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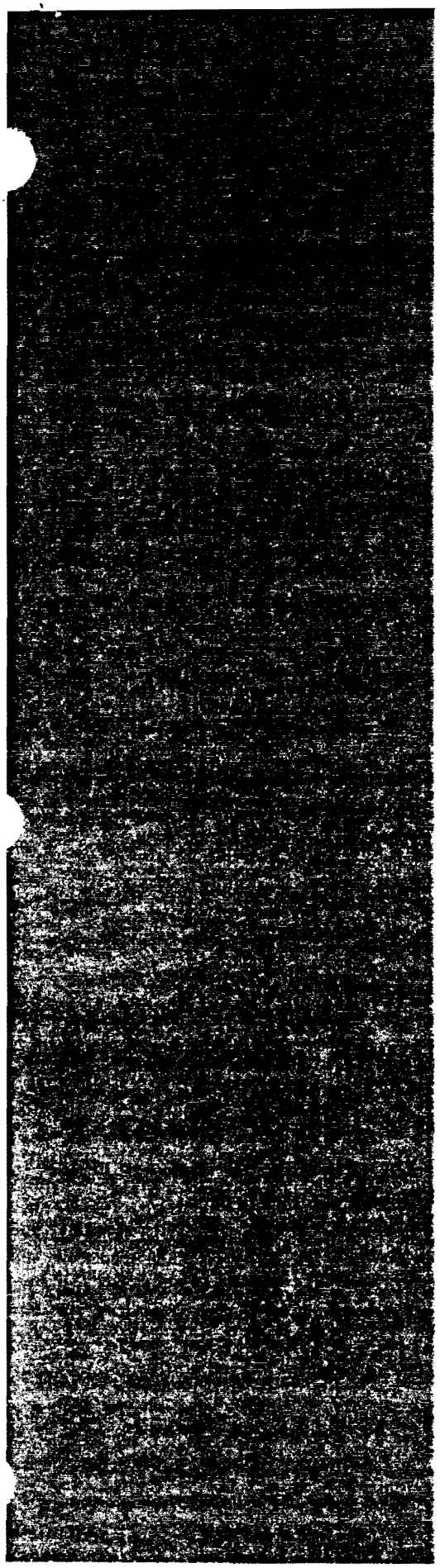

Decommissioning Completion Report for Phase Separator Pit at Technical Area 35

Phase 2 – Building 35-7

Phase 3 – Building 35-3 (Phase Separator Pit)

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Los Alamos
NATIONAL LABORATORY

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1.0 INTRODUCTION

This report summarizes the successful decommissioning of portions of the Phase Separator Pit (PSP) at Technical Area 35 (TA-35). The project management plans for this project [1,2] describe the history, location, and decommissioning process.

The PSP exhaust system consisted of ducts, separator tanks, and filtering facility designed to remove and dispose of gases and liquids from experimental laboratories and hot cells in Building 2. To decommission this system, six phases were developed (see Section 3.1). The completion of phases 1, 4, 5, and 6 and part of phase 3 was reported in fiscal year (FY) 1996. This report describes the decommissioning work performed in phases 2 and 3 (decontaminate and demolish Building 7 and the PSP). Table 1 summarizes the start and end dates for these activities.

Table 1. Project Start and End Dates.

Description	Start	End
Phase 2: Building TA-35-7	April 1996	October 1996
Phase 3: PSP, TA-35-3	January 1996	January 1997
Final grading and paving	April 1997	May 1997

The primary goal was to decommission the facilities safely and cost effectively. Activities were integrated with those of the Environmental Restoration Field Unit (FU) 4 team, which produced the Resource Conservation and Recovery Act (RCRA) Facility Investigation Work Plan (RFI Work Plan) for TA-35 [3]. This team provided much of the historical information about the site.

All decommissioning activities complied with all applicable environmental, safety, and health requirements. The project conducted operations under a Site-Specific Health and Safety Plan, a Waste Management Plan, a Storm Water Pollution Prevention Plan, and a Spill Prevention, Control, and Countermeasures Plan [1]. A final report will be published in the spring of 1997. The final report will provide additional information and be the formal record of completion.

2.0 PROJECT DESCRIPTION

Also known as Ten Site, TA-35 is located on a finger mesa between Mortandad and Ten-Site canyons. Within TA-35, on the north-central portion of Los Alamos National Laboratory, resides the PSP exhaust system. Figure 1 shows the location of the facilities within TA-35.

