurate with their responsibility to comply with applicable requirements. Specialized employee training included pre-job safety briefings, plan-of-the-day meetings, and facility/work site orientations. The following training and qualifications (where applicable) were required by job assignment for 108-F Facility work activities:

Training in accordance with 29 CFR 1910.120:

- 40-Hour Hazardous Waste Worker/8-Hour Refresher
- 24-Hour Experience Component
- 8-Hour Supervisor Training (for selected individuals)
- Site-specific health and safety plan/radiological work permit
- Respirator Training
- First Aid (two qualified persons per shift/crew)
- Certified Asbestos Worker and/or Asbestos Awareness

- Lead Worker
- Radiation Worker II.

Medical surveillance requirements:

- Hazardous waste worker physical
- Mask fit
- Lead worker baseline
- Asbestos worker.

Dosimetry and bioassay requirements:

- Thermoluminescent dosimeter (as directed in the radiological work permit)
- Whole body count.

4.0 FINAL FACILITY CONDITION

Due to the 108-F Biological Laboratory's proximity to multiple WIDS sites, verification samples were not taken. Remediation of the adjacent WIDS sites is expected to occur in FY 2000, and final verification of activities will be deferred to the completion of those activities (BHI 1999a, BHI 1999b). Ground-surface surveys were performed at the sump and french drain locations, and the results of these surveys are included in Appendix C.

The physical condition of the facility at the time of turnover to the ERC Remedial Action group included the following:

- All building debris and foundations were removed.
- The piping trench, sump, and french drain 100-F-15 were removed.
- All exposed piping was cut at the edge of the excavation.
- The excavation was backfilled to support grading to a maximum slope of 1.5:1.
- All disturbed areas were graded smooth.
- The facility footprint soils were fixed in place with soil cement.

Complete details will be contained in the WIDS 100-F-36 site description (also known as 108-F Chemical Pumphouse or the 108-F Biological Laboratory Building).

5.0 COST AND SCHEDULE

The project was originally initiated in October 1997 but was only funded for 4 months. The engineering work was started but was stopped in January 1998 due to lack of additional funds. Work was restarted in December 1998, and actual fieldwork commenced in February 1999 after approval of the required engineering and regulatory documentation. Pre-demolition activities (i.e., biological cleanup, asbestos removal, and hazardous waste removal) were completed in June 1999. The actual building demolition was started at the end of June, and all field work (including demobilization) was completed in September 1999. The original demolition schedule of 14 months was completed in only 10 months after funding was authorized.

The estimated cost was $1.399 million to complete the engineering work and field work. The actual cost was $1.396 million. The potential to under-run the estimate was anticipated, but several very large foundation footings were discovered that were not on the drawings and required several weeks to remove and prepare for shipment. In addition, major equipment breakdowns occurred that also caused several weeks of delay to the schedule. A cost summary is shown in Appendix B.

6.0 WASTE DISPOSAL

Waste material generated by demolition of the 108-F Biological Laboratory included 429 ERDF containers, averaging approximately 9.5 m^3 (12.4 yd^3)each, or approximately 4,076 m^3 (5,331.4 yd^3)of debris. This material was transported between August 2, 1999, and September 14, 1999. Additional waste disposed by the project included the following:

- Asbestos: 99 m^3 (129.5 yd^3)(floor tiles and pipe lagging)
- PCBs: One 114-L (30 gal) drum (primarily light ballast, approximately 45.4 kg [100 lb])
- Mercury: 2.3 kg (5 lb).

Approximately 80.3 m^3 (105 yd^3) of material (e.g., masonry block) were surveyed for release (Appendix B) and were transported to the 116-B-14 sludge pit excavation for use as clean backfill. Material disposition in the 116-B-14 sludge pit is documented in BHI (1999a) and BHI (1999b). The remaining block and building debris were transported to the ERDF for disposal.

7.0 OCCUPATIONAL EXPOSURES

7.1 PERSONNEL INJURIES

Five personnel injures were recorded during the 108-F Facility demolition project, which consisted of four first aid incidents that required minor treatment but resulted in no work restrictions, and one non-lost workday Occupational Safety and Health Administration-recordable injury, which resulted in the prescription of medication but no work restrictions.

7.2 PERSONNEL RADIOLOGICAL EXPOSURES

No contaminations occurred during the 108-F Biological Laboratory D&D project. In addition, D&D project staff reviewed monthly dosimetry records for workers on the 108-F Biological Laboratory demolition projects, and no measurable external exposures were reported.

8.0 CONCLUSIONS

8.1 LESSONS LEARNED

1. It is good practice to use old characterization data as guidance and then verify the current conditions with new instrumentation and technologies that are currently available. Radiological release criteria change over time, and new instrumentation and technologies become available that improve on old survey methods. Between 1977 and 1983, interim decommissioning work was performed that removed the building's laboratory equipment, including sinks, cabinets, hoods, and related piping and ducting. Extensive radiological surveys were performed at the end of the interim decommissioning effort and the building was decontaminated to unrestricted use levels. However, over time, conditions may have changed due to various reasons (e.g., from deterioration of the structure), therefore, resulting in weather and animal/insect/vermin intrusion and changing or newly discovered radiological conditions. In addition, he endpoint criteria for the 1983 surveys for release to unrestricted-use levels did not account for today's more stringent requirements for release for unrestricted use.

2. It is important to know the history and use of a facility when planning radiological work. Generally, in the Hanford Site's 100 Area, beta/gamma radiation surveys are performed and if activity is found, alpha radiation surveys are then performed. This method generally is correct when dealing with the 100 Area reactors and their respective ancillary facilities. In the case of the 108-F Facility, however, various experiments were performed with a variety of radionuclides, including pure plutonium. A complete history for the use of individual rooms and areas of the 108-F Facility was either inadequate or unavailable to support performing either a beta/gamma survey alone or an alpha survey alone. For this reason, both alpha and beta/gamma surveys should have been performed during characterization and D&D work activities. Lack of any alpha surveys led to the conditions (i.e., assumption that alpha was not present) that resulted in discovery of alpha contamination in previously released areas of the building, which stopped work on the project for several months and dramatically increased the budgeted cost of D&D.

3. Funding for the 108-F D&D Project was unstable throughout the project, which resulted in higher project costs due to unnecessary mobilization and demobilization activities. Only partial funding was allotted each year, thereby causing the project to demobilize each time funding was depleted. This caused disruptions with each restart of the project. Examples of this include preparing/updating project documentation, performing radiological surveys to establish current radiological conditions, costs for demobilization and mobilization, and loss of knowledgeable personnel (manual and non-manual) to other projects. Stable and adequate funding would have benefited the project by ensuring that the project was performed safely, in a timely manner, and at a reasonable cost.

4. Due to the facility's history (i.e., experimental laboratory), the discovery of containers with unknown contents should have been anticipated during the planning phases of the project. During work at the 108-F Building, a bottle of unknown material was discovered. Efforts to

characterize the contents were initiated by the project by visual inspection and arrangements with the project sampling group. Concerns about the shock sensitivity of the material and the appropriate personal protective equipment were raised. The project management team decided to contact the Hanford Fire Department Hazardous Material Team to inspect the material. The Hazardous Material Team representative inspected the bottle and determined that the material was currently stable; however, because the material was an unknown and its physical state did not invite sampling, it was recommended that the project management team to contact the Richland Police Bomb Squad to dispose the material. Contact was made with the Richland Bomb Squad and an agreement was reached to detonate the bottle, which was done without incident.

6. Use of chemical expertise (e.g., senior ERC chemists and engineers) should be considered prior to making decisions about method of disposal for unknown materials. Response plans should be clear that unknown materials are not to be disturbed prior to expert inspection.

8.2 CONCLUSIONS

Unstable funding causes demobilization of a project each time funding is depleted, which causes disruptions in the operation that cause additional costs to the project in the long term. Examples of this include the additional costs of performing radiological surveys to establish current radiological conditions, demobilization and re-mobilization, and loss of knowledgeable personnel (manual and non-manual) to other projects. Future D&D projects need stable and adequate funding to ensure that the project is performed safely and in a timely manner.

Radiological release criteria change over time, and new instrumentation and technologies enhance current surveys. Future D&D projects need to use old characterization data as guidance and then verify the current conditions with the newest instrumentation and technologies that are currently available.

Despite these difficulties, the 108-F Laboratory D&D was a highly successful project that resulted in a safe and effective removal of an environmental hazard. There were no lost-time work injuries or skin contaminations, and the project was completed for almost exactly the original cost estimate. Each of the challenges faced by the project team was met successfully with a safe, effective, and technically correct solution. Demolition of the 108-F Laboratory Building moved the 100-F Area, closer to final closure and ultimate release to public use, in accordance with *Hanford Federal Facility Agreement and Consent Order* milestones (Ecology et al. 1994).

Even though the funding issue caused disruptions, the D&D team assigned to the project (both manual and non-manual) did an excellent job of completing the project. Their safety record, ability to function as a team, and dedication to getting the job done contributed to a successful project.

9.0 REFERENCES

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APPENDIX A

PROJECT PHOTOGRAPHS

Project Photographs

This appendix contains a series of photographs showing the various activities performed during the demolition of the 108-F Biological Laboratory. The photos start with the removal of the concrete walls of the west side of the building and finish with a photo of the site after demolition and backfilling were completed

Photo 1. Heavy Equipment Removing Concrete Wall on Westside of 108-F as Water is Sprayed to Control Dust.

Photo 2. West Side of Building (Annex) After Concrete Walls Removed.

Photo 3. Demolition of North Site of 108-F Building.

Photo 4. Demolition of Southern Half of 108-F Building.

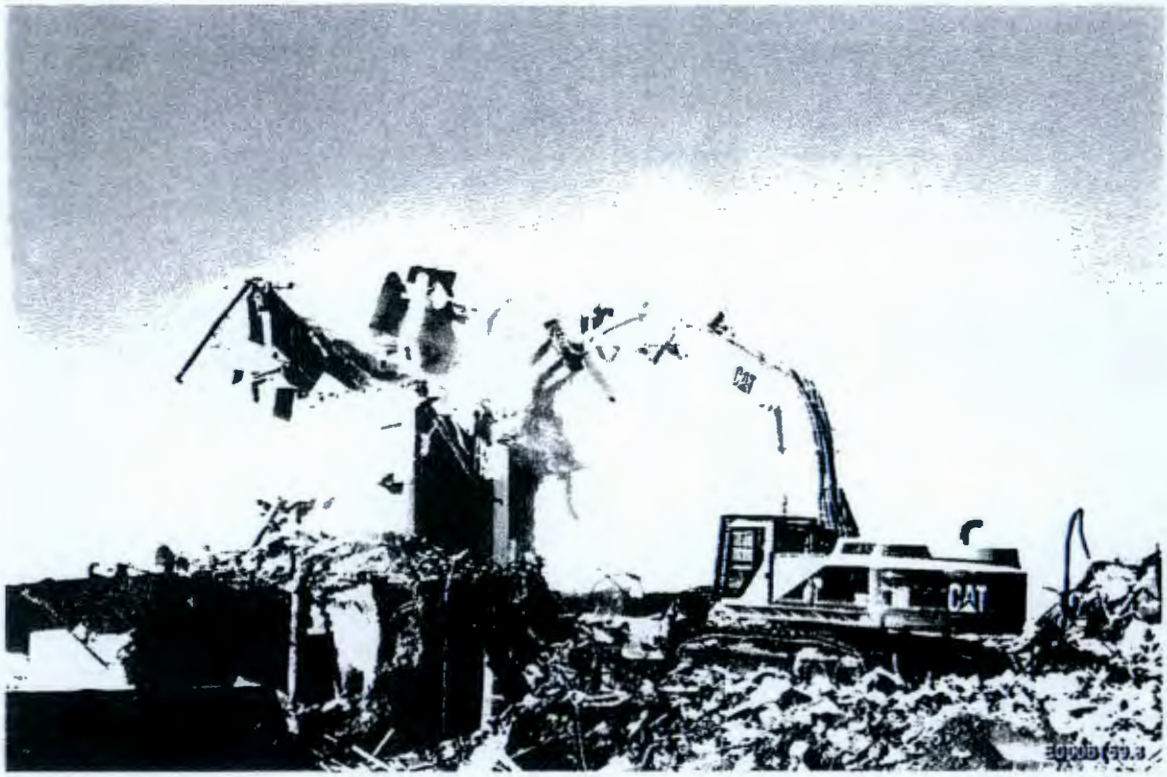


Photo 5. Non-Contaminant Masonry Block Being Deposited into the U-6-B-14 Sludge Pit Site.

Photo 6. Contaminant Soil Being Loaded in ERDF Container.

Photo 7. Site of 108-F Biological Laboratory After D&D Operations Completed.

APPENDIX B

PROJECT SCHEDULE, RESOURCES, AND PROJECT COST

Project Schedule, Resources, and Project Cost

ID	Task Name	Duration
1	Characterization	120 days
2	Removal Action Workplan (RAW)	90 days
3	Data Quality Objective	62 days
4	Sampling & Analysis Plan	30 days
5	Readiness Assessment	10 days
6	Utility Isolation	39 days
7	Drywall / Stud Rem 4th Floor	8 days
8	Drywall / Stud Rem 3rd Floor	12 days
9	Drywall / Stud Rem 1st/2nd Floor	39 days
10	Haz Mat Removal	74 days
11	Asbestos Abate 1st Floor	39 days
12		
13	Revise Hazards Classification	39 days
14	Revise RAW	48 days
15	Develop CMU Reuse Plan	44 days
16	Survey CMU's	21 days
17	Readiness Assessment	9 days
18	Remobilize at Site	27 days
19	Asbestos / Equipment Removal	77 days
20	Building Demo	59 days
21	Site Restoration	1 day
22	Demobilization	1 day

Project: 108F Final Rpt
Date: Thu 8/3/00

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary

Page 1

108-F BIOLOGY LABORATORY FY95-FY00

BASELINE CHANGE PROPOSALS

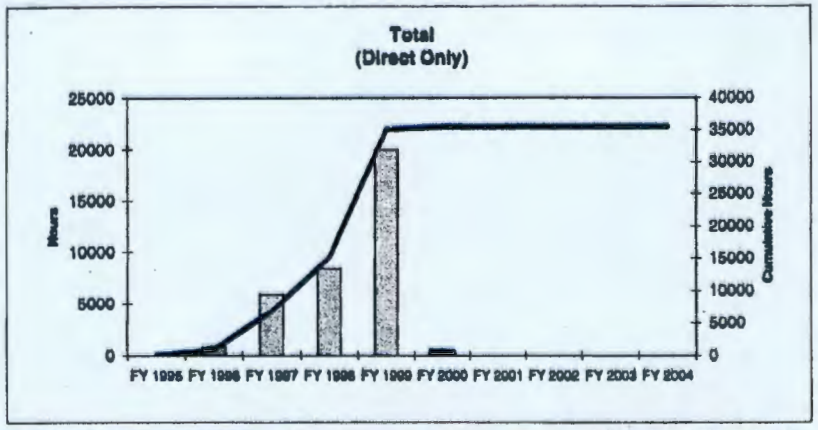
BCP NUMBER	ISSUE DATE	APPROVAL DATE	DESCRIPTION	TOTAL $ VALUE IN 1,000'S Fyxx
96176	4/17/1996	4/26/1996	Early Start of Bldg 108F Characterization	150
97037	11/6/1996	11/20/1996	Deferral of 108F Biology Lab Remediation	951.9
97090	12/18/1996	1/27/1997	108F Reclassification from NEPA to CERCLA	13
97186	3/31/1997	5/27/1997	108F Biology Lab Demo Acceleration	392.9
97305	9/8/1997	9/16/1997	Contamination at 108F Biology Lab	34.7
98030	10/28/1997	10/29/1997	108F Biology Lab DWP Corrections/Revisions	0
98082	1/1/1998	1/27/1998	108F Area Contamination & Demobilization	279.3
98101	1/26/1998	1/27/1998	108f DWP - Rev. 2, Scope Deferral	(338.6)
99080	1/1/1999	1/28/1999	Re-baseline 108F Lab Due to Admin Hold List	0
99154	4/9/1999	4/29/1999	108F Biology Masonry Block Re-use Plan	89

HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F Biology Laboratory
FINAL BUDGET/COST BY HTRW
FY95-FY00

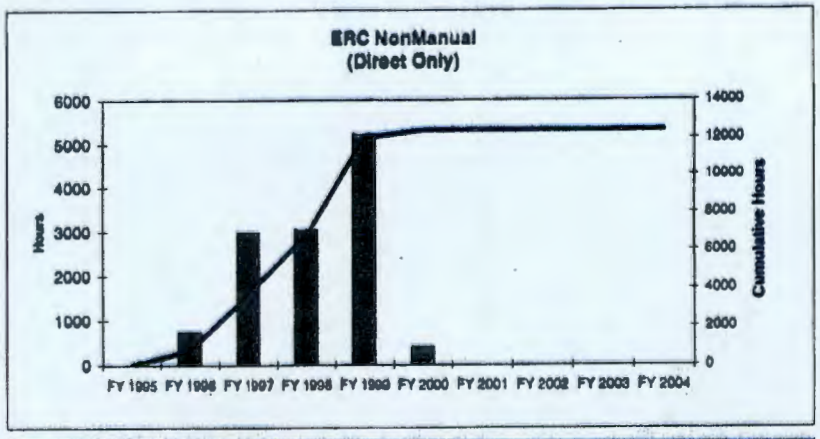
HTRW	Category	Budget	Actual
	*Budget	$ 2,654.0	
	Cost ($000's)		
32.02	REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)		$ 208.1
32.03	REMEDIAL DESIGN		$ 20.5
33.01	MOBILIZATION AND PREPARATORY WORK		$ 244.5
33.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS		$ 178.4
33.17	DECONTAMINATION AND DECOMMISSIONING (D&D)		$ 1,387.1
33.18	DISPOSAL (OTHER THAN COMMERCIAL)		$ 25.3
33.20	SITE RESTORATION		$ -
33.21	DEMOBILIZATION		$ 46.7
33.99	DIRECT PROJECT SUPPORT		$ 298.9
	OTHER		$ -
	Total Cost	**$ 2,654.0**	**$ 2,409.6**

* Note: Budget includes 31K for FY00 to cover the cost of closeout reports.
Actuals do not reflect any expenditures for FY00.

