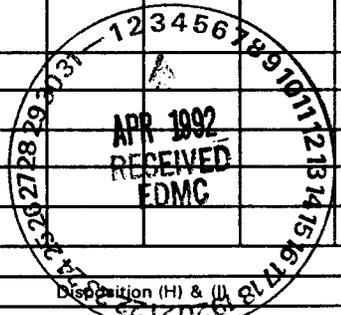


ENGINEERING DATA TRANSMITTAL

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Environmental Engineering	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: 80223	6. Cog. Engr.: DH DeFord	7. Purchase Order No.: N/A
8. Originator Remarks: EDT Copy is provided with photo's in black and white. Final copy will provide photo's in color.		9. Equip./Component No.: N/A
11. Receiver Remarks:		10. System/Bldg./Facility: Semi-works
		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: N/A

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-EN-019 <i>-ES- ^</i>		0	SEMI-WORKS AGGREGATE AREA MANAGEMENT STUDY TECHNICAL BASELINE REPORT	NA	1,2		



16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)											
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G)	(H)
1	1	Cog. Eng. DH DeFord	<i>[Signature]</i>	3/5/92	H4-55	EDMC	<i>[Signature]</i>			3	
1	1	Cog. Mgr. RP Henckel	<i>[Signature]</i>	3/5/92	H4-55	EDMC (2)	<i>[Signature]</i>	H4-22		3	
		QA									
		Safety									
		Env.									
4	1	RA Carlson	<i>[Signature]</i>	3/6/92	H4-55						

18. Signature of EDT Originator <i>[Signature]</i> Date: 3/5/92	19. Authorized Representative for Receiving Organization <i>[Signature]</i> Date: 3/5/92	20. Cognizant/Project Engineer's Manager <i>[Signature]</i> Date: 3/5/92	21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
---	--	--	--

INSTRUCTIONS FOR COMPLETION OF THE ENGINEERING DATA TRANSMITTAL

(USE BLACK INK OR TYPE)

BLOCK	TITLE	
(1)*	EDT	• Enter the assigned EDT number.
(2)	To: (Receiving Organization)	• Enter the individual's name, title of the organization, or entity (e.g., Distribution) that the EDT is being transmitted to.
(3)	From: (Originating Organization)	• Enter the title of the organization originating and transmitting the EDT.
(4)	Related EDT	• Enter EDT numbers which relate to the data being transmitted.
(5)*	Project/Program/Dept./Div.	• Enter the Project/Program/Department/Division title or Project/Program acronym or Project Number, Work Order Number or Organization Code.
(6)	Cognizant/Project Engineer	• Enter the name of the individual identified as being responsible for coordinating disposition of the EDT.
(7)	Purchase Order No.	• Enter related Purchase Order (P.O.) Number, if available.
(8)*	Originator Remarks	• Enter special or additional comments concerning transmittal, or "Key" retrieval words may be entered.
(9)	Equipment/Component No.	• Enter equipment/component number of affected item, if appropriate.
(10)	System/Bldg./Facility	• Enter appropriate system, building or facility number, if appropriate.
(11)	Receiver Remarks	• Enter special or additional comments concerning transmittal.
(12)	Major Assm. Dwg. No.	• Enter applicable drawing number of major assembly, if appropriate.
(13)	Permit/Permit Application No.	• Enter applicable permit or permit application number, if appropriate.
(14)	Required Response Date	• Enter the date a response is required from individuals identified in Block 17 (Signature/Distribution).
(15)*	Data Transmitted	
	(A)* Item Number	• Enter sequential number, beginning with 1, of the information listed on EDT.
	(B)* Document/Drawing No.	• Enter the unique identification number assigned to the document or drawing being transmitted.
	(C)* Sheet No.	• Enter the sheet number of the information being transmitted. If no sheet number, leave blank.
	(D)* Rev. No.	• Enter the revision number of the information being transmitted. If no revision number, leave blank.
	(E) Title or Description of Data Transmitted	• Enter the title of the document or drawing or a brief description of the subject if no title is identified.
	(F) Impact Level	• Enter the appropriate Impact Level (Block 15). Use NA for non-engineering documents.
	(G) Reason for Submittal	• Enter the appropriate code to identify the purpose of the data transmittal (see Block 16).
	(H) Originator Disposition	• Enter the appropriate disposition code (see Block 16).
	(I) Receiver Disposition	• Enter the appropriate disposition code (see Block 16).
(16)	Key	• Number codes used in completion of Blocks 15 (G), (H), and (I), and 17 (G), (H) (Signature/Distribution).
(17)	Signature/Distribution	
	(G) Reason	• Enter the code of the reason for transmittal (Block 16).
	(H) Disposition	• Enter the code for the disposition (Block 16).
	(J) Name	• Enter the signature of the individual completing the Disposition 17 (H) and the Transmittal.
	(L) Date	• Enter date signature is obtained.
	(M) MSIN	• Enter MSIN. Note: If Distribution Sheet is used, show entire distribution (including that indicated on Page 1 of the EDT) on the Distribution Sheet.
(18)	Signature of EDT Originator	• Enter the signature and date of the individual originating the EDT (entered prior to transmittal to Receiving Organization). If the EDT originator is the Cognizant/Project Engineer, sign both Blocks 17 and 18.
(19)	Authorized Representative for Receiving Organization	• Enter the signature and date of the individual identified by the Receiving Organization as authorized to approve disposition of the EDT and acceptance of the data transmitted, as applicable.
(20)*	Cognizant/Project Manager	• Enter the signature and date of the Cognizant/Project Engineer's manager. (This signature is authorization for release.)
(21)	DOE Approval	• Enter DOE approval (if required) by letter number and indicate DOE action.

*Asterisk denote the required minimum items checked by Configuration Documentation prior to release; these are the minimum release requirements.

COPY OF ORIGINAL

INFORMATION RELEASE REQUEST

References: WHC-CM-3-6

COMPLETE FOR ALL TYPES OF RELEASE

Purpose: <input checked="" type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape		<input type="checkbox"/> Reference <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Files <input type="checkbox"/> Software/Databases <input type="checkbox"/> Controlled Database <input type="checkbox"/> Other	New ID Number: WHC-SD-EN-ES-019, REV. 0 Existing ID Number (include revision, volume, etc.): If previously cleared, list ID number: Date Release Required: 3/9/92
---	--	--	--

Title: SEMIWORKS AGGREGATE AREA MANAGEMENT STUDY TECHNICAL BASELINE REPORT	Unclassified Category: UC-	Impact Level: 4
--	--------------------------------------	---------------------------

COMPLETE FOR SPEECH OR PRESENTATION

Title of Journal: NA	Group or Society Sponsoring: NA		
Date(s) of Conference or Meeting: NA	City/State: NA	Will proceedings be published? <input type="checkbox"/> Yes <input type="checkbox"/> No	Will material be handed out? <input type="checkbox"/> Yes <input type="checkbox"/> No
Title of Conference or Meeting: NA			

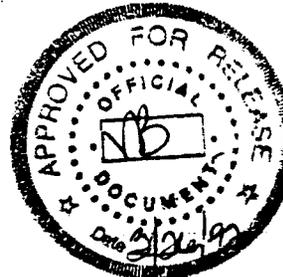
CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Patent - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. D. WILLIAMSON	<i>B. D. Williamson</i>	3/10/92
Legal - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. D. WILLIAMSON	<i>B. D. Williamson</i>	3/10/92
Applied Technology/Export Controlled Information or International Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
WHC Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Communications	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
DOE-RL Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Publication Services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	D. E. SMITH	<i>D. E. Smith</i>	3/26/92
Other Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
References Available to Intended Audience	<input checked="" type="checkbox"/>	<input type="checkbox"/>	D. H. DEFORD	<i>D. H. Deford</i>	3/2/92
Transmit to DOE-HQ/Office of Scientific and Technical Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature): D. H. DEFORD <i>D. H. Deford</i>	Date: 3/2/92
Responsible Manager (Printed/Signature): R. P. HENCKEL <i>R. P. Henckel</i>	Date: 3/5/92

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP
Stamp is required before release. Release is contingent upon resolution of mandatory comments.