2.1 Phase 2: Building TA-35-7

Phase 2 consists of removing the contaminated floor and superstructure of building TA-35-7, including the associated electrical and mechanical building services, abandoned waste piping along the northern edge of the facility, and the exhaust stacks.

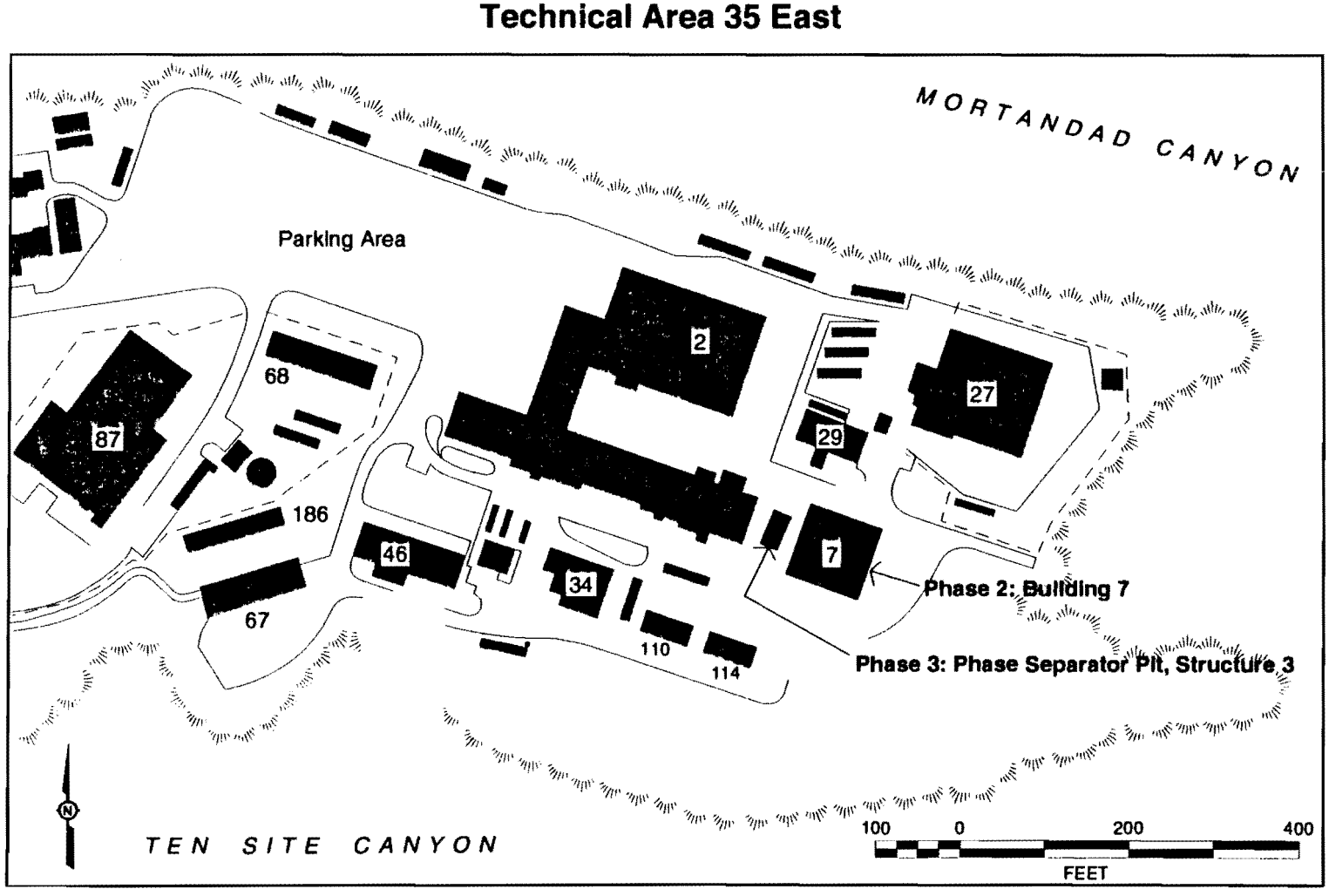


Figure 1. Phase Separator Pit Decommissioning Facilities located at Technical Area 35.