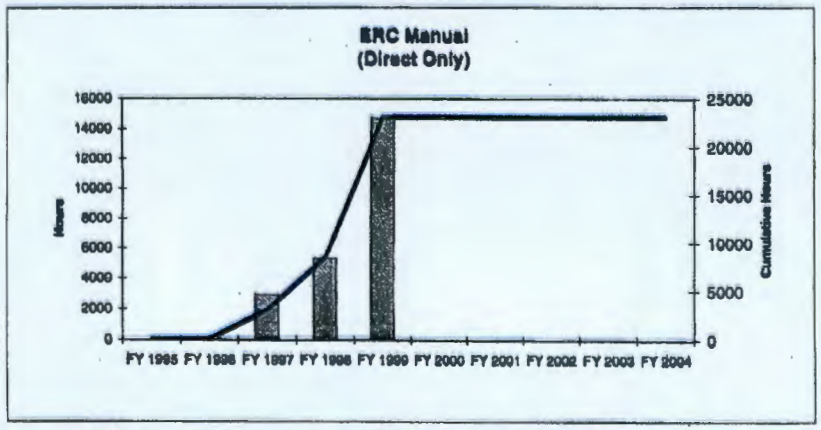
HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F BIOLOGY LABORATORY
STAFFING PLAN



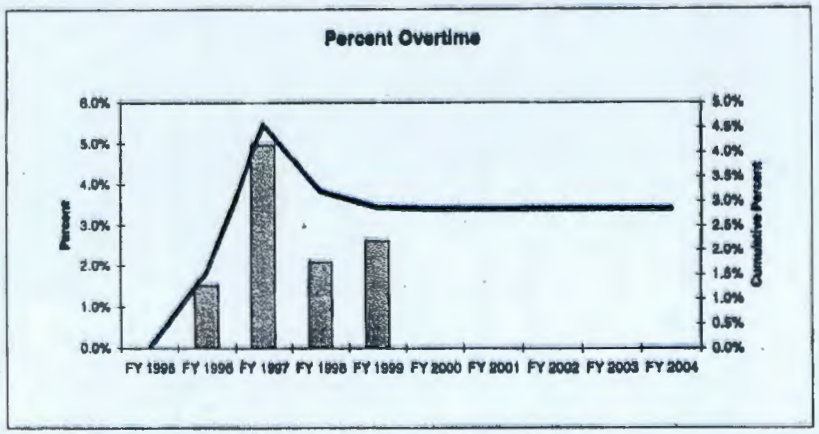
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	816	5,919	8,397	19,947	400	-	-	-	-
FY Cum	-	816	6,735	15,132	35,079	35,479	35,479	35,479	35,479	35,479



	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	737	2,984	3,041	5,234	400	-	-	-	-
FY Cum	-	737	3,721	6,762	11,996	12,396	12,396	12,396	12,396	12,396

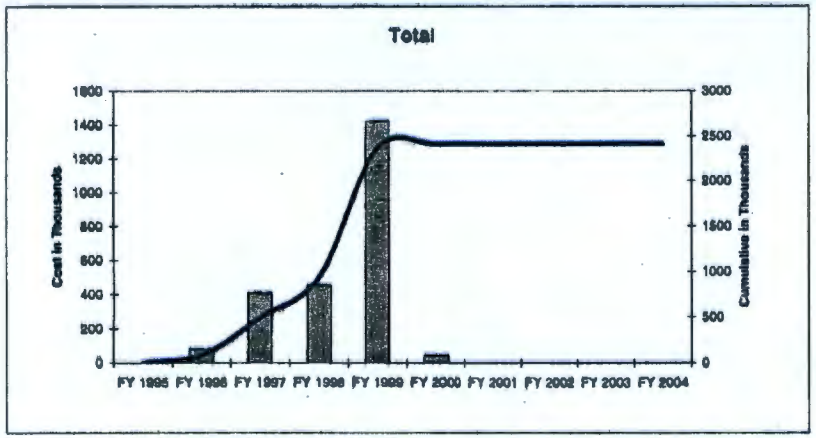


	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	79	2,935	5,358	14,713	-	-	-	-	-
FY Cum	-	79	3,014	8,370	23,083	23,083	23,083	23,083	23,083	23,083

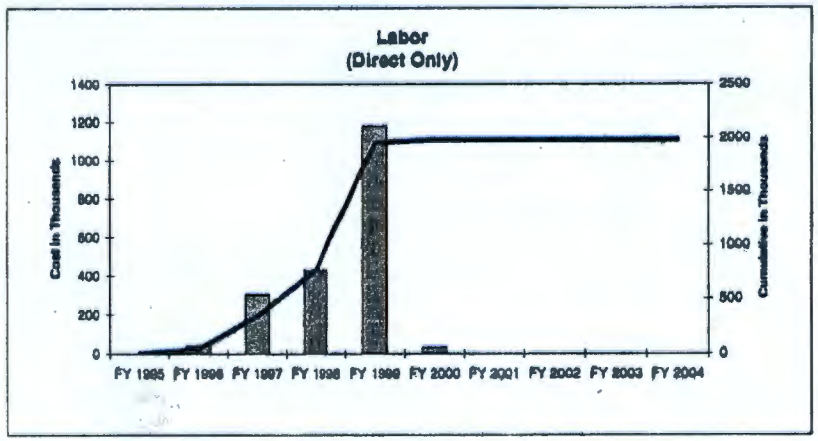


	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	0.0%	1.5%	5.0%	2.1%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%
FY Cum	0.0%	1.5%	4.8%	3.2%	2.9%	2.8%	2.8%	2.8%	2.8%	2.8%

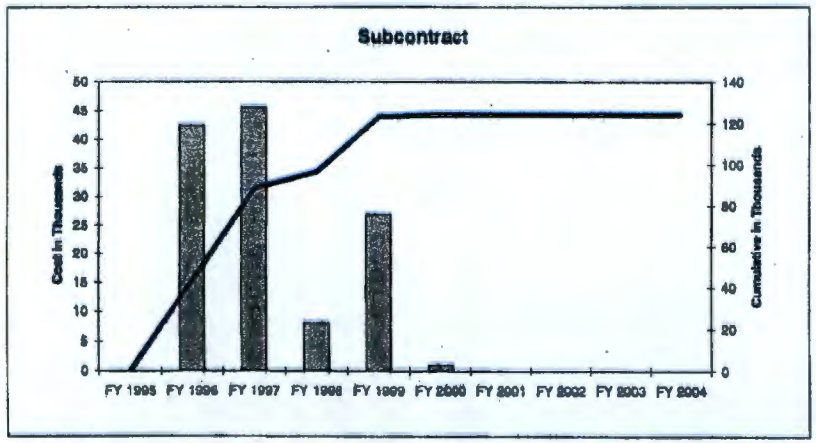
HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F BIOLOGY LABORATORY
SPEND PLAN



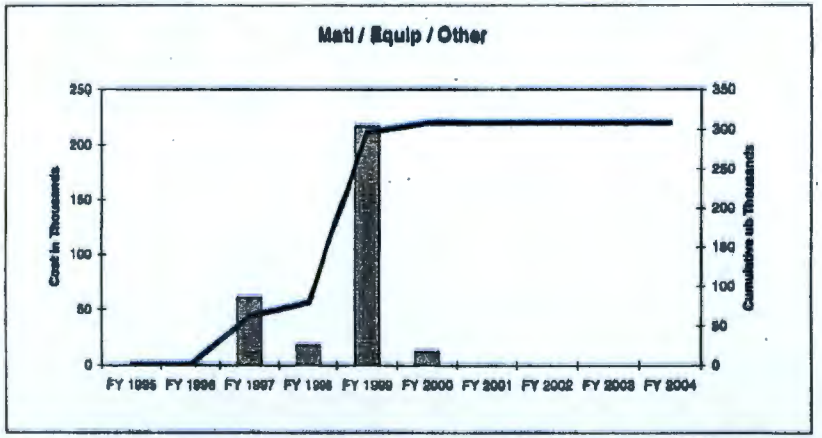
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	83	407	452	1,423	43	-	-	-	-
FY Cum	-	83	491	943	2,366	2,410	2,410	2,410	2,410	2,410



	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	41	301	426	1,179	30	-	-	-	-
FY Cum	-	41	342	768	1,947	1,978	1,978	1,978	1,978	1,978



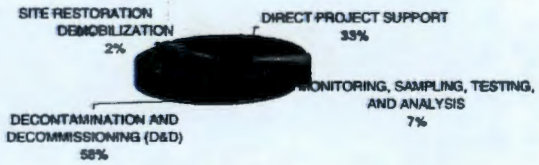
	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	42	46	9	27	1	-	-	-	-
FY Cum	-	42	88	96	123	124	124	124	124	124



	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
FY	-	0	61	18	217	12	-	-	-	-
FY Cum	-	0	61	79	296	308	308	308	308	308

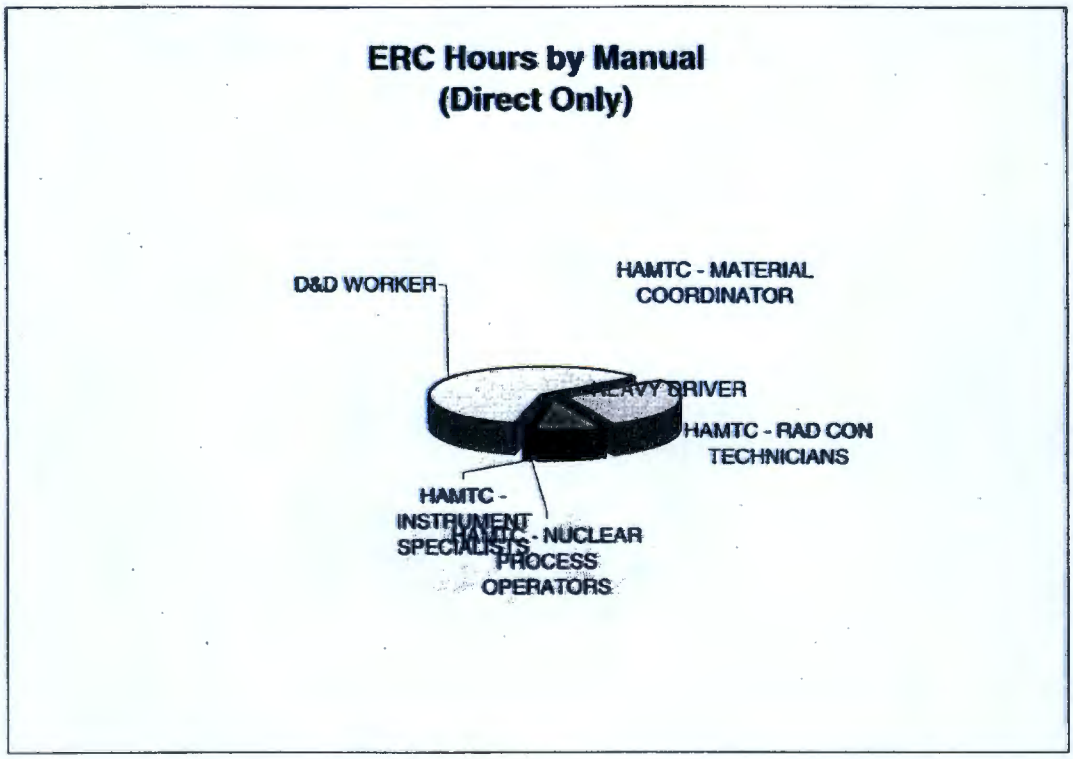
HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F Biology Laboratory
FINAL COST REPORT BY HTRW AND COST CATEGORY

Cost by HTRW and Cost Category



HTRW CATEGORY		LABOR (Direct Only) NON MAN HOURS	MANUAL HOURS	TOTAL HOURS	COST (in $1,000's) LABOR COST	S/C COST	OTHER COST	TOTAL COST
33.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	516	1759	2275	160.3	15.0	3.0	178.4
33.17	DECONTAMINATION AND DECOMMISSIONING (D&D)	2551	18600	21151	1123.5	17.1	246.6	1387.1
33.20	SITE RESTORATION	0	0	0	0.0	0.0	0.0	0.0
33.21	DEMOBILIZATION	434	247	681	46.6	0.0	0.1	46.7
	DIRECT PROJECT SUPPORT	8895	2477	11372	647.2	92.0	58.3	797.4
	TOTAL PROJECT	12396	23083	35479	1977.6	124.1	307.9	2409.6

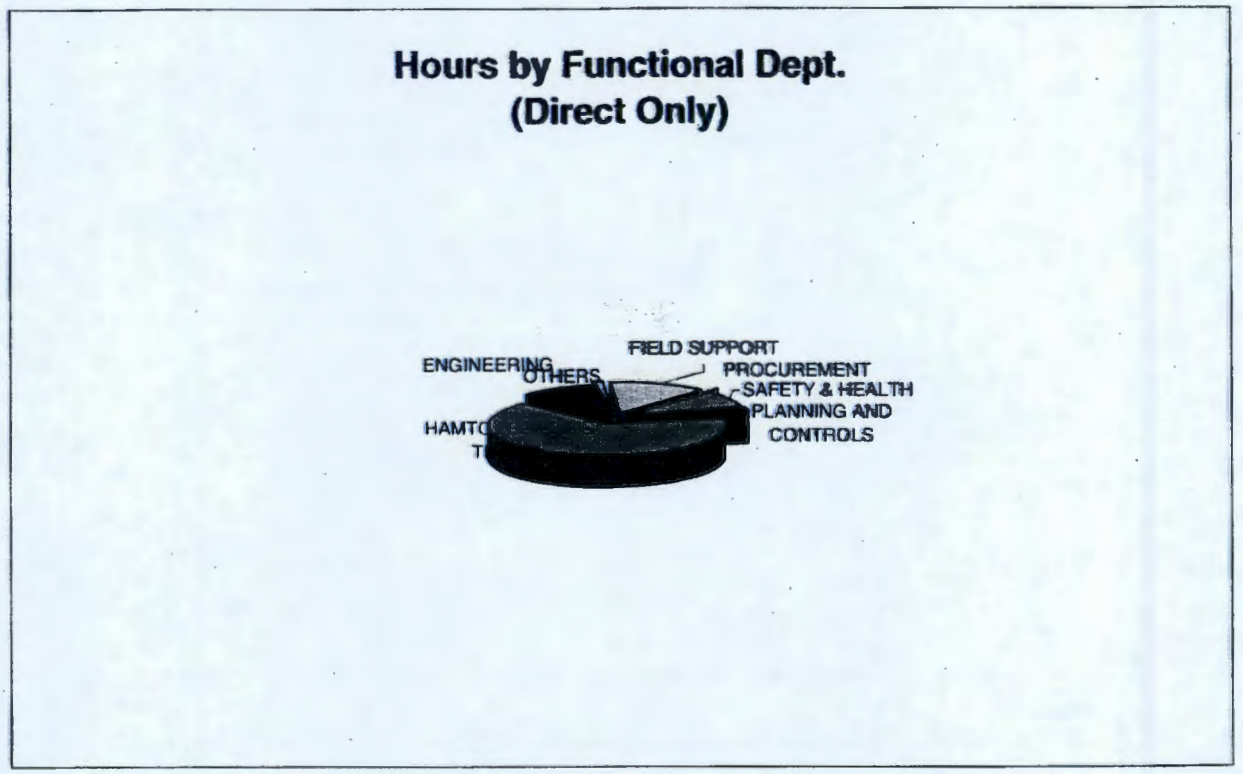
HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F Biology Laboratory