Intended Audience:

Internal Sponsor External

Date Received: **3/5/92**

SUPPORTING DOCUMENT		1. Total Pages <i>122</i>
2. Title Semiworks Aggregate Area Management Study Technical Baseline Report	3. Number WHC-SD-EN-ES-019	4. Rev No. 0
5. Key Words Semiworks, decontamination, REDOX, aggregate	6. Author Name: <i>D. H. Deford</i> <i>Dennis Deford</i> Signature Organization/Charge Code 81223/PEGA1	
7. Abstract <i>WHC-SD-EN-ES-019 3/26/92</i>		
<p>8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.</p> <p>PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured; upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.</p> <p>DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p>		<p>10. RELEASE STAMP</p> <p><i>Sta. 21</i></p>
9. Impact Level 4		

CONTENTS

1.0 INTRODUCTION 1

2.0 BACKGROUND 1

 2.1 PLANT DESCRIPTION 1

 2.1.1 Historical Summary, Semi-works 3

 2.1.2 Semi-works Decontamination Efforts 3

 2.2 LIQUID WASTE HANDLING 15

 2.3 CHARACTER OF SEMI-WORKS LIQUID WASTE 16

 2.3.1 Character of Semi-works REDOX Pilot Project Waste 17

 2.3.2 Character of Semi-works PUREX Pilot Project Waste 18

3.0 200-SO-1 OPERABLE UNIT 19

 3.1 200 EAST AREA POWER HOUSE DITCH 19

 3.2 216-C-1 CRIB 20

 3.3 216-C-2 REVERSE WELL 21

 3.4 216-C-3 CRIB 22

 3.5 216-C-4 CRIB 22

 3.6 216-C-5 CRIB 23

 3.7 216-C-6 CRIB 24

 3.8 216-C-7 CRIB 24

 3.9 216-C-9 POND 25

 3.10 216-C-10 CRIB 26

 3.11 218-C-9 BURIAL GROUND 27

 3.12 241-CX-70 STORAGE TANK 28

 3.13 241-CX-71 STORAGE TANK 28

 3.14 241-CX-72 STORAGE TANK 32

 3.15 241-C-154 DIVERSION BOX 33

 3.16 SEMI-WORKS VALVE PIT 35

 3.17 CRITICAL MASS LABORATORY VALVE PIT 35

 3.18 2607-E-5 SEPTIC TANK 35

 3.19 2607-E-7A SEPTIC TANK 36

 3.20 TANK STORAGE AREA 36

 3.21 UN-200-E-36 UNPLANNED RELEASE 36

 3.22 UN-200-E-37 UNPLANNED RELEASE 37

 3.23 UN-200-E-98 UNPLANNED RELEASE 37

 3.24 UN-200-E-141 UNPLANNED RELEASE 38

4.0 REFERENCES 38

APPENDICES

A. PHOTOGRAPHS A-1

B. WIDS DATA SHEETS, WIDS HAZARD MATERIAL INVENTORY, AND
WIDS RADIONUCLIDE INVENTORY B-1

CONTENTS (cont)

FIGURES

1	Area Map of Operable Unit 200-SO-1	2
2	Plan View of 201-C Process Building and 271-C Aqueous Makeup and Control Building	4
3	Cross Section View of the 201-C Process Building	5
4	Cross Section View of the 201-C Process Building After Decommissioning	6
5	Strontium Semi-works Time Sequence	7
6	Semi-works Before Decommissioning	9
7	Semi-works After Decommissioning	10
8	Semi-works Ventilation System	13
9	241-CX-70 Storage Tank	29
10	241-CX-71 Storage Tank	31
11	241-CX-72 Storage Tank	34

TABLES

1	Radioactive Inventory Entombed at Semi-works	8
2	Estimated Quantity of Semi-works Chemicals Disposed	17
3	Estimated Semi-works Radionuclide Inventory	17
4	Knowledgeable Personnel	40

1.0 INTRODUCTION

This document is prepared in support of an Aggregate Area Management Study of Semi-works, 200 East Area, at the U.S. Department of Energy's (DOE) Hanford Site near Richland, Washington. It provides a technical baseline of the aggregate area and results from an environmental investigation undertaken by the Technical Baseline Section of the Environmental Engineering Group, Westinghouse Hanford Company. It is based on review and evaluation of numerous Hanford Site current and historical reports, drawings and photographs, supplemented with site inspections and employee interviews. No intrusive field investigations or sampling were conducted.

The Semi-works Aggregate Area is made up of a single operable unit (200-SO-1) and consists of liquid and solid waste disposal sites in the vicinity of, and related to, Semi-works and the Critical Mass Laboratory operations.

This report describes the Semi-works and Critical Mass Laboratory and associated waste sites, including cribs, french drains, septic tanks and drain fields, trenches and ditches, ponds, catch tanks, settling tanks, diversion boxes, underground tanks, and the lines and encasements that connect them. Each waste site in the aggregate area is described separately. Close relationships between waste units, such as overflow from one to another, are also discussed. Photographs are provided where available.

An environmental summary for this aggregate area is not provided here. An excellent summary may be found in *Hanford Site National Environmental Policy Act (NEPA) Characterization*, which describes geology and soils, meteorology, hydrology, land use, population, and air quality.

2.0 BACKGROUND

2.1 PLANT DESCRIPTION

Semi-works and the Critical Mass Laboratory are the central features and key operational facilities of the aggregate area and are, therefore, described here even though they are not subject to remediation as part of this aggregate area. Figure 1 depicts the general area of facilities discussed in this report.

Semi-works is sometimes referred to in documentation as the Hot Semi-works, Strontium Semi-works, or 200-C Area. It is located on about 5 acres of land in the 200 East Area of the Hanford Site in eastern Washington State.

The primary site component was a three-celled chemical processing building (201-C process building) shown in plan view and cross section in Figures 2 and 3. Figure 4 provides a cross section of the 201-C process building following decommissioning. The 201-C process building cells were constructed of concrete with 3- to 5-ft thick walls and 5-ft thick roofs. Pipe and sample galleries were made of structural steel, and transite siding flanked the aboveground portion of the cells. Other facilities, shown in Figure 1, were support facilities for the 201-C process building.

The majority of the Semi-works facilities have been demolished and removed. Soil and ash berm have been placed over the foundations.

2.1.1 Historical Summary, Semi-works

Semi-works was constructed in 1949 as a pilot plant for the reprocessing of reactor fuel using the REDOX process. During 1954, Semi-works was converted to a pilot plant for the PUREX process and continued in this capacity until shut down in 1956. As a pilot fuel reprocessing plant, reactor fuel was brought into Semi-works and dissolved. The plutonium was separated, decontaminated, loaded out, and shipped to another facility. High level waste streams were neutralized and routed to the 200 East Area Tank Farms.

After extensive cleaning and decontamination, the buildings were modified and put back into operation in 1961 for the recovery of strontium from fission product waste. Megacurie quantities of strontium were recovered, purified, and loaded into casks for shipment offsite. The facility was known as the Strontium Semi-works during this period. Semi-works was also used for the recovery of cerium, technetium, and promethium. It operated in this final mode until 1967.

Semi-works has remained inactive since 1967 and decommissioning began in 1983. Figure 5 provides a time sequence chart of the Semi-works facilities.

2.1.2 Semi-works Decommissioning Efforts

The stated objective of Semi-works decommissioning is to stabilize radioactivity in place. The decommissioning technique selected was partial dismantlement and entombment wherein aboveground structures would be dismantled and demolished while belowground voids were filled with a cement material. Underground pipelines were cut and blanked. Demolition wastes were disposed in the 218-C-9 burial ground.

All entombed facilities were to be covered with an engineered earthen barrier equivalent to 15 ft of clean soil and stabilized with vegetation. Only an initial layer of bottom ash from the 200 East Area powerplant has been put in place. Planned additional layers of rip rap and soil have been delayed due to the need to integrate *Comprehensive Environmental Response Compensation and Liability Act of 1980* (CERCLA) requirements into the decommissioning project.