2.2 Phase 3: Phase Separator Pit

Phase 3 consisted of removing and safely disposing of the PSP and its contents, as well as the holding tanks. The main component of the exhaust system, the PSP was designed to receive and separate waste gases and liquids extracted from Building 2 laboratories.

Seven separator tanks in the PSP collected liquids from the system and drained to holding tanks. Three 1300-gal. waste-holding tanks (TSL 4, 5 & 6) in the system received liquids separated by the separator tanks in the PSP; these tanks held liquids until they could be pumped to a neutralizing tank, also in the PSP. Liquids were finally drained to the TSL-10 tank farm.

At the end of FY96, TSL-4, -5, and -6 were completely decommissioned. The PSP structure (TA-35-3) and its contents were completely decommissioned in FY97.

3.0 DECOMMISSIONING OBJECTIVES

The principal goal of this effort was to safely and cost effectively remove radiologically contaminated ductwork, equipment, and structures related to the TA-35 PSP exhaust system. Project objectives included

- reducing the health and environmental exposure risks associated with radiological and RCRA-listed contamination;
- removing contaminated materials and facilities;
- decontaminating remaining structures; and
- restoring the land for potential reuse.

The project also planned to minimize contaminated wastes sent to TA-54 by recycling all metals removed during decommissioning activities and by decontaminating as much waste material as economically feasible.

3.1 Work Scope

The work scope of this project consisted of six phases, described in the Project Management Plans [1,2]. The project remediated soil only within a two-foot working envelope around the buried structures. Table 3.1-1 summarizes the phases of the FY97 Work Scope.

3.2 Project Management/Oversight

The Environmental Restoration (ER) Office was the principal managing organization for this project and assumed full responsibility for removing the PSP exhaust system, including the PSP itself and the filter building (Building 7). The TA-35 Decommissioning Project Leader was responsible for overall TA-35 decommissioning activities. The Project Leader coordinated activities with the ER Project's field project leader for FU 4, the site facility manager, the onsite contractor (JCI), and the contractor (IDM Environmental Inc.). This coordination ensured that decommissioning and remedial action activities at TA-35 were fully integrated.

This decommissioning project was the first to award a fixed-price contract to an external contractor for decommissioning work at the Laboratory. The Laboratory instituted this contract to ensure that the

Table 3.1-1. Work Scope Phases.

Phase	Tasks
2	Decontaminate and demolish Building TA-35-7. This task includes the following: • remove associated electrical and mechanical building services, • remove abandoned waste piping along the northern edge of the facility, • remove exhaust stacks, • clean up soil to radioactive release criteria, and • backfill, grade, and install base-course material.
3	Decontaminate and demolish the Phase Separator Pit , Building TA-35 -3. This task includes the following: • remove all tanks and vessels; • dispose of approximately 1300 gal. of liquid mixed waste; • treat and dispose of 3 drums of mixed waste sludge; • remove electrical and mechanical equipment; • decontaminate concrete and dispose of radioactive waste; • rubbleize clean concrete for use as backfill material; • remove approximately 1700 radioactively contaminated lead bricks; and • backfill, grade, and pave.

tasks were done faster and more economically. Los Alamos prepared and distributed a request for proposals to select the best qualified contractor; in August 1995, the Laboratory made its award. Both JCI and IDM Environmental Inc. did decommissioning work for this project: JCI worked on Phase 1, and IDM worked on phases 2 through 6.

- The TA-35 Decommissioning Project team consisted of the following:
- Los Alamos Project Leader,
- Department of Energy Los Alamos Area Office Representative,
- oversight personnel,
- operations contractor, and
- IDM Environmental Inc., and its subcontractors.

The Los Alamos oversight team consisted of an FSS-6 Project Coordinator, an ESH-1 Team Leader, radiological control technicians (RCTs), and representatives of the Industrial Hygiene and Safety Group (ESH-5). For detailed information about this team, see the Project Management Plans for this project [1,2].

The project instituted weekly meetings so that team members could discuss progress, address any issues or concerns, and to plan for the following week's activities. Most problems were discovered and solved in the field. The field team held daily "tailgate" meetings to discuss the day's plans and alert personnel to health physics and safety concerns. All task-level activities were planned and accomplished by incorporating Work Packages that consisted of task hazard analyses, detailed work procedures, and required permits [4].