ERC MANUAL CODE	DESCRIPTION	ST HOURS	OT HOURS	TOTAL HOURS	OT %
10710	HAMTC - CARPENTER	183	0	183	0.0%
10712	HAMTC - POWER OPERATOR	15	0	15	0.0%
10713	HAMTC - HEAVY EQUIPMENT OPERATOR	568	3	571	0.4%
10714	HAMTC - CRANE OPERATOR	569	2	571	0.3%
10715	HAMTC - D&D WORKER	11,958	124	12,089	1.0%
10716	HAMTC - ELECTRICIAN	735	4	739	0.6%
10717	HAMTC - AUTO MECHANICS	0	0	0	0.0%
10718	HAMTC - HEAVY DRIVER	1,758	25	1,783	1.4%
10721	HAMTC - INSULATOR	0	0	0	0.0%
10722	HAMTC - LIGHT DRIVER (STOREKEEPER/TEAMSTER)	2	0	2	0.0%
10723	HAMTC - MATERIAL COORDINATOR	52	0	52	0.0%
10724	HAMTC - MILLWRIGHTS	0	0	0	0.0%
10728	HAMTC - PAINTER	0	0	0	0.0%
10729	HAMTC - NUCLEAR PROCESS OPERATORS	46	0	46	0.0%
10730	HAMTC - PIPEFITTER	35	0	35	0.0%
10734	HAMTC - RIGGER	485	18	503	3.6%
10737/10T26	HAMTC - INSTRUMENT SPECIALISTS	157	7	164	4.3%
10T25	HAMTC - RAD CON TECHNICIANS	5,235	300	5,535	5.4%
10T27	HAMTC - INDUSTRIAL HYGIENE TECHNICIANS	785	15	800	1.9%
	HAMTC - OTHER	4	0	4	0.0%
	TOTAL ERC CRAFT	22,585	498	23,083	2.2%

*Note: Excludes Subcontract

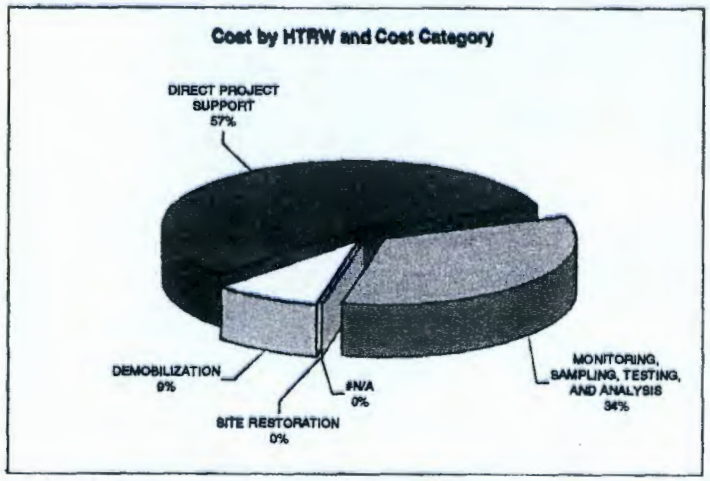
HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F Biology Laboratory
ERC MANUAL/NON MANUAL LABOR BY FUNCTIONAL DEPT

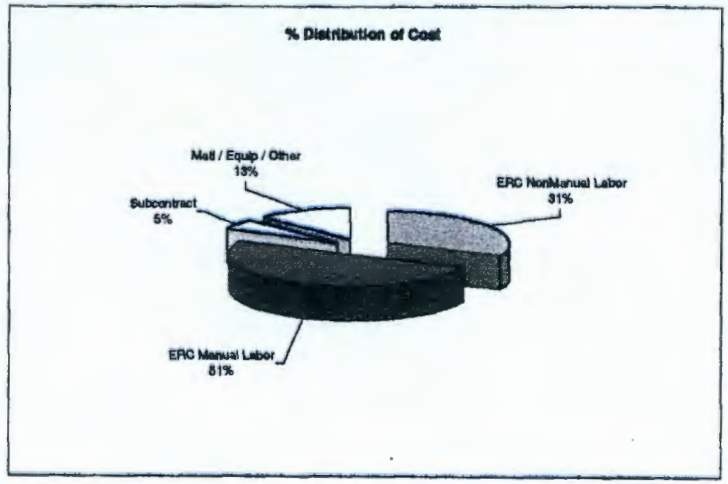


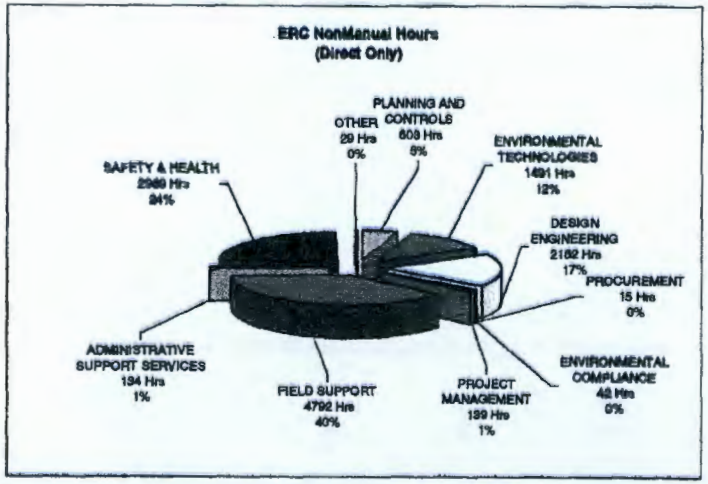
FUNC CODE	FUNCTIONAL DEPARTMENT	ST HOURS	OT HOURS	TOTAL HOURS	OT %
10	HAMTC / BUILDING TRADES	22,585	498	23,083	2.2%
21	PLANNING AND CONTROLS	576	27	603	4.5%
31	ENVIRONMENTAL TECHNOLOGIES	1,459	32	1,491	2.1%
32	DESIGN ENGINEERING	2,043	119	2,162	5.5%
41	PROCUREMENT	15	0	15	0.0%
53	FIELD SUPPORT	4,675	117	4,792	2.4%
54	FACILITIES & OFFICE SERVICES	29	0	29	0.0%
55	ADMINISTRATIVE SUPPORT SERVICES	131	3	134	1.9%
58	SAFETY & HEALTH	2,782	207	2,989	6.9%
	OTHER	176	5	181	2.5%
	PROJECT TOTAL	34,472	1,007	35,479	2.8%

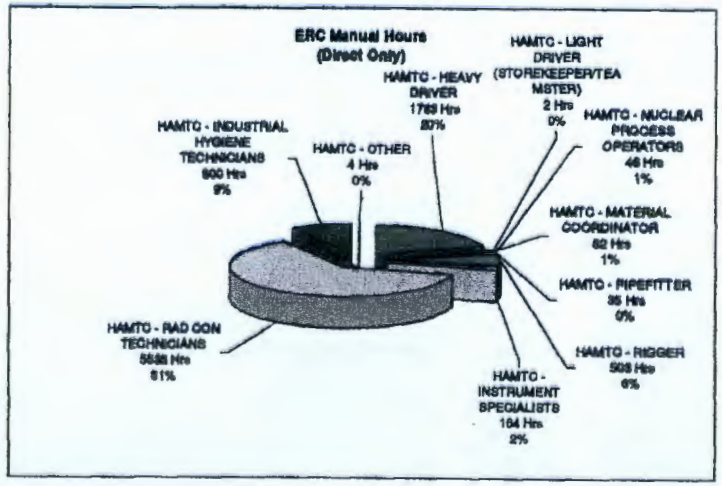
* Excludes subcontract & other resources (outside/offsite)..
** Actual Labor

HISTORICAL REPORT - ENVIRONMENTAL RESTORATION CONTRACT
JOB NO. 22192
108-F BIOLOGY LABORATORY









APPENDIX C

108-F WALL RELEASE SURVEY DATA INTERPRETATION

Attachment 11

070078

Job No. 22192
Written Response Required: NO
Due Date: N/A
Assignee: N/A
Close CCN: N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 5000, 5040

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

TO: R.S. Day X9-08

DATE: June 14, 1999

COPIES: See Below

FROM: G.M. Ceffalo
Radiological Measurements & Environmental Support
L5-64/373-6238

SUBJECT: **108-F WALL RELEASE SURVEY DATA INTERPRETATION**

Following the completion of data-gathering activities at the 108-F facility, I have analyzed the data set to determine the radiological conditions of the cinderblock walls. The results of the analysis were compared to the release criteria specified in DOE Order 5400.5, and the walls were determined to be releasable per the requirements of surface-contaminated material.

To summarize the attached spreadsheet, a total of 544 counts were collected over four days of surveying. Of these 544 counts, six were rejected from the analysis due to instrument error during reading (electronic noise). The rejection rate was 1.1%. The average contamination readings are shown below:

	β/γ dpm/100 cm^2	α dpm/100 cm^2	
Average Surface contamination value from 'sample' points:	364	7.55	
Standard Deviation:	72.3	6.06	
Coefficient of Variation:	0.20	0.80	
95% Upper Confidence Level:	482	17.5	(1.64 Two-tailed)
95% Upper Confidence Level:	505	19.4	(1.96 One-tailed)
Maximum Value:	491	24.0	

The values from the scanning surveys were slightly higher, and much more variable. No significant elevated readings were found. The highest-contaminated spots were 4067 dpm/100 cm^2 beta-gamma and 73 dpm/100 cm^2 alpha.

As even the highest spots of contamination are less than the DOE Order 5400.5 release values of 5000 dpm/100 cm^2 beta-gamma and 100 dpm/100cm2 transuranic, the cinderblock walls surveyed can be unconditionally released. The volumetric contamination that can be correlated with the surface contamination is less than 0.0158 pCi/g ^{239}Pu, and 0.41 pCi/g ^{137}Cs, well below the volumetric release criteria. In summary, the walls of the building can be released for use as backfill from a Radiological Controls perspective. Please call me at 373-6238 or 531-0678 if you have any questions.

GMC:kmh

Attachment: Data Analysis Spreadsheet "108-F Survey Data.xls"

C:\user\wm\CEFFALO\release survey 108-F analysis R3M.doc

Bechtel Hanford, Inc. – CH2M Hill Hanford, Inc. – Thermo Hanford, Inc.

070078

Distribution
Page 2

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M. R. Mihalic X9-08
S. R. Reed X9-09
Document and Info Services H0-09

Attachment 11

070078

108-F Wall Release Survey Data Points and Interpretation

α Efficiency: 0.089 α CF: 11.24
βγ Efficiency: 0.205 βγ CF: 4.88

Survey By
Mark Lippy
6/3/99
to
6/10/99

Analysis By
Grant Ceffalo
6/14/99

	#	Location	Count 1	Count 2	Units	Operating	Int Val T	Log Time	Log Date	dpm/ 100 cm2 beta/gamma	alpha
Background Checks	1	1002	900	3	cpm	Sampler	20 s	2:10:00	6/3/99	732	5.6
	2	1002	939	0	cpm	Sampler	20 s	2:10:00	6/3/99	763	0.0
	3	1002	975	0	cpm	Sampler	20 s	2:11:00	6/3/99	793	0.0
	4	1001	957	0	cpm	Sampler	20 s	2:11:00	6/3/99	778	0.0
Background Determinations in 108-F	5	1001	1511	5.4	cpm	Sampler	300 s	7:41:00	6/4/99	1228	10.1
	6	1001	1489	4.4	cpm	Sampler	300 s	7:46:00	6/4/99	1211	8.2
	7	1001	1502	2.4	cpm	Sampler	300 s	7:52:00	6/4/99	1221	4.5
	8	1001	1489	4.4	cpm	Sampler	300 s	7:57:00	6/4/99	1211	8.2
	9	1001	1516	4	cpm	Sampler	300 s	8:02:00	6/4/99	1233	7.5
	10	1001	1518	3	cpm	Sampler	300 s	8:07:00	6/4/99	1234	5.6
	11	1001	1519	5	cpm	Sampler	300 s	8:13:00	6/4/99	1235	9.4
	12	1001	1527	3.6	cpm	Sampler	300 s	8:18:00	6/4/99	1241	6.7
	13	1001	1509	6.4	cpm	Sampler	300 s	8:23:00	6/4/99	1227	12.0
	14	1001	1547	3.2	cpm	Sampler	300 s	8:28:00	6/4/99	1258	6.0
	15	1001	1527	6.2	cpm	Sampler	300 s	8:33:00	6/4/99	1241	11.6
	16	1001	1510	5	cpm	Sampler	300 s	8:39:00	6/4/99	1228	9.4
	17	1001	1534	5.2	cpm	Sampler	300 s	8:44:00	6/4/99	1247	9.7
	18	1001	1530	4.8	cpm	Sampler	300 s	8:49:00	6/4/99	1244	9.0
	19	1001	1519	5	cpm	Sampler	300 s	8:54:00	6/4/99	1235	9.4
	20	1001	1534	5.8	cpm	Sampler	300 s	9:00:00	6/4/99	1247	10.9
	21	1001	1557	6	cpm	Sampler	300 s	9:05:00	6/4/99	1266	11.2
	22	1001	1532	5.6	cpm	Sampler	300 s	9:10:00	6/4/99	1246	10.5
	23	1001	1587	5.8	cpm	Sampler	300 s	9:15:00	6/4/99	1290	10.9
	24	1001	1560	4.6	cpm	Sampler	300 s	9:20:00	6/4/99	1268	8.6
								Background Averages:		1241	9.0
Sample and Survey points	25	18	1687	11.6	cpm	Sampler	300 s	9:32:00	6/4/99	363	4.9
	26	20	1716	11.8	cpm	Sampler	300 s	9:37:00	6/4/99	387	5.3
	27	3	1755	10	cpm	Sampler	300 s	9:42:00	6/4/99	418	1.9
	28	16	1843	12.2	cpm	Sampler	300 s	9:47:00	6/4/99	327	6.0
	29	9	1545	13	cpm	Sampler	300 s	9:53:00	6/4/99	248	7.5
	30	4	1592	11	cpm	Integrate	300 s	10:00:00	6/4/99	286	3.8
	31	5	1568	21.8	cpm	Integrate	300 s	10:27:00	6/4/99	266	24.0
	32	13	1776	14.6	cpm	Integrate	300 s	10:34:00	6/4/99	435	10.5
	33	2	1705	12.4	cpm	Integrate	300 s	10:40:00	6/4/99	378	6.4
	34	14	1713	13.8	cpm	Integrate	300 s	10:45:00	6/4/99	384	9.0
	35	17	1715	12.4	cpm	Integrate	300 s	10:51:00	6/4/99	386	6.4
	36	100	1478	21	cpm	Integrate	300 s	10:57:00	6/4/99	193	22.5
Source Checks	37	1002	10460	17.88	cpm	Integrate	60 s	11:48:00	6/4/99	-	-
	38	1002	1493	2623	cpm	Integrate	60 s	11:58:00	6/4/99	-	-