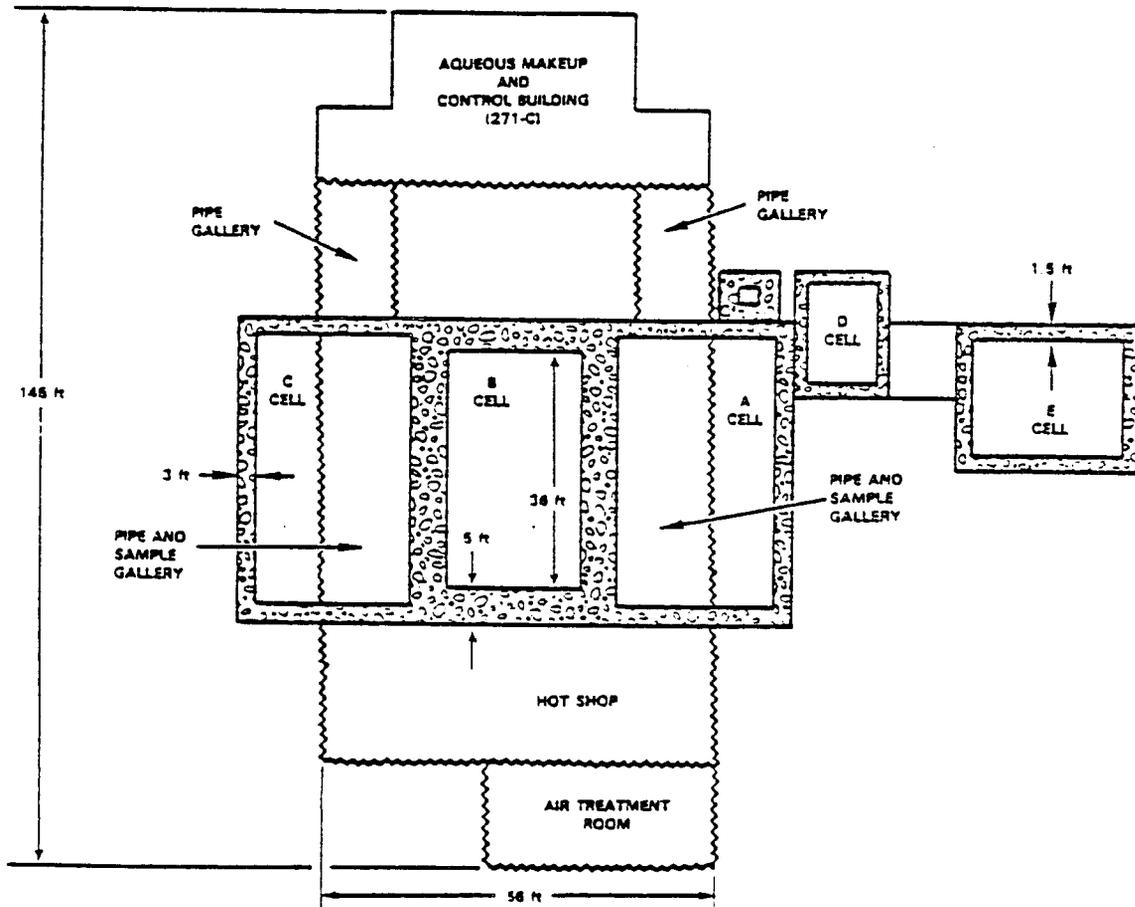


Figure 2. Plan View of 201-C Process Building and 271-C Aqueous Makeup and Control Building.

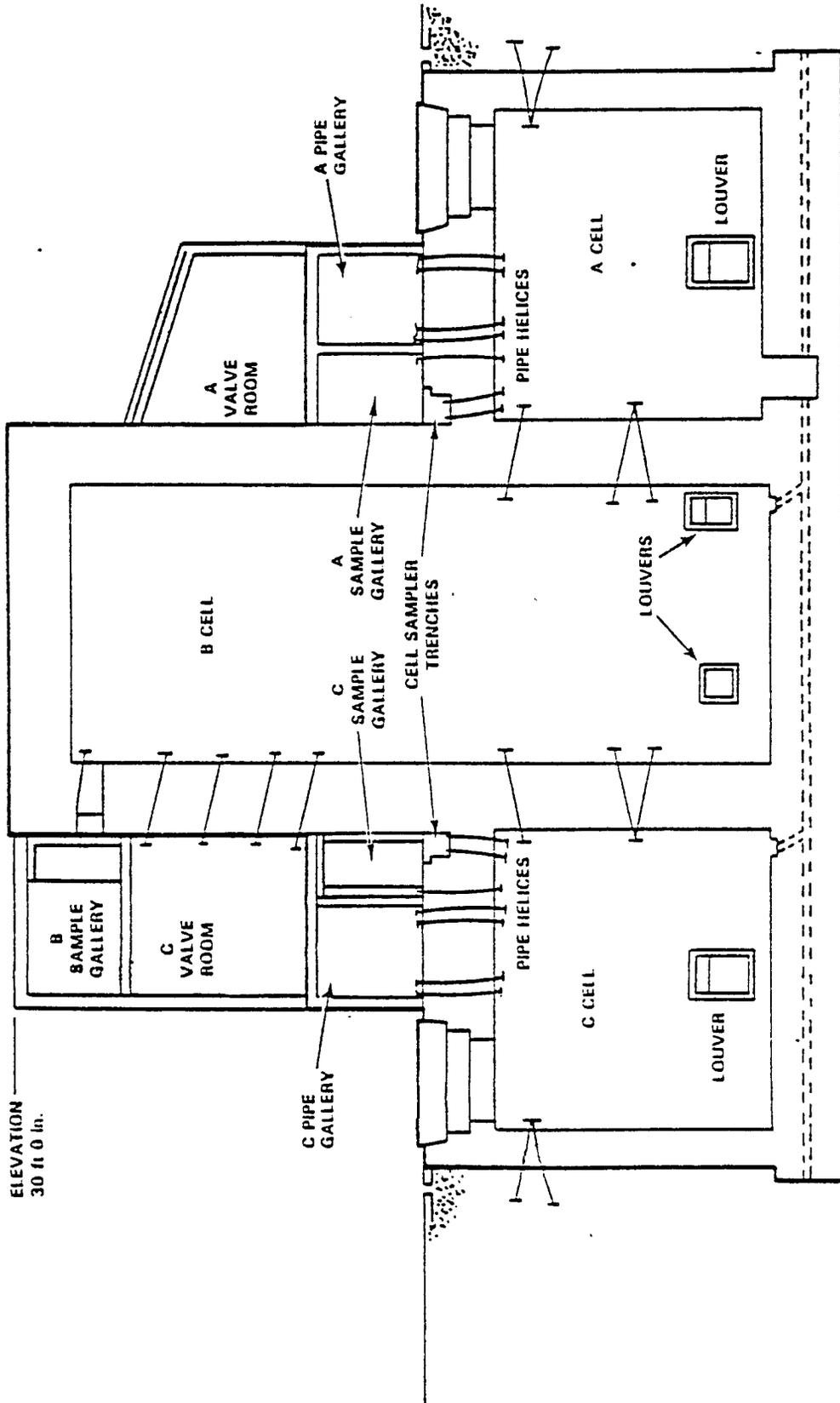


Figure 3. Cross Section View of the 201-C Process Building.