4.0 DECOMMISSIONING SUMMARY

4.1 Site Characterization

Before decommissioning activities could begin, the TA-35 Decommissioning Project characterized the PSP exhaust system and associated facilities to identify chemical, radiological, and physical hazards. These activities were conducted as planned in the TA-35 PSP Decommissioning Project Characterization Plan [7] and presented in the TA-35 PSP Decommissioning Project Characterization Reports for Phase I and Phases II-V [8, 9].

Characterization tasks included reviewing historical records, interviewing former users, collecting and revising applicable drawings, identifying and reviewing utilities, and conducting radiological and chemical sampling. Sampling was done according to approved work packages and followed standard operating procedures for collecting and handling samples in the ER project. Analyses were done at commercial laboratories.

Sampling was done on the exhaust system at easily accessible locations. Manual and automated drilling equipment took soil samples at several depths around the exhaust system and associated facilities at designated locations. Overhead and floor ducts in Building 2 were sampled at strategic locations. Collectors entered the PSP, where they collected samples from the standing water, liquids, and sediments in the separator tanks. Samples also were taken from the liquid collected from the TSL-6 holding tank. TSL-4 was found empty, and TSL-5 was not sampled because back pressure discovered during an attempt to open the access flange could have released contamination. The filter building was also sampled. No excavation was used to obtain samples from buried ducts or tanks.

The TA-35 PSP Decommissioning Project Characterization Reports [8,9] compiled site characterization results. Generally contaminants found were relatively low in radioactivity; only TSL-6 was found to contain RCRA F-listed constituents, which made the liquids a mixed waste. The highest levels of radioactivity found during the preliminary site characterization were in liquids of holding tank TSL-6 (180 μCi/L).

4.1.1 Additional Waste Characterization

During project decommissioning, additional radiological and chemical field surveys and sample analysis of materials were done. Table 4.1.1-1 and Table 4.1.1-2 summarize the levels of radiological contaminants found in various project operations.

Table 4.1.1-1. Project Characterization Summary—Buildings 3 and 7.

Location	Alpha dpm/100 cm^2			Beta/Gamma dpm/100 cm^2		
	Min.	Avg.	Max.	Min.	Avg.	Max.
Phase Separator Pit	<MDA	<MDA	<MDA	<MDA	300,000	645,000
Building 7	<MDA	<MDA	94	<MDA	1,600	5,600

Minimum detectable activity (MDA) for alpha was generally 50 dpm/100 cm^2. MDA for beta/gamma was generally 200 dpm/100 cm^2.

Table 4.1.1-2. Project Characterization Summary—Soils.

Location	Alpha pCi/g			Beta/Gamma pCi/g		
	Min.	Avg.	Max.	Min.	Avg.	Max.
Sludge in PSP	<MDA	<MDA	<MDA	57,000	57,000	57,000
Soil under PSP	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
Soil under Building 7	<MDA	<MDA	<MDA	<MDA	200	6,700

4.2 Decommissioning Operations

JCI and IDM Environmental Inc. performed decommissioning operations. JCI was responsible for phase 1, and IDM was awarded a fixed-price contract to perform the remaining scope of work, phases 2–6.

This report covers only the project tasks that have been accomplished in FY97, phases 2 and 3.

4.2.1 Phase 2

Task: Decontaminate and demolish building TA-35-7.

- The contractor surveyed of the interior and the exterior of the building for radiation.
- All equipment in the building—including the scrubbers, HEPA trains, HVAC units, fire-suppression system, and miscellaneous building electronic equipment—was surveyed and released to Ace Metals if it was not contaminated or to SEG for metal melt if it was radioactively contaminated.
- The contractor attempted to remove the top floor slab separate from the bottom to minimize waste. This task proved to be too time-consuming so both slabs were removed together and disposed as radioactive waste.
- The contractor decontaminated the walls and ceiling to be able to release the building and avoid doing demolition under a Radiation Work Permit (RWP). When elevated levels of thorium were discovered, the contractor decided to demolish the building under an RWP and dispose as radioactive waste.
- The soil underneath the building was cleaned up to a depth of two feet using an industrial scenario and a maximum exposure rate of 15 mrem/y.

Actual schedule: April 1996 to October 1996.

4.2.2 Phase 3

Task: Remove the PSP structure and all interior tanks, equipment and utilities.