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I	Int Val T	Log Time	Log Date	beta/gamma	alpha	
39	26	1560	12	cpm	Integrate	5 s	12:12:00	6/4/99	260	5.7	
40	26	1728	12	cpm	Integrate	5 s	12:12:00	6/4/99	396	5.7	
41	26	1584	12	cpm	Integrate	5 s	12:12:00	6/4/99	279	5.7	
42	26	1680	12	cpm	Integrate	5 s	12:13:00	6/4/99	357	5.7	
43	26	1860	0	cpm	Integrate	5 s	12:13:00	6/4/99	504	-16.8	
44	26	1860	12	cpm	Integrate	5 s	12:14:00	6/4/99	504	5.7	
45	26	1716	12	cpm	Integrate	5 s	12:14:00	6/4/99	387	5.7	
46	26	1812	36	cpm	Integrate	5 s	12:14:00	6/4/99	465	50.6	
47	26	1872	0	cpm	Integrate	5 s	12:15:00	6/4/99	513	-16.8	
48	26	1872	24	cpm	Integrate	5 s	12:15:00	6/4/99	513	28.1	
49	26	3637	12	cpm	Integrate	5 s	12:16:00	6/4/99	1948	5.7	
50	26	1320	24	cpm	Integrate	5 s	12:16:00	6/4/99	65	28.1	
51	26	1764	0	cpm	Integrate	5 s	12:16:00	6/4/99	426	-16.8	
52	29	1824	0	cpm	Integrate	5 s	12:17:00	6/4/99	474	-16.8	
53	29	1728	12	cpm	Integrate	5 s	12:18:00	6/4/99	396	5.7	
54	29	1548	36	cpm	Integrate	5 s	12:18:00	6/4/99	250	50.6	
55	29	1488	24	cpm	Integrate	5 s	12:19:00	6/4/99	201	28.1	
56	29	1548	0	cpm	Integrate	5 s	12:19:00	6/4/99	250	-16.8	
57	29	1524	0	cpm	Integrate	5 s	12:19:00	6/4/99	230	-16.8	
58	35	1596	12	cpm	Integrate	5 s	12:26:00	6/4/99	289	5.7	
59	35	1824	24	cpm	Integrate	5 s	12:27:00	6/4/99	474	28.1	
60	35	1728	12	cpm	Integrate	5 s	12:27:00	6/4/99	396	5.7	
61	35	1896	0	cpm	Integrate	5 s	12:27:00	6/4/99	533	-16.8	
62	35	1572	12	cpm	Integrate	5 s	12:27:00	6/4/99	269	5.7	
63	35	1812	0	cpm	Integrate	5 s	12:28:00	6/4/99	465	-16.8	
64	35	1596	24	cpm	Integrate	5 s	12:28:00	6/4/99	289	28.1	
65	35	1464	0	cpm	Integrate	5 s	12:28:00	6/4/99	182	-16.8	
66	35	1820	36	cpm	Integrate	5 s	12:28:00	6/4/99	309	50.6	
67	35	1668	12	cpm	Integrate	5 s	12:29:00	6/4/99	348	5.7	
68	35	1776	12	cpm	Integrate	5 s	12:29:00	6/4/99	435	5.7	
69	35	1908	24	cpm	Integrate	5 s	12:29:00	6/4/99	543	28.1	
70	35	1872	12	cpm	Integrate	5 s	12:29:00	6/4/99	513	5.7	
71	35	1608	0	cpm	Integrate	5 s	12:30:00	6/4/99	299	-16.8	
72	35	1620	12	cpm	Integrate	5 s	12:30:00	6/4/99	309	5.7	
73	35	1860	0	cpm	Integrate	5 s	12:30:00	6/4/99	504	-16.8	
74	35	1560	12	cpm	Integrate	5 s	12:30:00	6/4/99	260	5.7	
75	35	1752	24	cpm	Integrate	5 s	12:31:00	6/4/99	416	28.1	
76	35	2028	12	cpm	Integrate	5 s	12:31:00	6/4/99	640	5.7	
77	35	1836	36	cpm	Integrate	5 s	12:31:00	6/4/99	484	50.6	
78	35	1484	72.01	cpm	Integrate	5 s	12:31:00	6/4/99			Noted bad count
79	35	1872	12	cpm	Integrate	5 s	12:31:00	6/4/99	513	5.7	
80	35	1596	36	cpm	Integrate	5 s	12:32:00	6/4/99	289	50.6	

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I	Int Val T	Log Time	Log Date	beta/gamma	alpha
81	35	1824	12	cpm	Integrate	5 s	12:32:00	6/4/99	474	5.7
82	35	2040	12	cpm	Integrate	5 s	12:32:00	6/4/99	650	5.7
83	35	1788	0	cpm	Integrate	5 s	12:32:00	6/4/99	445	-16.8
84	35	1896	24	cpm	Integrate	5 s	12:33:00	6/4/99	533	28.1
85	35	1716	0	cpm	Integrate	5 s	12:33:00	6/4/99	387	-16.8
86	35	1800	12	cpm	Integrate	5 s	12:33:00	6/4/99	455	5.7
87	35	1872	24	cpm	Integrate	5 s	12:33:00	6/4/99	513	28.1
88	35	2112	12	cpm	Integrate	5 s	12:33:00	6/4/99	709	5.7
89	35	1512	12	cpm	Integrate	5 s	12:34:00	6/4/99	221	5.7
90	35	2040	0	cpm	Integrate	5 s	12:34:00	6/4/99	650	-16.8
91	35	1572	0	cpm	Integrate	5 s	12:34:00	6/4/99	269	-16.8
92	35	1560	0	cpm	Integrate	5 s	12:34:00	6/4/99	260	-16.8
93	35	1776	24	cpm	Integrate	5 s	12:35:00	6/4/99	435	28.1
94	35	1836	12	cpm	Integrate	5 s	12:35:00	6/4/99	484	5.7
95	35	1656	0	cpm	Integrate	5 s	12:35:00	6/4/99	338	-16.8
96	35	1656	12	cpm	Integrate	5 s	12:35:00	6/4/99	338	5.7
97	35	1620	12	cpm	Integrate	5 s	12:35:00	6/4/99	309	5.7
98	35	1704	0	cpm	Integrate	5 s	12:36:00	6/4/99	377	-16.8
99	35	1560	12	cpm	Integrate	5 s	12:36:00	6/4/99	260	5.7
100	35	1656	12	cpm	Integrate	5 s	12:36:00	6/4/99	338	5.7
101	35	1572	48	cpm	Integrate	5 s	12:36:00	6/4/99	269	73.1
102	35	1884	0	cpm	Integrate	5 s	12:36:00	6/4/99	523	-16.8
103	30	1668	0	cpm	Integrate	5 s	12:37:00	6/4/99	348	-16.8
104	30	1740	0	cpm	Integrate	5 s	12:38:00	6/4/99	406	-16.8
105	30	1668	12	cpm	Integrate	5 s	12:38:00	6/4/99	348	5.7
106	30	1536	36	cpm	Integrate	5 s	12:38:00	6/4/99	240	50.6
107	30	1668	36	cpm	Integrate	5 s	12:38:00	6/4/99	348	50.6
108	30	1932	12	cpm	Integrate	5 s	12:39:00	6/4/99	562	5.7
109	30	1632	12	cpm	Integrate	5 s	12:39:00	6/4/99	318	5.7
110	30	1908	0	cpm	Integrate	5 s	12:39:00	6/4/99	543	-16.8
111	30	1932	0	cpm	Integrate	5 s	12:39:00	6/4/99	562	-16.8
112	30	1704	12	cpm	Integrate	5 s	12:40:00	6/4/99	377	5.7
113	30	1704	0	cpm	Integrate	5 s	12:40:00	6/4/99	377	-16.8
114	30	1728	36	cpm	Integrate	5 s	12:40:00	6/4/99	396	50.6
115	30	1740	24	cpm	Integrate	5 s	12:40:00	6/4/99	406	28.1
116	30	1860	36	cpm	Integrate	5 s	12:41:00	6/4/99	504	50.6
117	30	1656	0	cpm	Integrate	5 s	12:41:00	6/4/99	338	-16.8
118	30	1632	12	cpm	Integrate	5 s	12:41:00	6/4/99	318	5.7
119	30	1800	12	cpm	Integrate	5 s	12:41:00	6/4/99	455	5.7
120	30	1896	24	cpm	Integrate	5 s	12:41:00	6/4/99	533	28.1
121	30	1860	48	cpm	Integrate	5 s	12:42:00	6/4/99	504	73.1
122	30	1872	0	cpm	Integrate	5 s	12:42:00	6/4/99	513	-16.8

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating	Int Val	T	Log Time	Log Date	beta/gamma	alpha
123	30	1440	12	cpm	Integrate	5	s	12:42:00	6/4/99	162	5.7
124	30	1860	12	cpm	Integrate	5	s	12:42:00	6/4/99	504	5.7
125	30	1584	12	cpm	Integrate	5	s	12:43:00	6/4/99	279	5.7
126	30	1872	36	cpm	Integrate	5	s	12:43:00	6/4/99	513	50.6
127	30	1788	12	cpm	Integrate	5	s	12:43:00	6/4/99	445	5.7
128	30	1908	12	cpm	Integrate	5	s	12:43:00	6/4/99	543	5.7
129	30	1476	0	cpm	Integrate	5	s	12:43:00	6/4/99	191	-16.8
130	32	1704	12	cpm	Integrate	5	s	12:44:00	6/4/99	377	5.7
131	32	1788	12	cpm	Integrate	5	s	12:45:00	6/4/99	445	5.7
132	32	1752	0	cpm	Integrate	5	s	12:45:00	6/4/99	416	-16.8
133	32	1920	12	cpm	Integrate	5	s	12:45:00	6/4/99	552	5.7
134	32	1620	0	cpm	Integrate	5	s	12:45:00	6/4/99	309	-16.8
135	32	1884	0	cpm	Integrate	5	s	12:46:00	6/4/99	523	-16.8
136	32	1812	0	cpm	Integrate	5	s	12:46:00	6/4/99	465	-16.8
137	32	1656	36	cpm	Integrate	5	s	12:46:00	6/4/99	338	50.6
138	32	1788	12	cpm	Integrate	5	s	12:46:00	6/4/99	445	5.7
139	32	1644	48.0	cpm	Integrate	5	s	12:46:00	6/4/99	328	73.1
140	32	1536	0	cpm	Integrate	5	s	12:47:00	6/4/99	240	-16.8
141	32	1668	0	cpm	Integrate	5	s	12:47:00	6/4/99	348	-16.8
142	32	1632	0	cpm	Integrate	5	s	12:48:00	6/4/99	318	-16.8
143	32	1488	0	cpm	Integrate	5	s	12:48:00	6/4/99	201	-16.8
144	32	1812	0	cpm	Integrate	5	s	12:49:00	6/4/99	465	-16.8
145	32	1668	0	cpm	Integrate	5	s	12:49:00	6/4/99	348	-16.8
146	32	1884	0	cpm	Integrate	5	s	12:49:00	6/4/99	523	-16.8
147	32	1608	0	cpm	Integrate	5	s	12:50:00	6/4/99	299	-16.8
148	32	1728	0	cpm	Integrate	5	s	12:51:00	6/4/99	396	-16.8
149	32	1728	0	cpm	Integrate	5	s	12:51:00	6/4/99	396	-16.8
150	32	1608	0	cpm	Integrate	5	s	12:51:00	6/4/99	299	-16.8
151	32	1344	36	cpm	Integrate	5	s	12:51:00	6/4/99	84	50.6
152	32	1212	12	cpm	Integrate	5	s	12:51:00	6/4/99	-23	5.7
153	32	1440	0	cpm	Integrate	5	s	12:52:00	6/4/99	162	-16.8
154	32	1656	12	cpm	Integrate	5	s	12:52:00	6/4/99	338	5.7
155	32	1728	12	cpm	Integrate	5	s	12:52:00	6/4/99	396	5.7
156	32	1788	0	cpm	Integrate	5	s	12:52:00	6/4/99	445	-16.8
157	34	1620	0	cpm	Integrate	5	s	12:54:00	6/4/99	309	-16.8
158	34	1548	12	cpm	Integrate	5	s	12:54:00	6/4/99	250	5.7
159	34	1836	12	cpm	Integrate	5	s	12:54:00	6/4/99	484	5.7
160	34	1476	0	cpm	Integrate	5	s	12:54:00	6/4/99	191	-16.8
161	34	1548	24	cpm	Integrate	5	s	12:54:00	6/4/99	250	28.1
162	34	1392	24	cpm	Integrate	5	s	12:55:00	6/4/99	123	28.1
163	15	1845	13.8	cpm	Integrate	300	s	9:16:00	6/7/99	491	9.0
164	22	1698	15	cpm	Integrate	300	s	9:22:00	6/7/99	372	11.3

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I	Int Val T	Log Time	Log Date	beta/gamma	alpha
165	33	1650	12.8	cpm	Integrate	300 s	9:28:00	6/7/99	333	7.2
166	19	1677	10.8	cpm	Integrate	300 s	9:34:00	6/7/99	355	3.4
167	21	1694	13	cpm	Integrate	300 s	9:40:00	6/7/99	369	7.5
168	204	1659	11.6	cpm	Integrate	300 s	9:47:00	6/7/99	340	4.9
169	25	1980	0	cpm	Integrate	5 s	9:49:00	6/7/99	601	-16.8
170	25	1704	0	cpm	Integrate	5 s	9:50:00	6/7/99	377	-16.8
171	25	1632	0	cpm	Integrate	5 s	9:50:00	6/7/99	318	-16.8
172	25	1992	24	cpm	Integrate	5 s	9:50:00	6/7/99	611	28.1
173	25	1716	0	cpm	Integrate	5 s	9:50:00	6/7/99	387	-16.8
174	25	1704	24	cpm	Integrate	5 s	9:51:00	6/7/99	377	28.1
175	25	1584	24	cpm	Integrate	5 s	9:51:00	6/7/99	279	28.1
176	25	1896	36.01	cpm	Integrate	5 s	9:51:00	6/7/99	533	50.6
177	25	1824	12	cpm	Integrate	5 s	9:51:00	6/7/99	474	5.7
178	25	1812	12	cpm	Integrate	5 s	9:52:00	6/7/99	465	5.7
179	25	1620	12	cpm	Integrate	5 s	9:52:00	6/7/99	309	5.7
180	25	1896	0	cpm	Integrate	5 s	9:52:00	6/7/99	533	-16.8
181	25	1704	12	cpm	Integrate	5 s	9:53:00	6/7/99	377	5.7
182	25	1560	12	cpm	Integrate	5 s	9:53:00	6/7/99	260	5.7
183	25	1752	36.01	cpm	Integrate	5 s	9:53:00	6/7/99	416	50.6
184	25	1716	12	cpm	Integrate	5 s	9:54:00	6/7/99	387	5.7
185	27	1668	24	cpm	Integrate	5 s	9:55:00	6/7/99	348	28.1
186	27	1884	24	cpm	Integrate	5 s	9:55:00	6/7/99	523	28.1
187	27	1728	0	cpm	Integrate	5 s	9:55:00	6/7/99	396	-16.8
188	27	1776	12	cpm	Integrate	5 s	9:55:00	6/7/99	435	5.7
189	27	1848	24	cpm	Integrate	5 s	9:56:00	6/7/99	494	28.1
190	27	1596	12	cpm	Integrate	5 s	9:56:00	6/7/99	289	5.7
191	27	1704	24	cpm	Integrate	5 s	9:56:00	6/7/99	377	28.1
192	27	1812	24	cpm	Integrate	5 s	9:57:00	6/7/99	465	28.1
193	27	1800	12	cpm	Integrate	5 s	9:57:00	6/7/99	455	5.7
194	27	1632	12	cpm	Integrate	5 s	9:57:00	6/7/99	318	5.7
195	27	1884	12	cpm	Integrate	5 s	9:58:00	6/7/99	523	5.7
196	27	1536	24	cpm	Integrate	5 s	9:58:00	6/7/99	240	28.1
197	27	1560	0	cpm	Integrate	5 s	9:58:00	6/7/99	260	-16.8
198	27	1704	24	cpm	Integrate	5 s	9:59:00	6/7/99	377	28.1
199	27	1668	0	cpm	Integrate	5 s	9:59:00	6/7/99	348	-16.8
200	27	1788	24	cpm	Integrate	5 s	9:59:00	6/7/99	445	28.1
201	27	1704	12	cpm	Integrate	5 s	10:00:00	6/7/99	377	5.7
202	27	1620	12	cpm	Integrate	5 s	10:00:00	6/7/99	309	5.7
203	27	1692	12	cpm	Integrate	5 s	10:01:00	6/7/99	367	5.7
204	27	1776	12	cpm	Integrate	5 s	10:01:00	6/7/99	435	5.7
205	27	1620	12	cpm	Integrate	5 s	10:01:00	6/7/99	309	5.7
206	27	1608	12	cpm	Integrate	5 s	10:02:00	6/7/99	299	5.7