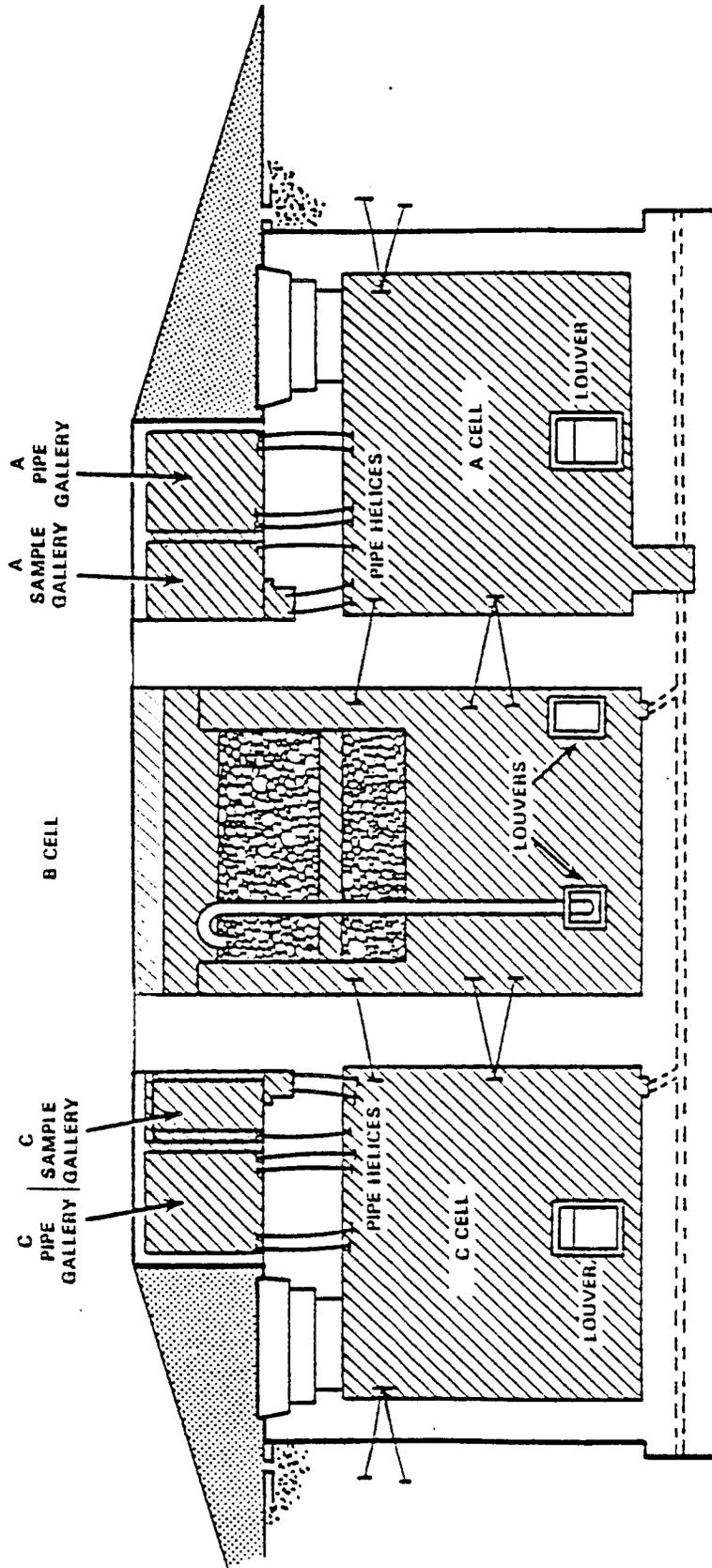
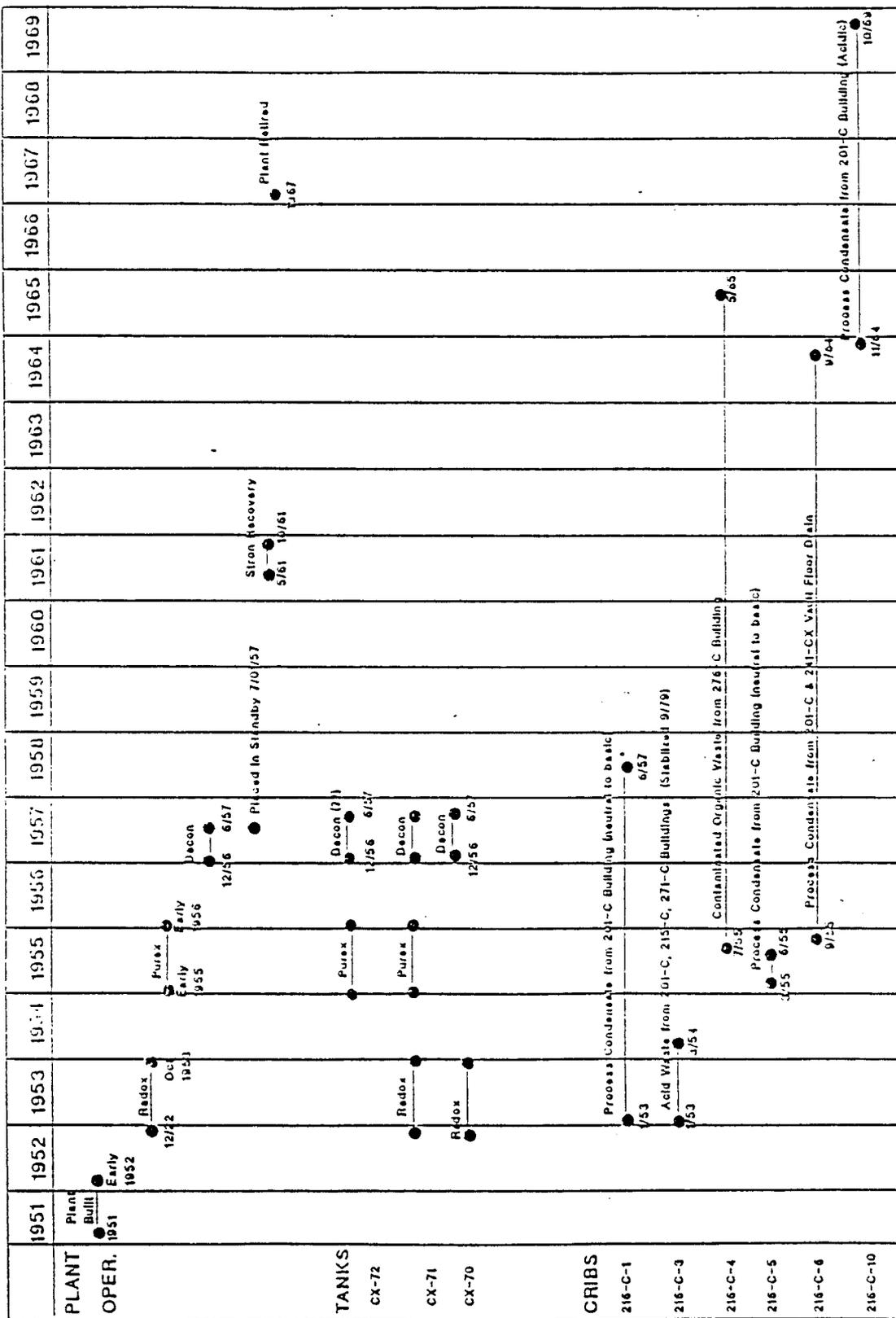


Figure 4. Cross Section View of the 201-C Process Building After Decommissioning.



(Cumings 1989)

Figure 5. Strontium Semi-works Time Sequence.

Three buildings were decontaminated and returned to use, including the 215-C gas preparation building, 2707-C change house, and the 276-C solvent handling facility.

Decommissioning of the following structures is complete and may be seen by comparing Figure 6 with Figure 7:

- 201-C process building
- Rerouting of 201-C process building site utilities
- 215-C gas preparation building
- 216-C-2 reverse well
- 271-C aqueous makeup building
- 291-C stack
- 291-C fan house, air tunnel, high-efficiency particulate air (HEPA) and fiberglass filters
- 2707-C change house.

It is estimated that at the end of 100 yr the inventory listed in Table 1 will remain entombed in Semi-works.

The following sections briefly describe Semi-works decommissioning efforts that have been completed.

2.1.2.1 215-C Gas Preparation Building. All equipment was removed from inside the 215 gas preparation building. The outside tanks were removed and all lines not providing services to the building were cut and capped. The building was decontaminated and is currently an uncontrolled facility used to store miscellaneous equipment. Before decontamination, inventory was estimated to include 6 Ci beta.

Table 1. Radioactive Inventory Entombed at Semi-works (DOE 1988).