- The contractor removed the soil overburden from the roof and one side of the pit structure to get access.
- Sampling and analyses revealed liquid and sludge mixed waste inside TSL-5, TSL-6, and the Caustic Treatment Tank. The tanks were pumped and the waste

stored in a less-than-90-day storage area until it could be further characterized and sent to the Waste Experimental Reduction Facility (WERF) at the Idaho National Engineering and Environmental Laboratory (INEEL) for treatment and disposal. TSL 5 & 6 were removed in FY 96.

- The contractor removed all tanks and equipment from the PSP and decontaminated the concrete walls and floor. All tanks and equipment were sent to SEG for metal melt.

- Contaminated concrete was disposed as low-level radioactive waste, and the clean concrete was rubbleized , the rebar removed, and the clean concrete used for backfill.

- The contractor then completed the final grading and paving.

Actual Schedule: January 1996 to May 1997.

5.0 WASTE MANAGEMENT

5.1 Managing Generated Waste

Principal responsibility for managing generated waste fell to the Project Leader, who worked closely with the contractor to ensure that proper waste-handling procedures were followed. The TA-35 Waste Management Plan [1] provided guidance for all waste management activities.

A Radioactive Control Area te in which to stage recyclable metals and wastes was established. Waste minimization was a high priority for the project, resulting in a high percentage of materials being decontaminated and free released or recycled to metal-recycling companies. A RCRA less-than-90-day and a satellite storage area were created to handle mixed waste generated from pumping and handling the liquid mixed waste found in holding tanks TSL-5 and -6 and in the Caustic Treatment Tank in the north end of the PSP.

5.2 Waste Volume Summary

This project generated the following wastes: low-level mixed, low-level radioactive, asbestos-radioactive and nonradioactive, and nonradioactive releasable waste. Table 5.2-1 shows the quantities of waste generated and their final disposition for all phases of work completed.

Table 5.2-1. Description of Project Wastes and Disposal Methods.

Waste Stream	Estimated volume ($ft.^3$)*	Actual volume ($ft.^3$)*	Destination
Recyclable metal—low-level waste	54.5 tons	110 tons	SEG
recyclable metal—releasable	not estimated	75 tons	Ace Metals
liquids—low-level waste	260	500	TA-50
liquids—mixed waste	260	174	WERF
solids—mixed waste	150	20	SEG
building debris	not estimated	7,000	County landfill
personal protective equipment (PPE) and debris—low-level waste	7660	75,600	TA-54, Area G

*Volumes are for the entire project.

This project recycled most of the metal to a low-level waste recycling company (SEG Inc.) or to a local recycler dealing with noncontaminated metals. Much of the recyclable metal consisted of ducts, pipes, exhaust hoods, and tanks that could not be readily compacted and that occupied a large volume not originally estimated.

Original estimates for low-level contaminated liquids did not include all the PSP pumping occurring during the project. Water in the PSP was caused by a previously unknown and unexpected constant flow of water from a drain in Building 2, which should have been connected to the sanitary system. The source was finally located during Phase 6.

The volume of personal protective equipment (PPE) was low compared with the original estimate because of compaction, but low level debris increased because of building 7 concrete that could not be decontaminated.

5.3 Final Disposition

Low-level waste—consisting of contaminated equipment, PPE, and building debris—was placed in the low-level waste disposal cell at TA-54, Area G. Approximately 95% of all metal was recycled, minimizing the waste destined for Area G. Liquid mixed wastes was shipped to the WERF at INEEL for treatment. The solid mixed waste was treated by SEG.

5.4 Waste Minimization

This project generated a significant amount of contaminated metal waste, a good candidate for decontamination and/or recycling. As shown in Table 5.2-1, much of the metal was survey released and/or decontaminated for free release to a metal recycler. Low-level radioactively contaminated metal was recycled by SEG Inc. in Oak Ridge, Tennessee.

6.0 COST AND SCHEDULE

Increased waste management costs and unidentified underground utilities have added to the cost.

6.1 Baseline Cost and Schedule

In April 1995, the baseline cost and schedule indicated that the project would be completed in February 1997 and cost $6.8 million. However, because the cost and schedule provided by the contractor were optimistic, the Project Leader moved up the finish date to October 1996 and lower d the estimated cost to $5.8 million (see Tables 6.1-1 and 6.1-2).