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I	Int Val T	Log Time	Log Date	beta/gamma	alpha	
207	27	4838	48.02	cpm	Integrate	5 s	10:02:00	6/7/99	-	-	Noted bad count
208	27	1656	0	cpm	Integrate	5 s	10:03:00	6/7/99	338	-16.8	
209	27	1404	12	cpm	Integrate	5 s	10:03:00	6/7/99	133	5.7	
210	27	1716	0	cpm	Integrate	5 s	10:03:00	6/7/99	387	-16.8	
211	27	1620	12	cpm	Integrate	5 s	10:04:00	6/7/99	309	5.7	
212	27	1824	0	cpm	Integrate	5 s	10:04:00	6/7/99	474	-16.8	
213	27	1884	12	cpm	Integrate	5 s	10:05:00	6/7/99	523	5.7	
214	27	2148	0	cpm	Integrate	5 s	10:05:00	6/7/99	738	-16.8	
215	27	1728	24	cpm	Integrate	5 s	10:06:00	6/7/99	396	28.1	
216	27	1656	0	cpm	Integrate	5 s	10:06:00	6/7/99	338	-16.8	
217	27	1728	12	cpm	Integrate	5 s	10:06:00	6/7/99	396	5.7	
218	27	3661	12	cpm	Integrate	5 s	10:07:00	6/7/99	1968	5.7	
219	27	1524	24	cpm	Integrate	5 s	10:07:00	6/7/99	230	28.1	
220	27	10110	1489	cpm	Integrate	5 s	10:07:00	6/7/99	-	-	Noted bad count
221	27	1584	12	cpm	Integrate	5 s	10:08:00	6/7/99	279	5.7	
222	27	1452	0	cpm	Integrate	5 s	10:08:00	6/7/99	172	-16.8	
223	27	1836	12	cpm	Integrate	5 s	10:08:00	6/7/99	484	5.7	
224	28	1572	24	cpm	Integrate	5 s	10:12:00	6/7/99	269	28.1	
225	28	1764	0	cpm	Integrate	5 s	10:12:00	6/7/99	426	-16.8	
226	28	1848	24	cpm	Integrate	5 s	10:13:00	6/7/99	494	28.1	
227	28	1932	12	cpm	Integrate	5 s	10:13:00	6/7/99	562	5.7	
228	28	1740	24	cpm	Integrate	5 s	10:13:00	6/7/99	406	28.1	
229	28	1656	0	cpm	Integrate	5 s	10:14:00	6/7/99	338	-16.8	
230	28	1788	0	cpm	Integrate	5 s	10:14:00	6/7/99	445	-16.8	
231	28	1896	12	cpm	Integrate	5 s	10:14:00	6/7/99	533	5.7	
232	28	1836	12	cpm	Integrate	5 s	10:15:00	6/7/99	484	5.7	
233	28	1668	24	cpm	Integrate	5 s	10:15:00	6/7/99	348	28.1	
234	28	1716	0	cpm	Integrate	5 s	10:15:00	6/7/99	387	-16.8	
235	28	1740	24	cpm	Integrate	5 s	10:15:00	6/7/99	406	28.1	
236	28	1944	48.01	cpm	Integrate	5 s	10:16:00	6/7/99	572	73.1	
237	28	1848	0	cpm	Integrate	5 s	10:16:00	6/7/99	494	-16.8	
238	28	1728	0	cpm	Integrate	5 s	10:17:00	6/7/99	396	-16.8	
239	28	1896	0	cpm	Integrate	5 s	10:17:00	6/7/99	533	-16.8	
240	28	2280	12	cpm	Integrate	5 s	10:17:00	6/7/99	845	5.7	
241	28	1884	0	cpm	Integrate	5 s	10:18:00	6/7/99	523	-16.8	
242	28	1848	0	cpm	Integrate	5 s	10:18:00	6/7/99	494	-16.8	
243	28	1716	12	cpm	Integrate	5 s	10:18:00	6/7/99	387	5.7	
244	28	1704	0	cpm	Integrate	5 s	10:18:00	6/7/99	377	-16.8	
245	28	1716	0	cpm	Integrate	5 s	10:19:00	6/7/99	387	-16.8	
246	28	2004	24	cpm	Integrate	5 s	10:19:00	6/7/99	621	28.1	
247	28	1620	24	cpm	Integrate	5 s	10:20:00	6/7/99	309	28.1	
248	28	2076	24	cpm	Integrate	5 s	10:20:00	6/7/99	679	28.1	

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I	Int Val T	Log Time	Log Date	beta/gamma	alpha	
249	28	4298	156.1	cpm	Integrate	5 s	10:20:00	6/7/99	-	-	Noted bad count
250	28	1776	0	cpm	Integrate	5 s	10:21:00	6/7/99	435	-16.8	
251	28	1728	12	cpm	Integrate	5 s	10:21:00	6/7/99	396	5.7	
252	28	1812	12	cpm	Integrate	5 s	10:21:00	6/7/99	465	5.7	
253	28	1824	0	cpm	Integrate	5 s	10:21:00	6/7/99	474	-16.8	
254	28	1692	12	cpm	Integrate	5 s	10:22:00	6/7/99	367	5.7	
255	28	1692	0	cpm	Integrate	5 s	10:22:00	6/7/99	367	-16.8	
256	28	1932	0	cpm	Integrate	5 s	10:22:00	6/7/99	562	-16.8	
257	28	1608	12	cpm	Integrate	5 s	10:23:00	6/7/99	299	5.7	
258	28	1992	24	cpm	Integrate	5 s	10:23:00	6/7/99	611	28.1	
259	28	1788	12	cpm	Integrate	5 s	10:23:00	6/7/99	445	5.7	
260	28	1740	0	cpm	Integrate	5 s	10:24:00	6/7/99	406	-16.8	
261	28	10330	12540	cpm	Integrate	5 s	10:24:00	6/7/99	-	-	Noted bad count
262	28	1776	48.01	cpm	Integrate	5 s	10:24:00	6/7/99	435	73.1	
263	28	1968	12	cpm	Integrate	5 s	10:24:00	6/7/99	591	5.7	
264	28	1896	12	cpm	Integrate	5 s	10:25:00	6/7/99	533	5.7	
265	28	1908	24	cpm	Integrate	5 s	10:25:00	6/7/99	543	28.1	
266	28	1860	12	cpm	Integrate	5 s	10:25:00	6/7/99	504	5.7	
267	28	1848	0	cpm	Integrate	5 s	10:25:00	6/7/99	494	-16.8	
268	28	1896	0	cpm	Integrate	5 s	10:26:00	6/7/99	533	-16.8	
269	28	1896	0	cpm	Integrate	5 s	10:26:00	6/7/99	533	-16.8	
270	28	1704	24	cpm	Integrate	5 s	10:26:00	6/7/99	377	28.1	
271	1002	1704	24	cpm	Integrate	5 s	10:26:00	6/7/99	377	28.1	
272	28	1548	12	cpm	Integrate	5 s	10:27:00	6/7/99	250	5.7	
273	28	1944	0	cpm	Integrate	5 s	10:27:00	6/7/99	572	-16.8	
274	28	1932	24	cpm	Integrate	5 s	10:27:00	6/7/99	562	28.1	
275	28	2016	12	cpm	Integrate	5 s	10:28:00	6/7/99	630	5.7	
276	28	1716	24	cpm	Integrate	5 s	10:28:00	6/7/99	387	28.1	
277	28	1692	24	cpm	Integrate	5 s	10:28:00	6/7/99	367	28.1	
278	28	1512	36	cpm	Integrate	5 s	10:29:00	6/7/99	221	50.6	
279	28	1944	24	cpm	Integrate	5 s	10:29:00	6/7/99	572	28.1	
280	28	2016	0	cpm	Integrate	5 s	10:29:00	6/7/99	630	-16.8	
281	28	1848	0	cpm	Integrate	5 s	10:30:00	6/7/99	494	-16.8	
282	28	1716	36.01	cpm	Integrate	5 s	10:30:00	6/7/99	387	50.6	
283	28	1824	0	cpm	Integrate	5 s	10:30:00	6/7/99	474	-16.8	
284	28	1728	12	cpm	Integrate	5 s	10:31:00	6/7/99	396	5.7	
285	28	2016	12	cpm	Integrate	5 s	10:31:00	6/7/99	630	5.7	
286	28	1752	12	cpm	Integrate	5 s	10:32:00	6/7/99	416	5.7	
287	28	1704	12	cpm	Integrate	5 s	10:32:00	6/7/99	377	5.7	
288	0	1920	24	cpm	Integrate	5 s	10:32:00	6/7/99	552	28.1	
289	28	1884	0	cpm	Integrate	5 s	10:33:00	6/7/99	523	-16.8	
290	28	2040	24	cpm	Integrate	5 s	10:33:00	6/7/99	650	28.1	

Attachment 11

108-F Wall Release Survey Data Points and Interpretation

	#	Location	Count 1	Count 2	Units	Operating	Int Val T	Log Time	Log Date	beta/gamma	alpha
	291	28	1848	0	cpm	Integrate	5 s	10:33:00	6/7/99	494	-16.8
	292	23	1737	12.8	cpm	Integrate	300 s	10:43:00	6/7/99	404	7.2
Background and Source Checks	293	1002	1012	1	cpm	N/A	60 s	7:53:00	6/9/99	-	-
	294	1002	1515	3279	cpm	N/A	60 s	7:54:00	6/9/99	-	-
	295	1002	1434	3278	cpm	N/A	60 s	7:56:00	6/9/99	-	-
	296	1002	1409	3252	cpm	N/A	60 s	7:57:00	6/9/99	-	-
	297	1002	1432	3215	cpm	N/A	60 s	7:58:00	6/9/99	-	-
	298	1002	1430	3215	cpm	N/A	60 s	7:59:00	6/9/99	-	-
	299	1002	10520	13.01	cpm	N/A	60 s	8:01:00	6/9/99	-	-
	300	1002	10430	15.01	cpm	N/A	60 s	8:02:00	6/9/99	-	-
	301	1002	10640	6.005	cpm	N/A	60 s	8:03:00	6/9/99	-	-
	302	1002	10640	14.01	cpm	N/A	60 s	8:04:00	6/9/99	-	-
	303	1002	10650	16.01	cpm	N/A	60 s	8:06:00	6/9/99	-	-
	304	1002	1487	2770	cpm	N/A	60 s	11:37:00	6/9/99	-	-
	305	1002	1446	2808	cpm	N/A	60 s	11:38:00	6/9/99	-	-
	306	1002	1519	2797	cpm	N/A	60 s	11:40:00	6/9/99	-	-
	307	1002	1468	2851	cpm	N/A	60 s	11:41:00	6/9/99	-	-
	308	1002	1440	2774	cpm	N/A	60 s	11:42:00	6/9/99	-	-
	309	1002	10110	10.01	cpm	N/A	60 s	11:44:00	6/9/99	-	-
	310	1002	10250	11.01	cpm	N/A	60 s	11:46:00	6/9/99	-	-
	311	1002	10050	11.01	cpm	N/A	60 s	11:47:00	6/9/99	-	-
	312	1002	10240	12.01	cpm	N/A	60 s	11:48:00	6/9/99	-	-
	313	1002	10030	8.007	cpm	N/A	60 s	11:50:00	6/9/99	-	-
	314	28	1944	12	cpm	N/A	5 s	12:34:00	6/9/99	572	5.7
	315	28	1584	12	cpm	N/A	5 s	12:34:00	6/9/99	279	5.7
	316	28	1560	24	cpm	N/A	5 s	12:34:00	6/9/99	260	28.1
	317	28	1836	24	cpm	N/A	5 s	12:35:00	6/9/99	484	28.1
	318	28	2100	0	cpm	N/A	5 s	12:35:00	6/9/99	699	-16.8
	319	28	1440	36	cpm	N/A	5 s	12:36:00	6/9/99	162	50.6
	320	28	1956	12	cpm	N/A	5 s	12:36:00	6/9/99	582	5.7
	321	28	1368	0	cpm	N/A	5 s	12:37:00	6/9/99	104	-16.8
	322	28	1788	24	cpm	N/A	5 s	12:37:00	6/9/99	445	28.1
	323	28	1740	0	cpm	N/A	5 s	12:38:00	6/9/99	406	-16.8
	324	28	1620	12	cpm	N/A	5 s	12:38:00	6/9/99	309	5.7
	325	28	1644	12	cpm	N/A	5 s	12:38:00	6/9/99	328	5.7
	326	28	1524	0	cpm	N/A	5 s	12:39:00	6/9/99	230	-16.8
	327	28	1668	0	cpm	N/A	5 s	12:39:00	6/9/99	348	-16.8
	328	28	1680	12	cpm	N/A	5 s	12:39:00	6/9/99	357	5.7
	329	28	1788	12	cpm	N/A	5 s	12:39:00	6/9/99	445	5.7
	330	28	1668	12	cpm	N/A	5 s	12:40:00	6/9/99	348	5.7
	331	0	1560	12	cpm	N/A	5 s	12:40:00	6/9/99	260	5.7
	332	28	1548	0	cpm	N/A	5 s	12:40:00	6/9/99	250	-16.8

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I Int Val T	Log Time	Log Date	beta/gamma	alpha
333	28	1956	0	cpm	N/A 5 s	12:41:00	6/9/99	582	-16.8
334	28	1848	0	cpm	N/A 5 s	12:41:00	6/9/99	494	-16.8
335	28	1704	12	cpm	N/A 5 s	12:41:00	6/9/99	377	5.7
336	28	1836	12	cpm	N/A 5 s	12:42:00	6/9/99	484	5.7
337	28	1776	12	cpm	N/A 5 s	12:42:00	6/9/99	435	5.7
338	28	1680	24	cpm	N/A 5 s	12:43:00	6/9/99	357	28.1
339	28	1908	0	cpm	N/A 5 s	12:43:00	6/9/99	543	-16.8
340	28	1668	0	cpm	N/A 5 s	12:43:00	6/9/99	348	-16.8
341	28	1860	0	cpm	N/A 5 s	12:44:00	6/9/99	504	-16.8
342	28	1932	0	cpm	N/A 5 s	12:44:00	6/9/99	562	-16.8
343	28	1836	36.01	cpm	N/A 5 s	12:44:00	6/9/99	484	50.6
344	28	1752	12	cpm	N/A 5 s	12:45:00	6/9/99	416	5.7
345	28	1404	12	cpm	N/A 5 s	12:45:00	6/9/99	133	5.7
346	28	1776	0	cpm	N/A 5 s	12:45:00	6/9/99	435	-16.8
347	28	1848	0	cpm	N/A 5 s	12:46:00	6/9/99	494	-16.8
348	28	1680	12	cpm	N/A 5 s	12:46:00	6/9/99	357	5.7
349	28	1608	12	cpm	N/A 5 s	12:46:00	6/9/99	299	5.7
350	28	1692	0	cpm	N/A 5 s	12:46:00	6/9/99	367	-16.8
351	28	1860	36.01	cpm	N/A 5 s	12:47:00	6/9/99	504	50.6
352	28	1944	12	cpm	N/A 5 s	12:47:00	6/9/99	572	5.7
353	28	1548	12	cpm	N/A 5 s	12:47:00	6/9/99	250	5.7
354	28	1428	12	cpm	N/A 5 s	12:48:00	6/9/99	152	5.7
355	27	1632	36.01	cpm	N/A 5 s	12:51:00	6/9/99	318	50.6
356	27	2220	0	cpm	N/A 5 s	12:51:00	6/9/99	796	-16.8
357	27	1716	12	cpm	N/A 5 s	12:52:00	6/9/99	387	5.7
358	27	1800	0	cpm	N/A 5 s	12:52:00	6/9/99	455	-16.8
359	27	1776	0	cpm	N/A 5 s	12:53:00	6/9/99	435	-16.8
360	27	1440	0	cpm	N/A 5 s	12:53:00	6/9/99	162	-16.8
361	27	1956	24	cpm	N/A 5 s	12:53:00	6/9/99	582	28.1
362	27	1488	0	cpm	N/A 5 s	12:54:00	6/9/99	201	-16.8
363	27	1260	12	cpm	N/A 5 s	12:54:00	6/9/99	16	5.7
364	27	1680	24	cpm	N/A 5 s	12:55:00	6/9/99	357	28.1
365	27	1704	48.01	cpm	N/A 5 s	12:55:00	6/9/99	377	73.1
366	1002	1620	12	cpm	N/A 5 s	12:56:00	6/9/99	309	5.7
367	27	1392	12	cpm	N/A 5 s	12:56:00	6/9/99	123	5.7
368	27	1572	12	cpm	N/A 5 s	12:56:00	6/9/99	269	5.7
369	27	1620	24	cpm	N/A 5 s	12:57:00	6/9/99	309	28.1
370	27	1668	12	cpm	N/A 5 s	12:57:00	6/9/99	348	5.7
371	27	1584	24	cpm	N/A 5 s	12:57:00	6/9/99	279	28.1
372	27	1572	12	cpm	N/A 5 s	12:58:00	6/9/99	269	5.7
373	27	1608	12	cpm	N/A 5 s	12:58:00	6/9/99	299	5.7
374	27	1488	12	cpm	N/A 5 s	12:58:00	6/9/99	201	5.7