Site	Alpha (Ci)	Beta (Ci)
201-C process building	-	9,000.0
215-C gas preparation building	-	6.0
271-C aqueous makeup building	-	45.0
276-C solvent handling building	1.0	10.0
291-C and C-1 Building and stack	.7	600.0
2707-C change house	-	.2
241-CX-70 storage tank	3.0	6,000.0
241-CX-71 storage tank	6.0	6,000.0
296-C-2 stack	-	4.4
Liquid waste disposal sites	.7	6,430.0

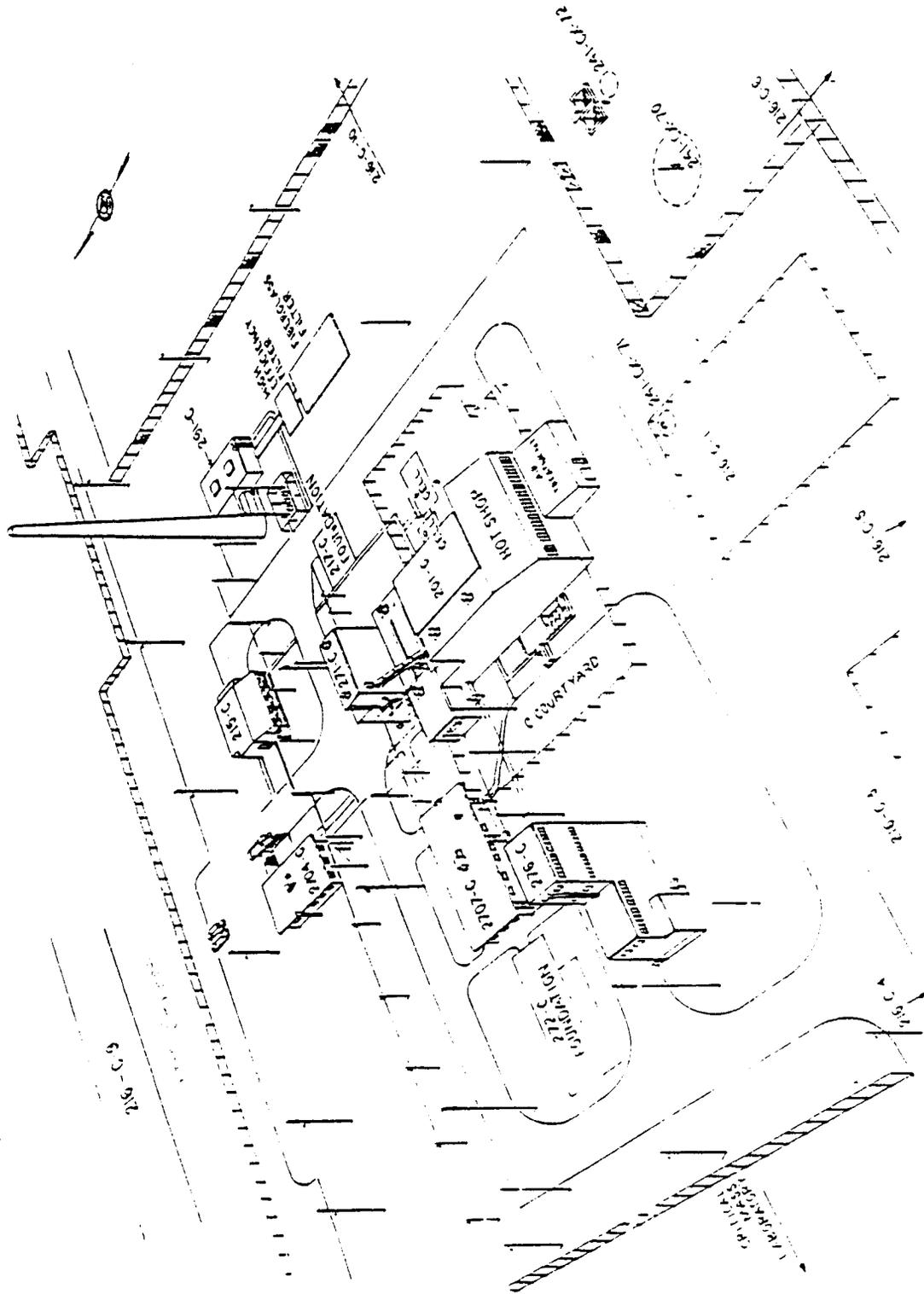


Figure 6. Semi-works Before Decommissioning.

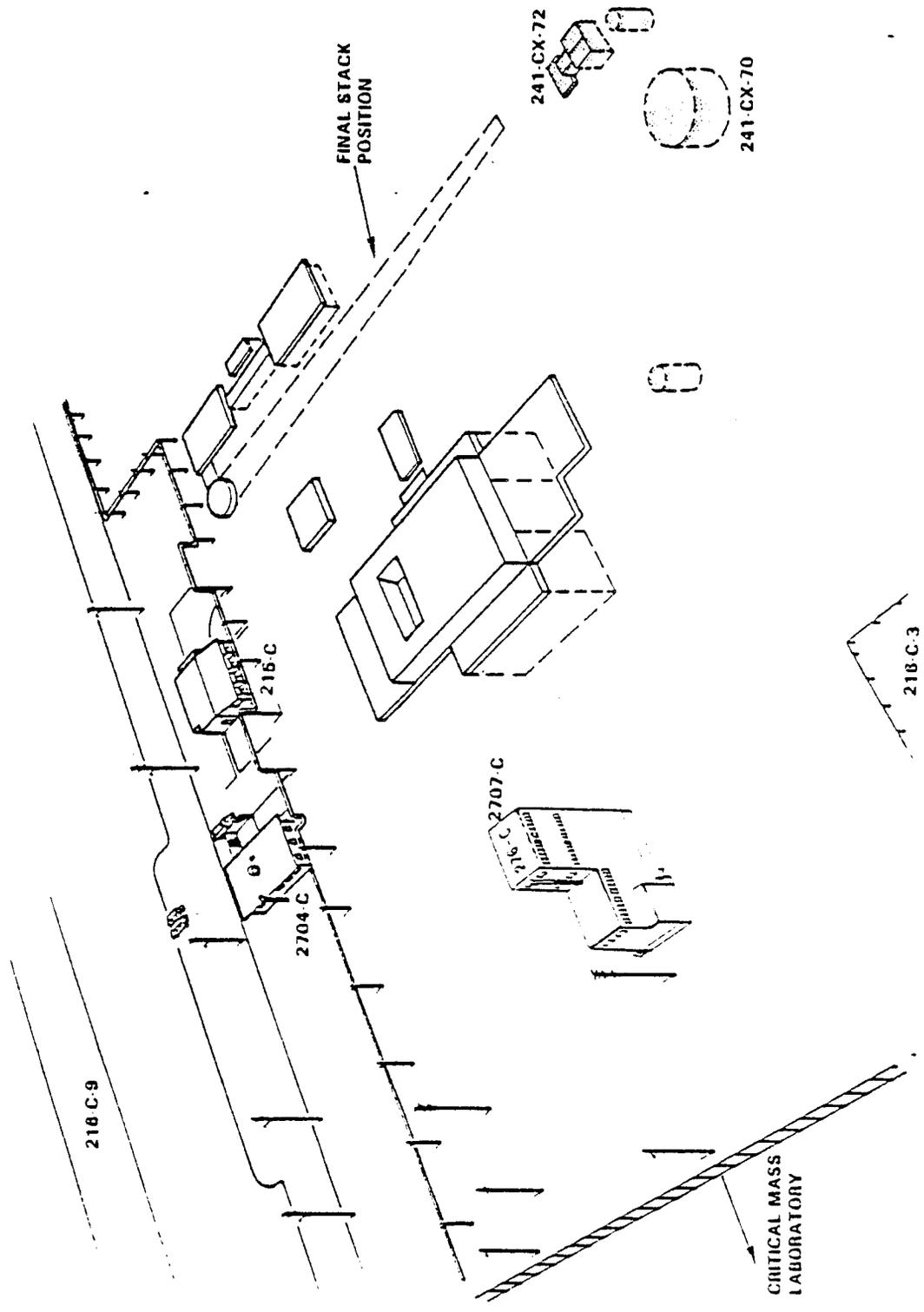


Figure 7. Semi-works After Decommissioning.

2.1.2.2 271-C Aqueous Makeup Building. Decommissioning and demolition was completed in 1987. This building was a three story, 3,200 ft² steel frame building on a concrete foundation. It was the main control center for 201-C process building operations and included an aqueous makeup area for 'cold' solutions. The building contained 26 tanks ranging from 20 to 800 gal, 13 pumps, piping and tubing, and control panels.

The control room was contaminated to 100,000 cpm beta-gamma with 70,000 cpm smearable. No significant contamination is reported on the second and third floors except for some filters in the second floor fan room (200 cpm). Prior to decommissioning, inventory was estimated to include 45 Ci beta.