Poor planning and execution by the contractor caused scheduling delays. In addition, the removal of LAPRE-I and LAPRE-II materials and an increase in liquid mixed waste disposal costs contributed to additional costs. This project was rebaselined for the previously estimated February 1997 finish date and $7.06 million cost.

Table 6.1-1. Funding Required for the TA-35 PSP Decommissioning Project.

Fiscal year	Activity	Estimated ($1000)	Actual ($1000)
93-94	Assessment	1300	1529
95	Phase 1	1900	1763
96	Phases 4 and 5	2600	2531
97	Phases 2, 3 and closeout	1240	2261
Total		**7040**	**8084**

Table 6.1-2. Costs in Thousands $K by Work Breakdown Structure (WBS) Element.

WBS Element	FY93 actuals	FY94 actuals	FY95 actuals	FY96 actuals	FY97 actuals	Totals
environmental compliance		16	12	8	0	36
site characterization		188	0	0	0	188
engineering		250	150	150	57	607
project planning	275	160	180	0	0	615
project support		275	320	320	225	1140
dismantlement		0	681	1327	700	2708
waste management		35	95	400	1105	1635
health physics		120	265	291	145	821
material		210	60	35	29	334
Total	**275**	**1254**	**1763**	**2531**	**2261**	**8084**

7.0 FINAL SITE CONDITION

After removal of all building material and underground piping from the footprints and immediate surrounding area of Building 7 and the PSP, the soil footprints were divided into 5 x 5 m grids, and 5 one-minute direct readings were collected in accordance with the guidance in NUREG 5849. Five surface and four subsurface soil samples were collected from each grid cell. Gamma spectrometry analysis of the soils indicated that no remediation was required under the PSP and minimal remediation was required under Building 7. The cleanup criteria for the soils was were based on an ALARA goal of a 15 mrem/y using an industrial scenario. Clean backfill was brought in and the entire area was graded and paved or covered with base course as the plans specified.

8.0 LESSONS LEARNED, CONCLUSIONS, AND RECOMMENDATIONS

The Scope of Work proved crucial for the contract and award. Although a decommissioning project is often laden with unexpected and unplanned findings, defining as much detail as possible is critical. Such definition will minimize the potential for claims.

Although this was a fixed price contract, project controls could have been enhanced if the Laboratory had required the contractor to submit a more detailed, logic-based schedule and to provide timely status and revisions of the schedule.

The project recorded no radiological incidents, health and safety accidents, or worker injuries primarily because of tight oversight of the contractor by Laboratory health physics and industrial safety personnel. Another reason for the good record was the use of the Site Specific Health and Safety Plan work package procedure. This document helped the project team identify hazards by doing task-hazard analysis on each task; create safe detailed procedures; obtain required permitting; and encourage communication among members of the field team. Worker input into procedures ensured efficient, and safe work packages. Also, daily safety tailgate meetings introduced and reinforced safety topics.

Another lesson learned was the importance of working closely with the ER Field Unit Leader, Allyn Pratt, and personnel of FU 4 (OU 1129). Any time excavation is planned as part of the scope of work, project leaders and team personnel must communicate on a frequency commensurate with the nature and amount of work being done. Communication ensured that the ER team collected soil samples as needed to document soil conditions and conduct cleanup activities as needed. Communication with the facility manager was also important to avoid impacting ongoing operations and to provide him with a good "as left" description of the facility.

9.0 REFERENCES

1. TA-35 Decommissioning Project, Los Alamos National Laboratory Implementation Plan Phases 2 through 5, August 1995, October 1996.

2. TA-35 D&D Project, Implementing Plans for Support of Phase I, Los Alamos National Laboratory, February 1995.

3. Operable Unit 1129 RFI Work Plan for Environmental Restoration, Los Alamos National Laboratory Report, LA-UR 92-800 (May 1992).

4. K-Division Staff, Los Alamos Power Reactor Experiment Number One (LAPRE-I), Los Alamos Scientific Laboratory report LA-2292 (January 1959).

5. D. P. King, The Los Alamos Power Reactor Experiment and Its Associated Hazards, Los Alamos Scientific Laboratory report LAMS-1611 (December 1953).

6. G. M. Montoya, Final Project Report TA-35 Los Alamos Power Reactor Experiment No. II (LAPRE-II) Decommissioning Project, Los Alamos National Laboratory report LA-12464 (February 1993).

7. Dennis Basile, The TA-35 D&D Project, Phase Separator Pit, Characterization Plan, Los Alamos National Laboratory (November 17, 1994).