108-F Wall Release Survey Data Points and Interpretation

	#	Location	Count 1	Count 2	Units	Operating Int Val T	Log Time	Log Date	beta/gamma	alpha
	375	27	1644	0	cpm	N/A 5 s	12:59:00	6/9/99	328	-16.8
	376	27	1860	24	cpm	N/A 5 s	1:00:00	6/9/99	504	28.1
	377	27	1956	0	cpm	N/A 5 s	1:00:00	6/9/99	582	-16.8
	378	27	1572	0	cpm	N/A 5 s	1:00:00	6/9/99	269	-16.8
	379	27	1824	12	cpm	N/A 5 s	1:00:00	6/9/99	474	5.7
	380	27	1656	12	cpm	N/A 5 s	1:01:00	6/9/99	338	5.7
	381	27	1752	12	cpm	N/A 5 s	1:01:00	6/9/99	416	5.7
	382	27	1620	24	cpm	N/A 5 s	1:01:00	6/9/99	309	28.1
	383	27	1596	0	cpm	N/A 5 s	1:01:00	6/9/99	289	-16.8
	384	27	1872	12	cpm	N/A 5 s	1:02:00	6/9/99	513	5.7
	385	27	1644	24	cpm	N/A 5 s	1:02:00	6/9/99	328	28.1
	386	27	1644	12	cpm	N/A 5 s	1:02:00	6/9/99	328	5.7
	387	25	1824	12	cpm	N/A 5 s	1:03:00	6/9/99	474	5.7
	388	25	1920	12	cpm	N/A 5 s	1:04:00	6/9/99	552	5.7
	389	25	2028	12	cpm	N/A 5 s	1:04:00	6/9/99	640	5.7
	390	25	1716	12	cpm	N/A 5 s	1:04:00	6/9/99	387	5.7
	391	25	1776	12	cpm	N/A 5 s	1:05:00	6/9/99	435	5.7
	392	25	1932	0	cpm	N/A 5 s	1:05:00	6/9/99	562	-16.8
	393	25	1764	0	cpm	N/A 5 s	1:06:00	6/9/99	426	-16.8
	394	25	1812	12	cpm	N/A 5 s	1:06:00	6/9/99	465	5.7
	395	25	1872	36.01	cpm	N/A 5 s	1:06:00	6/9/99	513	50.6
	396	25	1704	0	cpm	N/A 5 s	1:06:00	6/9/99	377	-16.8
	397	25	1860	36.01	cpm	N/A 5 s	1:07:00	6/9/99	504	50.6
	398	25	1656	24	cpm	N/A 5 s	1:07:00	6/9/99	338	28.1
	399	25	1872	0	cpm	N/A 5 s	1:08:00	6/9/99	513	-16.8
	400	25	1704	12	cpm	N/A 5 s	1:08:00	6/9/99	377	5.7
	401	25	1620	0	cpm	N/A 5 s	1:08:00	6/9/99	309	-16.8
	402	25	1704	36.01	cpm	N/A 5 s	1:09:00	6/9/99	377	50.6
Source Checks	403	1002	1479	2711	cpm	N/A 60 s	6:45:00	6/10/99	-	-
	404	1002	1462	2710	cpm	N/A 60 s	6:46:00	6/10/99	-	-
	405	1002	1425	2642	cpm	N/A 60 s	6:47:00	6/10/99	-	-
	406	1002	1487	2731	cpm	N/A 60 s	6:48:00	6/10/99	-	-
	407	1002	1574	2711	cpm	N/A 60 s	6:51:00	6/10/99	-	-
	408	1002	10280	14.01	cpm	N/A 60 s	6:53:00	6/10/99	-	-
	409	1002	10340	7.006	cpm	N/A 60 s	6:54:00	6/10/99	-	-
	410	1002	10360	9.008	cpm	N/A 60 s	6:55:00	6/10/99	-	-
	411	1002	10390	16.01	cpm	N/A 60 s	6:56:00	6/10/99	-	-
	412	1002	10550	13.01	cpm	N/A 60 s	6:58:00	6/10/99	-	-
	413	26	1668	24	cpm	N/A 5 s	7:30:00	6/10/99	348	28.1
	414	26	1572	0	cpm	N/A 5 s	7:31:00	6/10/99	269	-16.8
	415	26	1680	0	cpm	N/A 5 s	7:31:00	6/10/99	357	-16.8
	416	26	1728	24	cpm	N/A 5 s	7:31:00	6/10/99	396	28.1

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I Int Val T	Log Time	Log Date	beta/gamma	alpha
417	26	1704	0	cpm	N/A 5 s	7:32:00	6/10/99	377	-16.8
418	26	1836	0	cpm	N/A 5 s	7:32:00	6/10/99	484	-16.8
419	26	1728	0	cpm	N/A 5 s	7:32:00	6/10/99	396	-16.8
420	26	1752	0	cpm	N/A 5 s	7:33:00	6/10/99	416	-16.8
421	26	1800	0	cpm	N/A 5 s	7:33:00	6/10/99	455	-16.8
422	26	1980	0	cpm	N/A 5 s	7:33:00	6/10/99	601	-16.8
423	26	1788	12	cpm	N/A 5 s	7:33:00	6/10/99	445	5.7
424	26	1776	0	cpm	N/A 5 s	7:34:00	6/10/99	435	-16.8
425	26	1824	24	cpm	N/A 5 s	7:34:00	6/10/99	474	28.1
426	26	1776	12	cpm	N/A 5 s	7:34:00	6/10/99	435	5.7
427	26	1620	36	cpm	N/A 5 s	7:35:00	6/10/99	309	50.6
428	26	1788	24	cpm	N/A 5 s	7:35:00	6/10/99	445	28.1
429	26	1560	0	cpm	N/A 5 s	7:36:00	6/10/99	260	-16.8
430	26	1896	36.01	cpm	N/A 5 s	7:36:00	6/10/99	533	50.6
431	26	1560	0	cpm	N/A 5 s	7:37:00	6/10/99	260	-16.8
432	26	1776	0	cpm	N/A 5 s	7:37:00	6/10/99	435	-16.8
433	26	1836	24	cpm	N/A 5 s	7:38:00	6/10/99	484	28.1
434	26	1500	12	cpm	N/A 5 s	7:38:00	6/10/99	211	5.7
435	26	1848	24	cpm	N/A 5 s	7:38:00	6/10/99	494	28.1
436	26	2148	0	cpm	N/A 5 s	7:38:00	6/10/99	738	-16.8
437	26	1884	12	cpm	N/A 5 s	7:39:00	6/10/99	523	5.7
438	26	1728	0	cpm	N/A 5 s	7:39:00	6/10/99	396	-16.8
439	26	1608	36	cpm	N/A 5 s	7:40:00	6/10/99	299	50.6
440	26	1656	24	cpm	N/A 5 s	7:40:00	6/10/99	338	28.1
441	26	1728	0	cpm	N/A 5 s	7:41:00	6/10/99	396	-16.8
442	26	1824	12	cpm	N/A 5 s	7:41:00	6/10/99	474	5.7
443	26	1668	0	cpm	N/A 5 s	7:41:00	6/10/99	348	-16.8
444	26	1776	12	cpm	N/A 5 s	7:41:00	6/10/99	435	5.7
445	26	1620	24	cpm	N/A 5 s	7:42:00	6/10/99	309	28.1
446	26	1620	24	cpm	N/A 5 s	7:42:00	6/10/99	309	28.1
447	26	1404	0	cpm	N/A 5 s	7:42:00	6/10/99	133	-16.8
448	26	1872	0	cpm	N/A 5 s	7:42:00	6/10/99	513	-16.8
449	26	1644	0	cpm	N/A 5 s	7:43:00	6/10/99	328	-16.8
450	26	1560	0	cpm	N/A 5 s	7:43:00	6/10/99	260	-16.8
451	26	1596	24	cpm	N/A 5 s	7:43:00	6/10/99	289	28.1
452	26	1716	24	cpm	N/A 5 s	7:44:00	6/10/99	387	28.1
453	26	1704	0	cpm	N/A 5 s	7:44:00	6/10/99	377	-16.8
454	26	1692	24	cpm	N/A 5 s	7:44:00	6/10/99	367	28.1
455	26	1680	48.01	cpm	N/A 5 s	7:44:00	6/10/99	357	73.1
456	26	1848	12	cpm	N/A 5 s	7:56:00	6/10/99	494	5.7
457	26	1752	24	cpm	N/A 5 s	7:56:00	6/10/99	416	28.1
458	26	1680	0	cpm	N/A 5 s	7:57:00	6/10/99	357	-16.8

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I Int Val T	Log Time	Log Date	beta/gamma	alpha
459	26	1728	0	cpm	N/A 5 s	7:57:00	6/10/99	396	-16.8
460	26	1932	12	cpm	N/A 5 s	7:57:00	6/10/99	562	5.7
461	26	1668	24	cpm	N/A 5 s	7:57:00	6/10/99	348	28.1
462	26	1884	24	cpm	N/A 5 s	7:58:00	6/10/99	523	28.1
463	26	1872	12	cpm	N/A 5 s	7:58:00	6/10/99	513	5.7
464	26	1824	12	cpm	N/A 5 s	7:58:00	6/10/99	474	5.7
465	26	1740	0	cpm	N/A 5 s	7:59:00	6/10/99	406	-16.8
466	26	2040	0	cpm	N/A 5 s	7:59:00	6/10/99	650	-16.8
467	26	1668	0	cpm	N/A 5 s	7:59:00	6/10/99	348	-16.8
468	26	1788	12	cpm	N/A 5 s	8:00:00	6/10/99	445	5.7
469	26	1536	36	cpm	N/A 5 s	8:00:00	6/10/99	240	50.6
470	26	1884	0	cpm	N/A 5 s	8:00:00	6/10/99	523	-16.8
471	26	1656	0	cpm	N/A 5 s	8:00:00	6/10/99	338	-16.8
472	26	1632	12	cpm	N/A 5 s	8:01:00	6/10/99	318	5.7
473	26	1836	12	cpm	N/A 5 s	8:01:00	6/10/99	484	5.7
474	26	1788	0	cpm	N/A 5 s	8:01:00	6/10/99	445	-16.8
475	26	1844	24	cpm	N/A 5 s	8:02:00	6/10/99	328	28.1
476	26	1692	12	cpm	N/A 5 s	8:02:00	6/10/99	367	5.7
477	26	2196	12	cpm	N/A 5 s	8:03:00	6/10/99	777	5.7
478	26	2004	12	cpm	N/A 5 s	8:03:00	6/10/99	621	5.7
479	26	1812	0	cpm	N/A 5 s	8:04:00	6/10/99	465	-16.8
480	26	1560	0	cpm	N/A 5 s	8:04:00	6/10/99	260	-16.8
481	26	1788	12	cpm	N/A 5 s	8:05:00	6/10/99	445	5.7
482	26	1620	0	cpm	N/A 5 s	8:05:00	6/10/99	309	-16.8
483	26	1812	0	cpm	N/A 5 s	8:05:00	6/10/99	465	-16.8
484	26	1680	12	cpm	N/A 5 s	8:06:00	6/10/99	357	5.7
485	26	1752	12	cpm	N/A 5 s	8:06:00	6/10/99	416	5.7
486	26	1728	12	cpm	N/A 5 s	8:06:00	6/10/99	396	5.7
487	26	2112	0	cpm	N/A 5 s	8:07:00	6/10/99	709	-16.8
488	26	1908	24	cpm	N/A 5 s	8:07:00	6/10/99	543	28.1
489	26	1584	0	cpm	N/A 5 s	8:07:00	6/10/99	279	-16.8
490	26	1704	12	cpm	N/A 5 s	8:08:00	6/10/99	377	5.7
491	26	1848	24	cpm	N/A 5 s	8:08:00	6/10/99	494	28.1
492	1002	1860	24	cpm	N/A 5 s	8:08:00	6/10/99	504	28.1
493	26	1680	0	cpm	N/A 5 s	8:09:00	6/10/99	357	-16.8
494	26	1992	12	cpm	N/A 5 s	8:09:00	6/10/99	611	5.7
495	26	1728	12	cpm	N/A 5 s	8:09:00	6/10/99	396	5.7
496	26	1656	0	cpm	N/A 5 s	8:10:00	6/10/99	338	-16.8
497	32	1608	12	cpm	N/A 5 s	8:24:00	6/10/99	299	5.7
498	32	1380	36	cpm	N/A 5 s	8:24:00	6/10/99	113	50.6
499	32	1692	0	cpm	N/A 5 s	8:24:00	6/10/99	367	-16.8
500	32	1716	0	cpm	N/A 5 s	8:25:00	6/10/99	387	-16.8

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating Int Val T	Log Time	Log Date	beta/gamma	alpha	
501	32	1680	0	cpm	N/A 5 s	8:25:00	6/10/99	357	-16.8	
502	32	1524	36	cpm	N/A 5 s	8:25:00	6/10/99	230	50.6	
503	32	1428	12	cpm	N/A 5 s	8:25:00	6/10/99	152	5.7	
504	32	1728	12	cpm	N/A 5 s	8:26:00	6/10/99	396	5.7	
505	32	1524	12	cpm	N/A 5 s	8:26:00	6/10/99	230	5.7	
506	32	1536	0	cpm	N/A 5 s	8:27:00	6/10/99	240	-16.8	
507	32	1860	0	cpm	N/A 5 s	8:27:00	6/10/99	504	-16.8	
508	32	1752	12	cpm	N/A 5 s	8:27:00	6/10/99	416	5.7	
509	32	1836	0	cpm	N/A 5 s	8:27:00	6/10/99	484	-16.8	
510	32	1716	0	cpm	N/A 5 s	8:28:00	6/10/99	387	-16.8	
511	32	1668	12	cpm	N/A 5 s	8:28:00	6/10/99	348	5.7	
512	32	1572	24	cpm	N/A 5 s	8:29:00	6/10/99	269	28.1	
513	32	1236	12	cpm	N/A 5 s	8:29:00	6/10/99	-4	5.7	
514	32	1488	12	cpm	N/A 5 s	8:29:00	6/10/99	201	5.7	
515	32	1680	12	cpm	N/A 5 s	8:29:00	6/10/99	357	5.7	
516	32	1476	0	cpm	N/A 5 s	8:30:00	6/10/99	191	-16.8	
517	32	1356	48.01	cpm	N/A 5 s	8:30:00	6/10/99	94	73.1	
518	32	1548	0	cpm	N/A 5 s	8:31:00	6/10/99	250	-16.8	
519	32	1260	12	cpm	N/A 5 s	8:31:00	6/10/99	16	5.7	
520	32	1524	12	cpm	N/A 5 s	8:32:00	6/10/99	230	5.7	
521	32	1524	12	cpm	N/A 5 s	8:32:00	6/10/99	230	5.7	
522	1002	1752	12	cpm	N/A 5 s	8:32:00	6/10/99	416	5.7	
523	32	1368	12	cpm	N/A 5 s	8:33:00	6/10/99	104	5.7	
524	32	1704	12	cpm	N/A 5 s	8:34:00	6/10/99	377	5.7	
525	32	1476	0	cpm	N/A 5 s	8:34:00	6/10/99	191	-16.8	
526	32	1560	12	cpm	N/A 5 s	8:34:00	6/10/99	260	5.7	
527	32	1620	0	cpm	N/A 5 s	8:35:00	6/10/99	309	-16.8	
528	32	1788	24	cpm	N/A 5 s	8:35:00	6/10/99	445	28.1	
529	32	1680	36.01	cpm	N/A 5 s	8:35:00	6/10/99	357	50.6	
530	1002	47600	795.2	cpm	N/A 5 s	8:41:00	6/10/99	-	-	Noted bad count
531	1002	6243	12.01	cpm	N/A 5 s	8:43:00	6/10/99	4067	5.7	
532	35	1872	12	cpm	N/A 5 s	8:44:00	6/10/99	513	5.7	
533	35	1968	48.01	cpm	N/A 5 s	8:44:00	6/10/99	591	73.1	
534	35	1872	12	cpm	N/A 5 s	8:45:00	6/10/99	513	5.7	
535	35	1704	24	cpm	N/A 5 s	8:45:00	6/10/99	377	28.1	
536	35	1320	0	cpm	N/A 5 s	8:45:00	6/10/99	65	-16.8	
537	35	1992	0	cpm	N/A 5 s	8:46:00	6/10/99	611	-16.8	
538	35	1860	12	cpm	N/A 5 s	8:46:00	6/10/99	504	5.7	
539	35	1632	0	cpm	N/A 5 s	9:05:00	6/10/99	318	-16.8	
540	35	1848	0	cpm	N/A 5 s	9:05:00	6/10/99	494	-16.8	
541	35	1800	12	cpm	N/A 5 s	9:05:00	6/10/99	455	5.7	
542	35	2016	12	cpm	N/A 5 s	9:06:00	6/10/99	630	5.7	