The 271-C aqueous makeup building was dismantled by removing; 1) all piping and small equipment, 2) the outer walls, 3) the roof, superstructure, 4) large equipment, and 5) the floors. Contaminated portions of the structure were disposed in the 218-C-9 burial ground, immediately north of the Semi-works site. The uncontaminated portions were transported to the central landfill and the large tanks were removed for reuse.

The building foundation remains and is partially covered by the ash layer.

2.1.2.3 201-C Process Building. Decommissioning and demolition was completed in 1987. The 201-C process building was a three story, 9,375 ft² metal frame building on a concrete foundation with metal siding and a steel roof. The building consisted of three integrated cells (A, B, and C), seven process galleries, a gallery exhaust system, a hot shop, and an air treatment room. Two additional cells (D and E) were connected to the east side of the building.

Process equipment included 38 stainless steel tanks, 19 columns, 13 centrifugal pumps, and a large amount of primarily stainless steel process and service piping.

Significant alpha, beta, and gamma contamination existed in this structure. Before decommissioning, inventory was estimated at 10 Ci alpha and 9,000 Ci beta. The A, B, and C process cells were highly contaminated prior to decommissioning but decontamination efforts succeeded in removing much of it. The residual contamination was stabilized in situ by entombment.

Process cell tanks larger than 500 gal were sampled then filled with grout. The A, C, D, and E cells were completely filled with grout. B cell was decontaminated using chemical washes and filled to 5-ft abovegrade with concrete. The upper cell was further decontaminated via wet sandblasting then the walls were demolished and buried in the 218-C-9 burial ground.

Sample galleries, pipe galleries, and valve rooms associated with the process cells were dismantled to 10-ft abovegrade and filled with grout. The remainder of the 201-C process building was dismantled by removing: 1) all piping and small equipment, 2) the outer walls, 3) the roof, superstructure, large equipment, and 4) the floors. Contaminated portions of the structure were disposed in the 218-C-9 burial ground, immediately north of the Semi-works site, and uncontaminated portions were transported to the central landfill. The remaining portions of the building are partially covered by the ash barrier.

Approximately 2 1/2 tons of lead were entombed in this structure; 1 ton on the floor of A cell, and 1 1/2 tons of shielding lead in B cell and the A and C sample rooms. The concrete floor in A cell was rebuilt in 1957 because of high radiation levels resulting from spills. One quarter inch lead plates were placed on the floor over hot spots and covered with 2- to 5-in. high-density concrete. A 3/16-in. stainless steel floor was installed over this structure.

The inventory of radionuclides estimated to be entombed in the 201-C process building (DOE 1988) include:

- ²³⁹Pu 4.9 Ci
- ²³⁸Pu 3.7 Ci
- ²⁴¹Am 0.2 Ci
- ⁹⁰Sr 9,000.0 Ci.

2.1.2.4 291-C Ventilation System. The 291-C ventilation system is made up of the following seven interconnected facilities, as shown on Figure 8:

- Interconnecting exhaust duct
- Fiberglass filter housing
- HEPA filter unit 1
- HEPA filter unit 2
- 291-C fan house
- 291-C stack.

The radionuclide inventory of the ventilation system was located primarily in the fiberglass filters and HEPA filter unit 1. It is estimated to consist of 4.6 Ci alpha and 600 Ci beta-gamma contaminants. Transuranic (TRU) waste isotope activity of 0.11 terabequerel (2.93 Ci) was found in 40 cartridges of the deep bed fiberglass filter assembly. Isotopic composition based on measured relative alpha activities was used to establish the TRU content. A major fraction of the observed ambient neutron flux was attributable to ²⁴⁴Cm, a non-TRU radionuclide.

Contamination on the inside surfaces of the 291-C stack were characterized as 99% ⁹⁰Sr and ⁹⁰Y with traces of other fission products and TRU (Louie and Speer, 1989). Prior to decommissioning, the inventory was estimated to include 4.6 Ci alpha and 600 Ci beta.

The interconnecting air tunnel is 44 X 44 in. and about 200 ft long and varies between 5 and 20 ft below original grade. The air tunnel was excavated, holes were drilled in the upper surface and filled with grout. The fiberglass filter housing and HEPA filter unit 1 were also filled with grout. HEPA filter unit 2 and the 291-C fan house were dismantled and removed for disposal.

The 200-ft tall 291-C stack was decontaminated using remote sandblasting technology on the interior surfaces. The interior was then painted with a water-based latex paint to stabilize remaining contaminants and the stack was felled by explosives into a prepared trench. This trench runs south from the stack base. The stack rubble was further demolished to minimize void spaces and ash was used to fill the voids and cover the rubble.

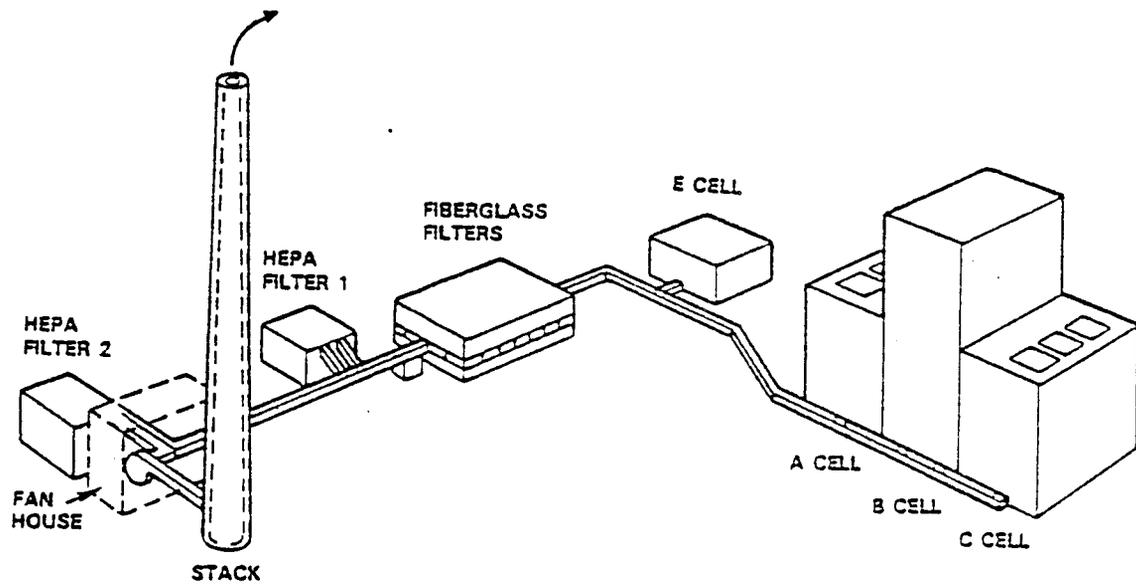


Figure 8. Semi-works Ventilation System.

2.1.2.5 2707-C Change House. This one story wood frame structure housed maintenance and instrument shops and hot and cold locker rooms with restrooms. The personnel decontamination room contained a shower and sink. The structure is estimated to have had an inventory of 0.2 Ci of beta-gamma isotopes.

Water and steam lines were isolated, transite siding was removed, and the 2707-C change house and its concrete slab were demolished. Contaminated drain lines were isolated and the site was backfilled and graded to match existing terrain.

2.1.2.6 276-C Solvent Handling Building. The 276-C solvent handling building contained equipment and tanks for the treatment and storage of process solvents used in 201-C process building operations. It is a four story, 2,300 ft², steel framed structure with metal siding. Its structural steel is covered with an asbestos material.

Prior to decommissioning, the 276-C solvent handling building had a maximum trace fission product contamination of less than 1 Ci of Pu and 20 Ci beta; this was mainly confined to the diluent vessel on the third floor and in the filter housing.

During 1984, the 276-C solvent handling building was partially decommissioned by removing all contaminated tanks and piping, and decontaminating all exposed surfaces. The 276-C solvent handling building was then returned to use for activities unrelated to Semi-works decommissioning.

2.1.2.7 Rerouting and Isolation of Utilities. Hanford Site drawings were reviewed to identify underground utilities and a complete radar/sonar pipe detection survey of the Semi-works site was conducted to locate any undocumented pipelines.

All pipelines to and from the portion of the Semi-works site to be covered by the engineered barrier were isolated by cutting and capping. Most were intercepted by excavating a section of the line, cutting out a length of pipe, and sealing both ends. Radioactive pipelines were filled by foam injection to contain contamination during cutting and sealing.