8. Dennis Basile, The TA-35 D&D Project, Phase Separator Pit, Characterization Report Phase I, Los Alamos National Laboratory (August 1994).

9. Dennis Basile, The TA-35 Phase Separator Pit Decommissioning Project Characterization Report Phases II–V, Los Alamos National Laboratory (November 1994).

APPENDIX A

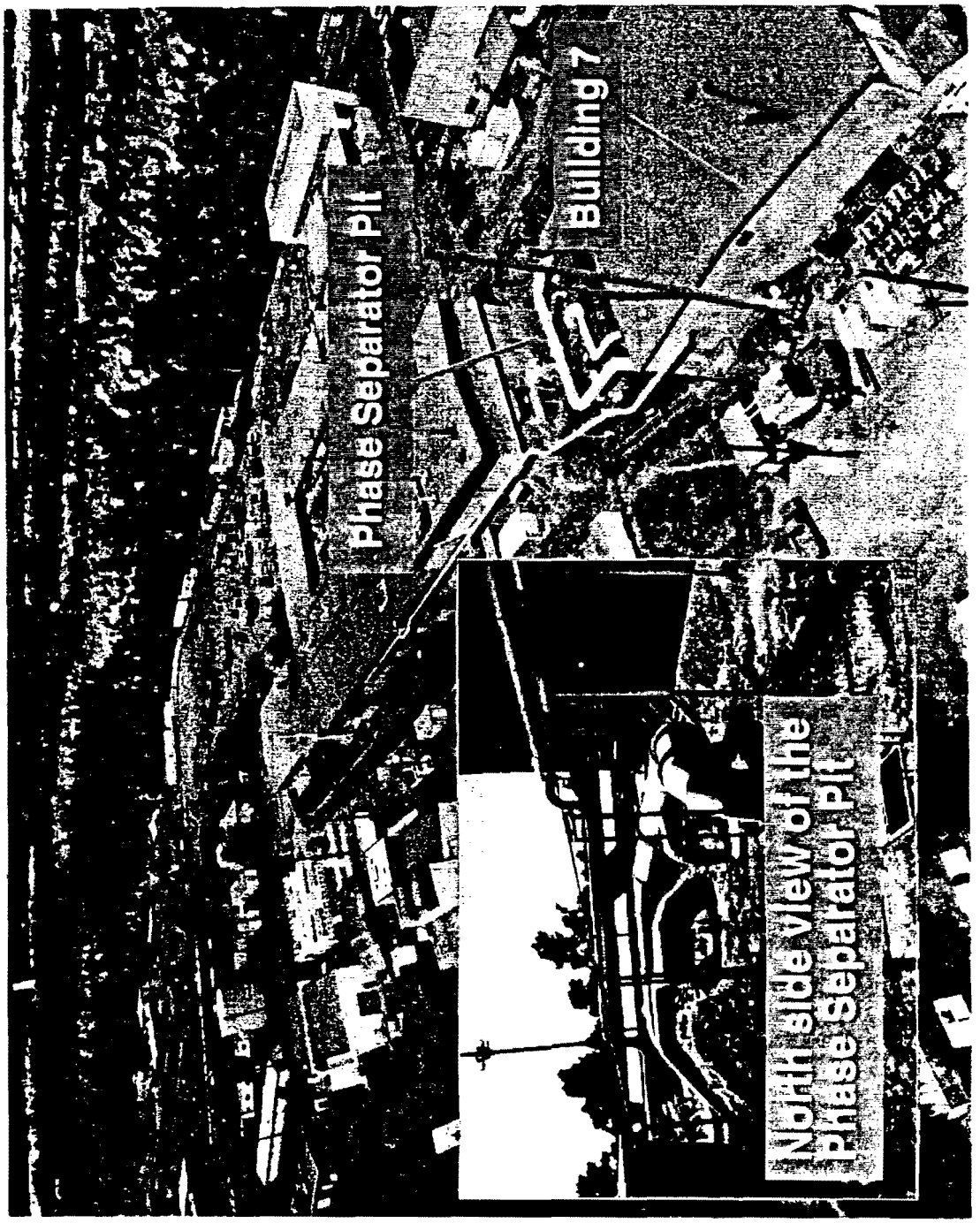
ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
ER	Environmental Restoration
ESH-1	Health Physics Operations Group
ESH-5	Industrial Hygiene and Safety Group
FSS-6	Field Operations Group
FU	Field Unit
FY	fiscal year
HEPA	high-efficiency particulate air
HVAC	heating, ventilation, and air conditioning
INEEL	Idaho National Engineering and Environmental Laboratory
JCI	Johnson Controls World Services, Inc.
LAPRE	Los Alamos Power Reactor Experiment
MDA	minimum detectable activity
NUREG	Nuclear Regulatory Commission
PPE	personal protective equipment
PSP	Phase separator pit
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RFI	RCRA Facility Investigation
RWP	Radiological Work Permit
TA	Technical Area
WBS	work breakdown structure
WERF	Waste Experimental Reduction Facility