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating Int Val T	Log Time	Log Date	beta/gamma	alpha
543	35	1788	24	cpm	N/A	5 s	9:06:00	6/10/99	445	28.1
544	35	1896	24	cpm	N/A	5 s	9:06:00	6/10/99	533	28.1
545	35	1728	0	cpm	N/A	5 s	9:07:00	6/10/99	396	-16.8
546	35	1788	0	cpm	N/A	5 s	9:07:00	6/10/99	445	-16.8
547	35	1632	0	cpm	N/A	5 s	9:07:00	6/10/99	318	-16.8
548	32	1944	0	cpm	N/A	5 s	9:10:00	6/10/99	572	-16.8
549	32	1788	36.01	cpm	N/A	5 s	9:10:00	6/10/99	445	50.6
550	32	2004	36.01	cpm	N/A	5 s	9:10:00	6/10/99	621	50.6
551	32	1956	24	cpm	N/A	5 s	9:11:00	6/10/99	582	28.1
552	32	1620	12	cpm	N/A	5 s	9:11:00	6/10/99	309	5.7
553	32	1608	12	cpm	N/A	5 s	9:12:00	6/10/99	299	5.7
554	32	1992	36.01	cpm	N/A	5 s	9:12:00	6/10/99	611	50.6
555	32	1740	24	cpm	N/A	5 s	9:12:00	6/10/99	406	28.1
556	32	1788	12	cpm	N/A	5 s	9:12:00	6/10/99	445	5.7
557	32	1848	36.01	cpm	N/A	5 s	9:13:00	6/10/99	494	50.6
558	32	1608	0	cpm	N/A	5 s	9:17:00	6/10/99	299	-16.8
559	32	1668	0	cpm	N/A	5 s	9:17:00	6/10/99	348	-16.8
560	32	1920	0	cpm	N/A	5 s	9:17:00	6/10/99	552	-16.8
561	32	1752	0	cpm	N/A	5 s	9:18:00	6/10/99	416	-16.8
562	32	1752	48.01	cpm	N/A	5 s	9:18:00	6/10/99	416	73.1
563	32	2076	12	cpm	N/A	5 s	9:18:00	6/10/99	679	5.7
564	32	1704	0	cpm	N/A	5 s	9:19:00	6/10/99	377	-16.8
565	32	1896	0	cpm	N/A	5 s	9:19:00	6/10/99	533	-16.8
566	32	1968	0	cpm	N/A	5 s	9:19:00	6/10/99	591	-16.8
567	32	1968	0	cpm	N/A	5 s	9:20:00	6/10/99	591	-16.8
568	32	1776	48.01	cpm	N/A	5 s	9:20:00	6/10/99	435	73.1
569	32	1908	24	cpm	N/A	5 s	9:20:00	6/10/99	543	28.1
570	32	1740	12	cpm	N/A	5 s	9:21:00	6/10/99	406	5.7
571	32	1932	12	cpm	N/A	5 s	9:21:00	6/10/99	562	5.7
572	32	1788	12	cpm	N/A	5 s	9:21:00	6/10/99	445	5.7
573	32	1776	24	cpm	N/A	5 s	9:21:00	6/10/99	435	28.1
574	32	1920	24	cpm	N/A	5 s	9:22:00	6/10/99	552	28.1
575	32	1620	12	cpm	N/A	5 s	9:22:00	6/10/99	309	5.7
576	32	1704	12	cpm	N/A	5 s	9:22:00	6/10/99	377	5.7
577	32	2064	0	cpm	N/A	5 s	9:23:00	6/10/99	669	-16.8
578	32	1824	36.01	cpm	N/A	5 s	9:23:00	6/10/99	474	50.6
579	1002	1284	12	cpm	N/A	5 s	9:25:00	6/10/99	35	5.7
580	30	1800	12	cpm	N/A	5 s	9:31:00	6/10/99	455	5.7
581	30	1860	12	cpm	N/A	5 s	9:31:00	6/10/99	504	5.7
582	30	1884	0	cpm	N/A	5 s	9:32:00	6/10/99	523	-16.8
583	30	1704	0	cpm	N/A	5 s	9:32:00	6/10/99	377	-16.8
584	30	1548	12	cpm	N/A	5 s	9:32:00	6/10/99	250	5.7

108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating	Int Val T	Log Time	Log Date	beta/gamma	alpha	
585	30	1896	0	cpm	N/A	5 s	9:33:00	6/10/99	533	-16.8	
586	30	1848	12	cpm	N/A	5 s	9:33:00	6/10/99	494	5.7	
587	30	1728	12	cpm	N/A	5 s	9:33:00	6/10/99	396	5.7	
588	30	1764	24	cpm	N/A	5 s	9:33:00	6/10/99	426	28.1	
589	30	1776	0	cpm	N/A	5 s	9:34:00	6/10/99	435	-16.8	
590	30	1584	24	cpm	N/A	5 s	9:34:00	6/10/99	279	28.1	
591	30	1716	12	cpm	N/A	5 s	9:34:00	6/10/99	387	5.7	
592	30	2040	12	cpm	N/A	5 s	9:35:00	6/10/99	650	5.7	
593	30	1656	0	cpm	N/A	5 s	9:35:00	6/10/99	338	-16.8	
594	30	1596	24	cpm	N/A	5 s	9:35:00	6/10/99	289	28.1	
595	30	1608	24	cpm	N/A	5 s	9:36:00	6/10/99	299	28.1	
596	30	1824	12	cpm	N/A	5 s	9:36:00	6/10/99	474	5.7	
597	30	1740	0	cpm	N/A	5 s	9:36:00	6/10/99	406	-16.8	
598	30	1824	12	cpm	N/A	5 s	9:37:00	6/10/99	474	5.7	
599	30	1620	36	cpm	N/A	5 s	9:37:00	6/10/99	309	50.6	
600	1002	1797	8.801	cpm	N/A	300 s	12:38:00	6/10/99	452	-0.3	
601	1002	1797	8.801	cpm	N/A	300 s	12:38:00	6/10/99	452	-0.3	
								Average (all points):	413	6	
								Standard Deviation:	225	22	
								Coefficient of Variation:	0.55	3.58	
								95% UCL:	783	42	(1.64 Two-tailed)
								95% UCL:	855	49	(1.96 One-tailed)
								Maximum Value:	4067	73	
								Total Data Points:	538	563	
								Edited Data Points:	6	6	

Note: All survey points which indicated 49 dpm or higher alpha, or more than 4000 cpm beta-gamma were re-counted. In each case, the follow-up count indicted a much lower value. During the first two days of surveying it was noted that some electronic noise was generated if the cable was moved, giving the high reading. On later surveys, more care was taken to prevent this from occuring, and only one data point on 6-10 was rejected. All points edited are marked "noted bad count". A total of 6 data points were rejected of a total of 544 collected, a rejection rate of 1.1%.

Based on repeat counts, the data points which record 48.01 counts are presumed to be incorrect and high, but these points were retained in order to maintain the consistently conservative approach to this survey.

Average Surface contamination value from 'sample' points:	384	7.55	
Standard Deviation:	72.3	6.06	
Coefficient of Variation:	0.20	0.80	
95% UCL:	482	17.5	**(1.64 Two-tailed)**

Attachment 11

070078

Attachment 11

070078

077995

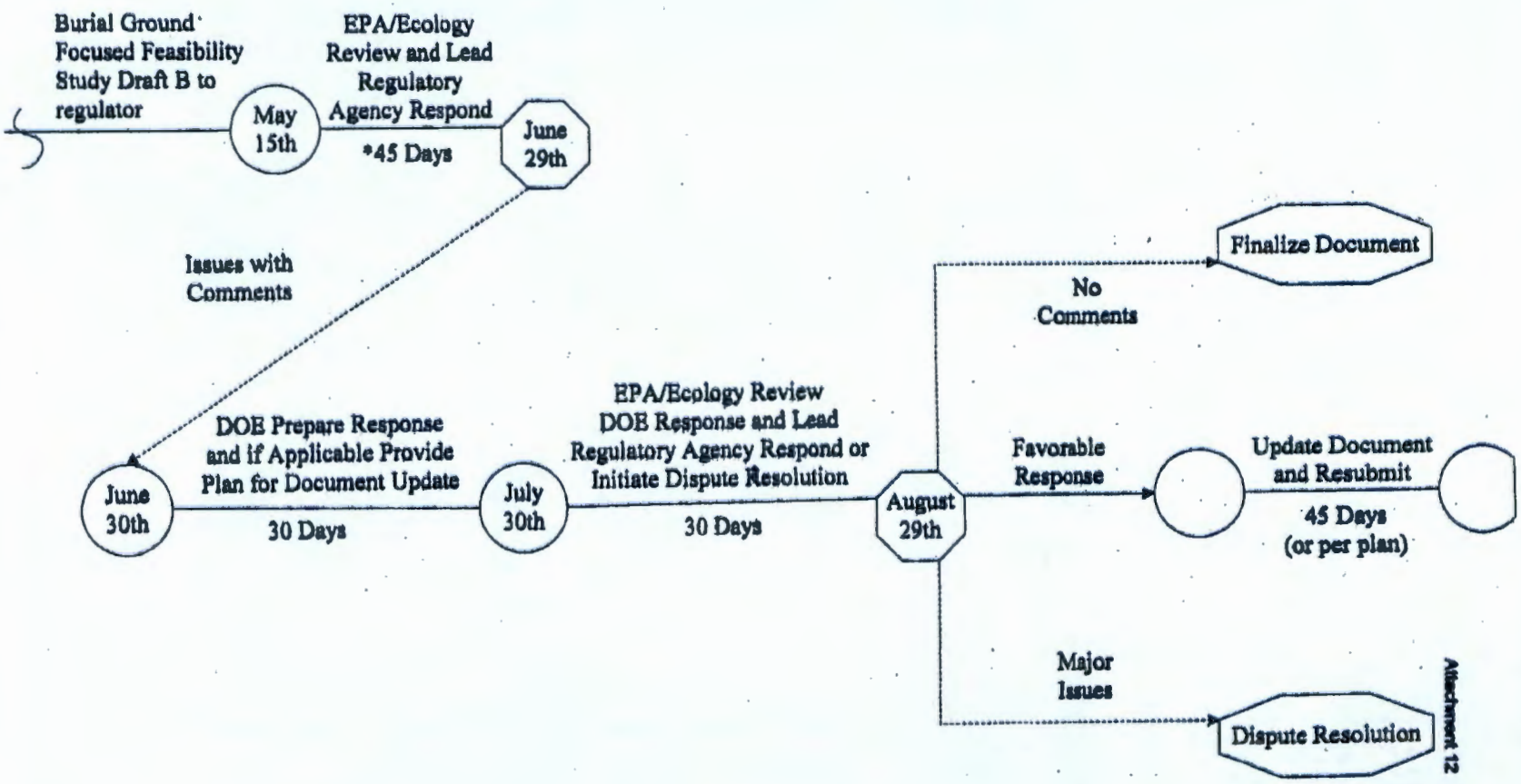
108-F Wall Release Survey Data Points and Interpretation

#	Location	Count 1	Count 2	Units	Operating I Int Val T	Log Time	Log Date	beta/gamma	alpha	
							95% UCL:	505	19.4	(1.96 One-tailed)
							Maximum Value:	491	24.0	

Note: The values determined by the 'sample' points indicate the most statistically reliable values for the true contamination values. Based on these data, the walls of the building are releasable from surface contamination limits, or volumetric limits. The surface release limits (DOE Order 5400.5) are 5000 dpm/100 cm^2 beta-gamma and 100 dpm/100cm^2 transuranic.

MDA (5-s count) = 96.2 dpm/100 cm^2 alpha and 714.3 dpm/100 cm^2 beta/gamma
MDA (300-s count) = 8.07 dpm/100 cm^2 alpha and 87.9 dpm/100 cm^2 beta/gamma

Review Process per the TPA



Attachment 12

077095

APPENDIX D

108-F BUILDING DEMOLITION SITE SURVEYS FOR WIDS

073199

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required: NO
Due Date: N/A
Action: N/A
Close OOI: N/A
OU: N/A
TSD: N/A
ERA: 108F
Subject Code:

TO: L. A. Dietz H0-20

DATE: October, 5, 1999

COPIES: R. S. Day X9-08
T. J. Rodovsky X9-08
M. A. Mihalic X9-08
Document and Info Services H0-09

FROM: J. P. Zoric X5-55 Joe Zoric 10/5/99

SUBJECT: 108F BUILDING DEMOLITION SITE SURVEYS FOR WIDS

Linda,

Attached are the radiological survey records of the 108F demolition site performed September 28, 1999. The surveys were conducted after demolition was completed of the 108F Biological Laboratory. The surveys are provided to you for inclusion into the WIDs records system for the site/facility.

Should you have any questions, please call me at 373-4315.

JPZ:jpz

Document

Bechtel Hanford, Inc. – CH2M Hill Hanford, Inc. – Therme Hanford, Inc.

ERC RADIOLOGICAL SURVEY RECORD

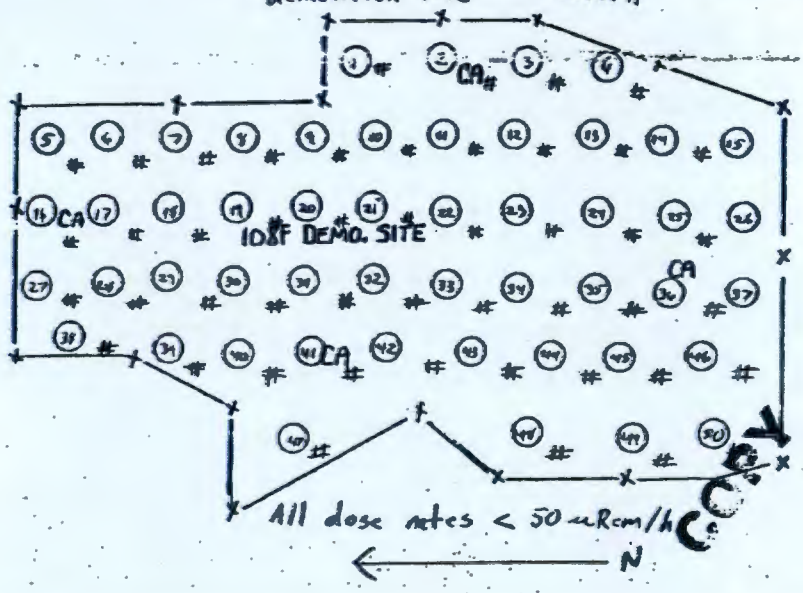
Page 1 of 6

Type of Survey (check one only)
☐ *Release ☐ Routine N/A ☑ Work Progress ☐ Shipment
* The potential for internal contamination was evaluated.

Survey # RSR - 108F-99 -0758

RWP # / Rev. #	Date	Time	Location Code/Description
108F-003/1	9-28-99	1230	108F

Survey for a down post CA to SCA @ 108F demolition site



All radiation readings are γ dose rates in units of mR/hr unless otherwise indicated.

Technical Assessment # TA-99-SR-01/1

CA Contamination Area	HCA High Contamination Area	RBA Radiological Buffer Area	ARA Airborne Radioactivity Area	RMA Radioactive Materials Area	RA Radiation Area	HRA High Radiation Area	VHRA Very High Radiation Area

○ Technical Smear	# Direct	M Large Area Wipe	Contact / 30 cm	General Area Dose Rates (uncorrected Meter Reading (mR/hr)	Radiological Boundary	Δ Micro Rem (uR/hr)	N Neutrons (mRem/hr)	AS Air Sample Location	SCA Soil Contamination Area

Instruments

Model	Serial #	Source ✓(Initial)	CF	Cal Due Date	Model	Serial #	Source ✓(Initial)	CF	Cal Due Date
Micro rem	0061	MK	N/A	3-31-00	E600	0002	MK	1.1	4-18-00
E600 SHP380AB	1044	MK	1.3	7-11-00	SHP380AB	1571	MK	1.3	9-30-00

RCT Name/Signature/Date:
David J. Gurth / 9-28-99
Rod Spencer / 9-28-99

RCT Supervisor Name/Signature/Date:
M.A. KOVACH / 9/29/99

BHI-TM-R008a (12/98) RSR completed in accordance with BHI-SH-04, Instruction 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)

Page 2 of 6

Contamination Measurement Information

Circled values indicate Removable β contamination in mrad/hr β

No.	Description of Item or Location	Removable (dpm/100 cm²) α	Removable (dpm/100 cm²) α C-F	Removable (dpm/100 cm²) β-γ	Removable (dpm/100 cm²) β-γ C-F	Total (dpm/100 cm²) α	Total (dpm/100 cm²) α C-F	Total (dpm/100 cm²) β-γ	Total (dpm/100 cm²) β-γ C-F
1-50	tech smears			see additional sheet					
#	direct frisk					<100	3.5	<5000	

Corrected Dose Rate Calculations

Show all work. CF = 1 unless noted.