2.1.2.8 Critical Mass Laboratory. The Critical Mass Laboratory is immediately west of Semi-works. The laboratory operated in the 209-E Building from 1960 to 1983 conducting criticality experiments with plutonium nitrate and enriched uranium solutions. Criticality research was also conducted with solid special nuclear materials and fuels. The Critical Mass Laboratory averaged 15 such experiments per year with a maximum of 50 per year.

Currently, the Critical Mass Laboratory is closed but not decommissioned. No research has occurred since 1983, but the administrative offices have been used on occasion.

The Critical Mass Laboratory 209-E Building is an L-shaped concrete block structure. One wing houses offices, control room, shops, and common facilities. The other wing houses an equipment room, change room, laboratories, and a two story reactor hall. The reactor hall is heavily shielded. Additional information is provided in Section 3.8.

2.2 LIQUID WASTE HANDLING

Semi-works wastes were chemically and radiologically contaminated, but their disposition was accomplished in accordance with their radiological content. High level wastes were stored in underground tanks in the 200 East Area Tank Farms while intermediate level wastes were routed to underground cribs for disposal. Low level liquid wastes were routed to the 216-C-9 pond. Reverse wells were also used for low and intermediate level wastes but proved unsatisfactory due to plugging and impact on groundwater. Organic solvent bearing wastes were classified as intermediate level wastes and were disposed to the 216-C-4 crib.

Two types of cribs were utilized to support Semi-works operations. The first was an underground chamber that received liquid wastes in a box-like, open-bottomed structure made of wooden timbers. The second type was a drain field, or tile field that introduced liquid wastes to soil through many yards of perforated underground pipe.

The cribs rest in gravel beds to aid in rapid dispersion of liquid to soil. Heavy metals, such as uranium and plutonium, contained in liquid wastes tend to be filtered by the first few feet of soil and thus are effectively contained in the soils immediately beneath the cribs. Other isotopes are less effectively filtered and are drawn downward in the soil column. Drawing H-2-4037 for the 216-C-1 crib provides an example of a Semi-works crib.

Other low level liquid wastes were disposed to the soil through french drains. These are underground gravel-filled encasements, usually concrete or tile pipe, with open bottoms, generally used for disposal of small volumes of low level waste.

Trenches have been used at the Hanford Site for the disposal of high-salt waste or waste containing complex radionuclides. This aggregate area has one such trench but it was used to dispose uncontaminated water from the 200 East Power House.

Several methods were commonly used for transporting liquid waste across the Hanford Site, including ditches, underground and aboveground pipelines, and tanker trucks. Aboveground pipelines have been removed from all sites in this aggregate area. Underground lines and encasements remain in place and may be expected to be contaminated.

Process lines and encasements are not included in this aggregate area but are described here because they pass through (or are adjacent to) the area and could present a complication to any remedial steps that may be undertaken in the immediate vicinity.

Process lines, sometimes referred to on drawings as transfer lines or process sewer lines, connect the major Hanford Site process facilities with each other and with associated waste handling facilities. Most are 1- to 3-in. diameter stainless steel pipe with welded joints. Those that transport high level waste are enclosed in steel reinforced concrete encasements. Those encasements that pass adjacent to this aggregate area are belowgrade, some as deep as 15 ft. Drawing H-2-44500 shows the location of 200 East Area process lines. Drawings H-2-44501 provide greater detail and clearly identify

encasements. Drawing H-2-95501 shows the location of underground process lines in the Semi-works Aggregate Area.

Encasements are concrete fixtures designed to protect from one to seven buried process lines. Encasements vary in width, depending on the number of lines contained. The base portion is steel reinforced concrete. Separate channels are sometimes provided for each process line, and the lines are raised from the encasement bottom by steel spacers. Steel plate of various design was sealed in place over the process line channels to form a water tight seal. A steel reinforced concrete upper portion, or encasement lid, was then sealed in place to form a second water tight seal and further protect the process lines. Riser pipes were provided to allow sampling of the interior of the encasement for contamination that might result from process line leakage. Diversion stations located at the process facilities and tank farms permit routing of process fluids to the different lines.

Two unencased process lines run from Semi-works to the 241-C Tank Farm. One runs from the 201-C process building to the 241-C-252 diversion box and the other from the 201-C diversion box to the 244-CR vault. Both are 2-in. stainless steel and have been isolated by cutting and capping.

2.3 CHARACTER OF SEMI-WORKS LIQUID WASTE

Semi-works was a pilot facility for REDOX and PUREX Plant processes, as well as a radioisotope recovery facility. The same waste streams were generated at Semi-works as were generated at REDOX and PUREX, in addition to those waste streams peculiar to isotope recovery operations.

Cummings (1989) provides waste characterization for the Semi-works cribs, which includes the following inventory:

- Nitric acid
- Various metallic nitrates
- Tributyl phosphate
- Normal paraffin hydrocarbon (kerosene)
- Methyl isobutyl ketone (hexone)
- ^{90}Sr
- ^{60}Co
- ^{137}Cs
- $^{239/240}\text{Pu}$
- ^{238}U
- ^3H .

Tables 2 and 3 provide additional waste characterization for liquid wastes introduced to Semi-works cribs (Cummings 1989).

Table 2. Estimated Quantity of Semi-works Chemicals Disposed (kg).

Site	NO ₂	TBP	Kerosene	HNO ₃	Na	MIBK
216-C-1	0	0	0	15,000	0	NA ¹
216-C-3	0	0	0	NA	0	NA
216-C-4	0	14,000	24,000	0	0	NA
216-C-5	8,000	0	0	0	3,000	NA
216-C-6	330	0	0	0	0	NA
216-C10	0	0	0	600	0	NA
216-C-2	NA	NA	NA	NA	NA	NA

¹No information available.

Table 3. Estimated Semi-works Radionuclide Inventory (Ci¹). (Cummings 1989)

site	³ H	⁶⁰ Co	⁹⁰ Sr	¹³⁷ Cs	²³⁹ Pu	²⁴⁰ Pu	²³⁸ U
216-C-1	70.00	.0020	93.800	.0496	.4570	.1230	.0988
216-C-3	0	.0014	8.830	.0463	.0571	.0154	.0153
216-C-4	0	.0018	13.000	.0472	.0571	.0154	.0011
216-C-5	0	.0018	4.610	.0484	.0571	.0154	.0182
216-C-6	0	.0025	31.600	.0507	.0571	.0154	.00001
216-C10	0	.0113	37.800	.0932	.0086	.0023	.00001
216-C-2	NA ²	NA	NA	NA	NA	NA	NA

¹ = Decayed Through April 1986

² = No Information Available

2.3.1 Character of Semi-works REDOX Pilot Project Waste

The character of REDOX waste streams is described in Anderson (1990) and it may be assumed that Semi-works waste streams were essentially identical during this pilot project. Waste streams are described as follows:

- Coating Waste: Aluminum-clad fuels were declad in a boiling solution of sodium nitrate by adding 50% caustic. The resultant salt waste was sent to a tank separate from the high level waste and had a composition as follows:

- NaAlO ₂	1.2	M
- NaOH	1.0	M
- NaNO ₃	0.6	M
- NaNO ₂	0.9	M
- Na ₂ SiO ₃	0.02	M
- SpG	1.19	
- Pu	0.4%	
- U	0.4%	

- Zircaloy-clad fuels were declad in a boiling ammonium nitrate-ammonium fluoride mixture. The resulting coating solution was neutralized with 50% caustic. This solution contained up to 40% slurriable solids and had a composition as follows:

- $ZrO_3 \cdot 2H_2O$	0.1	M
- NaF	0.7	M
- $NaNO_3$	0.02	M
- KF	0.01	M
- U	0.001	lb/gal
- Pu	0.001	lb/gal
- Ph	10.0	

- REDOX waste was the high level component of the process waste. The composition varied, but the following is considered a nominal for all wasted designated REDOX and probably approximates that generated at Semi-works:

- $NaAlO_2$	1.2	M
- NaOH	0.69	M
- $NaNO_3$	4.83	M
- Na_2CrO_7	0.066	M
- $Na_2(SO_4)$	0.031	M
- $Fe(OH)_3$	0.016	M
- SpG	1.29	
- Pu	0.04	%
- U	0.05	%

2.3.2 Character of Semi-works PUREX Pilot Plant Project Waste

The character of PUREX waste streams is described by Anderson (1990) and it may be assumed that Semi-works waste streams were essentially identical during this pilot project. Waste streams are described as follows:

- Coating waste - Aluminum-clad fuels were declad in a boiling solution of sodium nitrate by adding 50% caustic. The waste composition was estimated to be as follows:

- $NaAlO_2$	1.2	M
- NaOH	1.0	M
- $NaNO_3$	0.6	M
- $NaNO_2$	0.9	M
- Na_2SiO_3	0.02	M
- SpG	1.19	
- Pu	0.4	%
- U	0.4	%

- Zircaloy-clad fuels were declad in a boiling ammonium nitrate-ammonia fluoride mixture. The resulting coating was neutralized with 50% caustic.