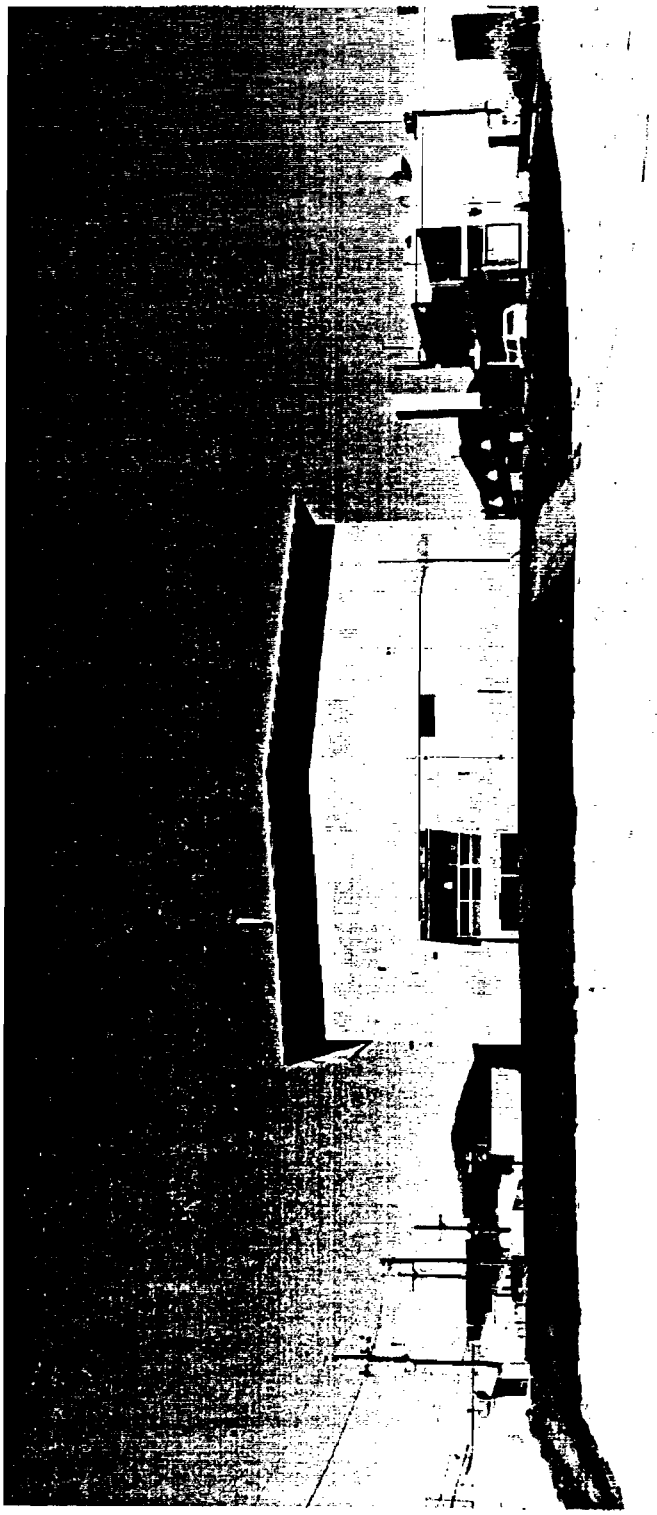
APPENDIX B

PHOTOGRAPHS



View of Phase Separator Pit and Building 7 prior to project

Site after removal of Phase Separator Pit



Completed site after removal of Phase Separator Pit and Building 7

APPENDIX C

CERTIFICATE OF COMPLETION