Location	Contact Readings β (mrad/hr) (WO-WC) X CF = DR	Contact Readings γ (mR/hr) WC X CF = DR	30 cm Readings β (mrad/hr) (WO-WC) X CF = DR	30 cm Readings γ (mR/hr) WC X CF = DR

BHI-TM-R006a (12/98)

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Smear Counting Results

Page 3 of 6
Survey #RSR-108F-98-0238 9-28-99

Counter Location:		Background (cpm)	MDCR (cpm)	MDA (dpm)	Counter Eff.
100F MO-544	α	0.2	4.22	12.2	.347
	βγ	42	25.57	59.1	.433

Sample		Counting Results				Final Analysis
No	Description of Smear Location	Con. Type	Sample Count Duration (min)	Gross CPM	Net CPM	Removable (dpm/100 cm²)
1	ground	α	1 min	0	0	<20
		βγ	1 min	42	0	<1000
2		α		0	0	<20
		βγ		29	0	<1000
3		α		0	0	<20
		βγ		41	0	<1000
4		α		0	0	<20
		βγ		48	0	<1000
5		α		0	0	<20
		βγ		50	4	<1000
6		α		0	0	<20
		βγ		34	0	<1000
7		α		2	1.8	<20
		βγ		39	0	<1000
8		α		0	0	<20
		βγ		41	0	<1000
9		α		0	0	<20
		βγ		39	0	<1000
10		α		0	0	<20
		βγ		46	0	<1000
11		α		0	0	<20
		βγ		49	3	<1000
12		α		0	0	<20
		βγ		35	0	<1000
13		α		0	0	<20
		βγ		28	0	<1000
14		α		0	0	<20
		βγ		40	0	<1000

COPY

BHI-TM-R088k (12/98)

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Smear Counting Results

Page 4 of 6

Survey #RSR-108F-99-0758

Counter Location:		Background (cpm)	MDCR (cpm)	MDA (dpm)	Counter Eff.
100F MO-544	α	0.2	~~12.7~~ 4.22	12.2	.347
	Br	46	25.57	59.1	.433

Sample		Counting Results				Final Analysis
No.	Description of Smear Location	Con. Type	Sample Count Duration (min)	Gross CPM	Net CPM	Removable (dpm/100 cm²)
15	ground	α	1min	0	-0	<20
		Br	1min	31	0	<1000
16		α		0	0	<20
		Br		37	0	<1000
17		α		0	0	<20
		Br		39	0	<1000
18		α		1	0.8	<20
		Br		42	0	<1000
19		α		0	0	<20
		Br		48	2	<1000
20		α		1	0.8	<20
		Br		42	0	<1000
21		α		1	0.8	<20
		Br		43	0	<1000
22		α		0	0	<20
		Br		40	0	<1000
23		α		0	0	<20
		Br		35	0	<1000
24		α		0	0	<20
		Br		52	6	<1000
25		α		0	0	<20
		Br		38	0	<1000
26		α		0	0	<20
		Br		46	0	<1000
27		α		0	0	<20
		Br		42	0	<1000
28		α		0	0	<20
		Br		43	0	<1000

BHI-TM-R008k (12/98)

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Smear Counting Results

Page 5 of 6

Survey #RSR-108F-99-0733

Counter Location:		Background (cpm)	MDCR (cpm)	MDA (dpm)	Counter Eff.
100F	α	0.2	~~12.2~~ 4.22	12.2	.347
MD-544	β	46	25.52	59.1	.433

Sample		Counting Results				Final Analysis
No	Description of Smear Location	Con. Type	Sample Count Duration (min)	Gross CPM	Net CPM	Removable (dpm/100 cm²)
		α	1min	0	0	<20
29	ground	β	1min	34	0	<1000
		α		0	0	<20
30		β		34	0	<1000
		α		0	0	<20
31		β		34	0	<1000
		α		0	0	<20
32		β		41	0	<1000
		α		0	0	<20
33		β		40	0	<1000
		α		0	0	<20
34		β		37	0	<1000
		α		0	0	<20
35		β		44	0	<1000
		α		0	0	<20
36		β		44	0	<1000
		α		0	0	<20
37		β		44	3	<1000
		α		1	0.8	<20
38		β		48	2	<1000
		α		0	0	<20
39		β		32	0	<1000
		α		0	0	<20
40		β		42	0	<1000
		α		1	0.8	<20
41		β		34	0	<1000
		α		0	0	<20
42		β		44	0	<1000

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BHI-TM-R008k (12/98)

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Smear Counting Results

Page 6 of 6

Survey #RSR-108F-99-0755

Counter Location:		Background (cpm)	MDCR (cpm)	MDA (dpm)	Counter Eff.
100F MD-544	α	0.2	4.22	12.2	.347
	β	46	25.57	59.1	.433

Sample		Counting Results				Final Analysis
No	Description of Smear Location	Con. Type	Sample Count Duration (min)	Gross CPM	Net CPM	Removable (dpm/100 cm²)
		α	1min	0	0	<20
43	ground	β	1min	53	7	<1000
		α		0	0	<20
44		β		36	0	<1000
		α		0	0	<20
45		β		33	0	<1000
		α		0	0	<20
46		β		45	0	<1000
		α		0	0	<20
47		β		43	0	<1000
		α		0	0	<20
48		β		48	2	<1000
		α		0	0	<20
49		β		50	4	<1000
		α		0	0	<20
50		β		43	0	<1000
		α	N/A	N/A	N/A	N/A
N/A	N/A	β	N/A	N/A	N/A	N/A
		α				
		β				
		α				
		β				
		α				
		β				
		α				
		β				

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HI-TM-R000K (12/98)

ERC RADIOLOGICAL SURVEY RECORD
Contamination

Page 1 of 4

Type of Survey (check one only)	Survey #
☐ *Release ☐ Routine NA ☒ Work Progress ☐ Shipment * The potential for internal contamination was evaluated.	RSR - 108F-99-0233

RWP #/Rev. #	Date	Time	Location Code/Description
108F-003 REV1	5-11-99	1300	108F

SEE PAGE # 4

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Technical Assessment Number TA-99-SR-04 REV 1

CA Contamination Area	HCA High Contamination Area	RBA Radiological Buffer Area	ARA Airborne Radioactivity Area	RMA Radioactive Materials Area	RA Radiation Area	HRA High Radiation Area

○ Technical Smear	# Direct	M Large Area Wipe	[AS] Air Sample Location	Radiological Boundary x----x----x----x	SCA Soil Contamination Area	VHRA Very High Radiation Area

Instruments

Model	Serial #	Source ✓ (Initial)	CF	Cal Due Date	Model	Serial #	Source ✓ (Initial)	CF	Cal Due Date
E600	0002	RS	N/	4-8-00	LUDLUM 2929	0019	MJL	N/A	4-13-00
SHP380	1429	RS	/A	3-21-00	NA →				

RCT Name/Signature/Date:	RCT Supervisor Name/Signature/Date:
Rod Spencer / Rod Spencer 5-11-99 MARK J. LIPPY M J Lippy 5-11-99	M.A. KOVACH M A Kovach 5/12/99

BHI-TM-R006e (12/98) RSR completed in accordance with BHI-SH-04, Instruction 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Page 2 of 4

Contamination Measurement Information
Circled values indicate removable β contamination in mrad/hr β

No.	Description of Item or Location	Removable (dpm/100 cm²)				Total (dpm/100 cm²)			
		α	α C-F	β-γ	β-γ C-F	α	α C-F	β-γ	β-γ C-F
	ALL IN'-H SURVEY LOCATIONS	<100	9	<1K	6	<100	9	<5K	6

N/A

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BHI-TM-R006e (12/98)

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Smear Counting Results

Page 3 of 34

Survey #RSR- 108F-99-0233 [illegible] 5/2/99

Counter Location:		Background (cpm)	MDCR (cpm)	MDA (dpm)	Counter Eff.
100F	α	.2	4	12	.347
	βγ	47	26	60	.433

Sample		Counting Results				Final Analysis
No	Description of Smear Location	Con. Type	Sample Count Duration (min)	Gross CPM	Net CPM	Removable (dpm/100 cm²)
1	FRENCH DRAIN	α	1	0	0	<20
		βγ		51	4	<1K
2		α		0	0	<20
		βγ		56	9	<1K
3		α		1	.8	<20
		βγ		49	2	<1K
4		α		1	.8	<20
		βγ		37	0	<1K
5		α		0	0	<20
		βγ		42	0	<1K
6		α		0	0	<20
		βγ		54	7	<1K
		α				
		βγ				
		α				
		βγ				
		α				
		βγ				
		α				
		βγ				
		α				
		βγ				
		α				
		βγ				
		α				
		βγ				
		α				
		βγ				

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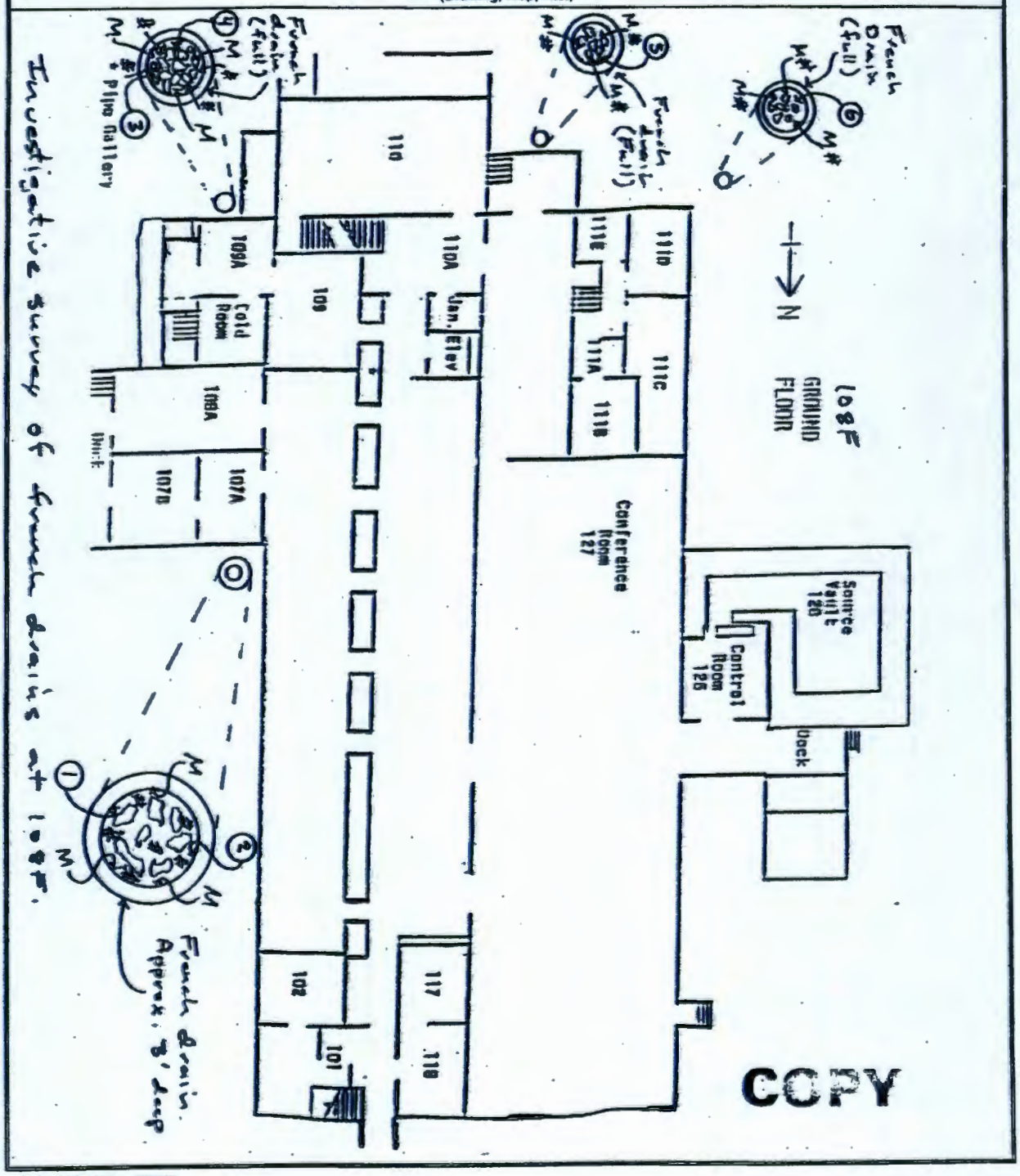
BHI-TM-R006k (12/98)

ERC RADIOLOGICAL SURVEY RECORD (continuation)

Page 4 of 4
108F
Survey # RSR-99-0233

Additional Information
(Drawing, Map, Etc.)



BHI-TM-R006c (10/97)

BHI-01247
Rev. 0

Table 1. Radiological Material Inventories

Contaminant	HVAC Trench Inventory (Ci)[a]	First Floor Pipe Trench Sump Inventory (Ci)[a]	French Drain Soil Inventory (Ci)[a]	First Floor Pipe Trench Inventory (Ci)[a]	Additional Radiological Inventory Found Throughout the Building (Ci)[b]	Total Inventory (Ci)	40 CFR 302.4, Table 302.4, Appendix B, (RQs)	RQ Fraction
Pu-238	2.72E-07	1.30E-07	6.57E-05	2.63E-08	1.02E-06	6.71E-05	0.01 Ci	6.71E-03
Pu-239/240	5.99E-08	3.57E-06	6.38E-06	–	1.01E-05	2.01E-05	0.01 Ci	2.01E-03
Am-241	–	3.63E-07	7.02E-07	–	4.03E-07	1.47E-06	0.01 Ci	1.47E-04
Co-60	1.52E-08	8.27E-09	7.43E-09	1.14E-08	–	4.23E-08	10 Ci	4.23E-09
Cs-137	1.36E-07	5.25E-06	5.71E-07	2.66E-08	1.86E-06	7.84E-06	1 Ci	7.84E-06
Eu-152	3.60E-08	–	3.61E-08	–	–	7.21E-08	10 Ci	7.21E-09
Eu-154	–	–	2.95E-08	6.28E-08	–	9.23E-08	10 Ci	9.23E-09
Eu-155	9.74E-09	–	2.87E-08	1.91E-08	–	5.75E-08	10 Ci	5.75E-09
Sr-90	5.44E-08	2.07E-05	8.60E-08	3.47E-05	7.33E-06	6.29E-05	0.1 Ci	6.29E-04
U-235	3.13E-09	9.99E-10	5.75E-08	1.12E-08	–	7.28E-08	0.1 Ci	7.28E-07
U-238	3.11E-07	9.86E-08	5.69E-06	1.11E-06	–	7.21E-06	0.1 Ci	7.21E-05
							Total	9.58E-03

RQ=Reportable quantities.
[a] Refer to BHI (1999b) for calculations of estimated quantities of radiological inventory. The "Annual Possession Quantity" cahns in Tables 1-4 of BHI (1999b) are estimates of radionuclides present by isotope. This calculation was originally produced in January 1999 tstimate radionuclide air emissions that are based on total curies of each radionuclide in the facility.
[b] Refer to BHI (1999b) for calculations of estimated quantities. Attachment B (pages 3 and 4) provide an explanation how quatiti of miscellaneous contamination were calculated.

Table 2. Hazardous Material Inventories.

Contamination	Quantity	40 CFR 302.4 RQ	40 CFR 302.4 RQ Fraction	29 CFR 1919.119 Appendix. A TQs	29 CFR 1919.119 Appendix. A TQ Fraction	40 CFR 68.130 Table 1-4 TQs	40 CFR 68.130 Table 1-4 TQ Fraction
Mercury	0.22 Kg (0.5 lb.)[a]	0.454 Kg (1 lb.)	0.50	NTV	0	NTV	0
PCBs	1.89E-04 Kg (4.17E-04 lbs.)[a]	0.454 Kg (1 lb.)	4.16E-04	NTV	0	NTV	0
Lead	4360 Kg (9600 lbs.)[a]	4.54 Kg (10 lbs.)	960	NTV	0	NTV	0
Asbestos	11,800 Kg (26,000 lbs.)[a]	0.454 Kg (1 lb.)[c]	26,000	NTV	0	NTV	0
Sodium Dichromate	1.3 kg (2.87 lbs.)[b]	4.54 Kg (10 lbs.)	0.29	NTV	0	NTV	0
		Total	26,961	Total	0	Total	0

NTV=No table value. TQ=Threshold quantity.
[a] Refer to BHI 1996b for estimated quantities.
[b] Refer to BHI 1999a for estimate quantities
[c] The RQ for asbestos is limited to friable forms only. All asbestos in the building is assumed to be friable, which is a conservative assumption.

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