- $ZrO_2 \cdot 2H_2O$	0.1	M
- NaF	0.7	M
- $NaNO_3$	0.02	M

- KF 0.01 M
 - U 0.001 lb/gal
 - Pu 0.001 lb/gal
 - Ph 10.0
 - SpG 1.1
- Organic Wash Waste - The solvent used in PUREX was treated before reuse by washing with potassium permanganate and sodium carbonate, followed by dilute nitric acid and then a sodium carbonate wash. The organic waste streams were combined and sent to boiling waste.

- SpG 1.02
- NaNO₃ 0.04 M
- Na₂CO₃ 0.13 M
- MnO₂ 0.004 M
- U 0.0003 lb/gal

- Neutralized PUREX Plant Acid Waste - PUREX neutralized all of the high level waste and sent it to the 241-A Tank Farm. Semi-works would have sent it to the 241-C Tank Farm.

- Fe 0.4 M
- Na 1.4 M
- NO₃ 1.3 M
- SO₄ 0.9 M
- PO₄ 0.02 M
- Al 0.15 M.

3.0 200-SO-1 OPERABLE UNIT

The 200-SO-1 Operable Unit encompasses Semi-works and the Critical Mass Laboratory. The operable unit includes 27 waste sites, only 20 of which are included in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1991). These include decommissioned facilities, cribs, a reverse well, a pond and a ditch, tanks, a diversion box and a valve pit, a stack, a dry well, septic tanks, a solid waste burial ground, and four unplanned releases.

3.1 200 EAST AREA POWER HOUSE DITCH

The 200 East Area Power House Ditch is an active nonhazardous, nonradioactive liquid waste site that runs along the southern boundary of the Semi-works site. It is a 2,500-ft long open ditch that drains wastewater from the 200 East Area Power House.

Water is delivered to the ditch through a 42-in. concrete pipe that enters at its head end, at Hanford coordinates N41540 W50723. The ditch is shown on Hanford Drawing M-2904-E to have an 8-ft 8-in. bottom width, a 2 1/2 to 1 side slope, and a depth of 3 ft 8 in. A site visit discloses that its approximate dimensions are 20-ft bottom width, and a depth of 8 to 10 ft. The

200 East Area Power House Ditch bottom is covered with aquatic vegetation and grass and numerous tumbleweeds have collected along most of its length.

Water entering the ditch from the powerplant is characterized by the "284-E Powerplant Wastewater Stream-Specific Report". The process associated with the 284-E powerplant wastewater is steam production. In this process, purified water from the 283-E water treatment facility is heated in coal fired boilers to produce steam. During this process three major discharges of wastewater occur and are combined to make up the 284-E powerplant wastewater effluent. The largest discharge is associated with the purified water used to cool various components in the 284-E powerplant, which averages a flow rate of about 3,250,000 gal/mo (12,300,000 L/mo). The most concentrated single discharge in terms of dissolved solids is the waste brine solution used to regenerate the zeolite water softener columns in the plant. This waste is about 9 wt% sodium chloride. It contains other minor constituents that bring the total concentration of dissolved solids to almost 10 wt%. It has an average monthly flow rate of 300,000 (1,140,000 L/mo), although its source is a batch process. The remaining discharge comes from the blowdown of scale from inside the boilers. This discharge is about 100,000 gal/mo (378,000 L/mo). The discharge contains dissolved boiler scale and residual oxygen scavenging chemicals, the latter in very low concentrations. Ethylenediamine-tetraacetic acid is used as a scaling compound and sodium sulfite is used as an oxygen scavenging agent. Additional detail on powerplant wastewater is beyond the scope of this document but is provided by WHC (1990).

The ditch terminates at Hanford coordinates N41898 W48518 where it flows into a 30-in. corrugated metal pipe that carries wastes to the 216-B-3 Pond Complex.

No barriers or warning signs exist on the ditch.

3.2 216-C-1 CRIB

The 216-C-1 crib is an inactive liquid waste site located immediately south of the 201-C process building. It is a vault type crib constructed of 8 X 8 in. concrete ties, which was set at the bottom of a 17-ft deep excavation. The excavation was backfilled with gravel (3/4 in. minimum graduated rock) to the top of the crib structure, then covered with 2 ft of soil. This resulted in a 5-ft deep depression at the crib site, which remained until the site was stabilized in the mid 1980's.

The concrete crib measures 23 X 5.5 X 8 ft high and has a concrete roof slab. A 35-ft long, 8-in. diameter steel well casing extends vertically through the center of the crib from 4 ft above the structure to 25 ft below the structure. The bottom 5 ft of the casing are perforated. A 1/2 in. steel water level indicator pipe extends from 4 ft above the structure to a point about 4 ft below its roof. The portion of indicator pipe above the 216-C-1 crib is protected by a 4-in. steel pipe through which it passes (Hanford Drawing H-2-4037).

This crib received cold-run waste and process condensate from the 201-C process building from 1953 until 1957. It is characterized as high-salt and neutral basic and contained the following inventory (WIDS):

- ¹³⁷Cs 4.550e-002 Ci
- ¹⁰⁶Ru 1.890e-008 Ci
- ⁹⁰Sr 8.550e+001 Ci
- Pu 8.000e+000 g
- Alpha 4.910e-001 Ci
- Beta 1.730e+002 Ci
- U Gross 9.830e-002 Ci
- Nitric 15,000 kg
- Acid

Cummings 1989 provides additional waste characterization as follows:

- ³H 70.000 Ci
- ⁶⁰Co .002 Ci
- ⁹⁰Sr 93.800 Ci
- ¹³⁷Cs .0496 Ci
- ²³⁹Pu .4579 Ci
- ²⁴⁰Pu .1230 Ci
- ²³⁸U .0988 Ci

The crib site has been stabilized to the extent of filling in the depression above the crib. A 4-in. sand pad was laid above the crib and ureabor herbicide was applied. This was followed with 10-mil plastic sheeting, then 12 in. of sand, and finally, 4 in. of gravel (DOE/RL 1988). A gravel road leading to the 241-CX-70 storage tank decommissioning site runs across part of this crib site. Construction supplies and plywood boxes containing radioactive waste are stored on this site as well. No crib vent pipes are evident at the site.

Aliases for this crib include the 216-C crib.

3.3 216-C-2 REVERSE WELL

The 216-C-2 reverse well is a decommissioned liquid waste site located a few yards southeast of the southeast corner of the 291-C fan house at Hanford coordinates N42300 W50000. It is a 12-in. diameter steel pipe that extends downward for 40 ft, the bottom 25 ft of which are perforated.

The well operated from 1953 to 1988 to receive 291-C stack drainage through a 4-in. steel line and stack ventilation filter seal water drainage through a 2-in. line. Both lines were cut and capped and the well head sealed in concrete in 1988. The well was covered with 4 ft of ash barrier as part of Semi-works decommissioning effort. A permanent concrete monument identifies the site.

Waste to this site is characterized as low-salt and neutral basic and contains less than 1 Ci total beta activity (WIDS).

The well is described on Hanford Drawing H-2-4033. Aliases include the 219-C dry well and the 216-C-2 dry well.

3.4 216-C-3 CRIB

The 216-C-3 crib is an inactive liquid waste site located near the southwest corner of the Semi-works site at Hanford coordinates N42055 W50390 (center). It is a drain field type crib that received 5,000,000 L of liquid waste between 1953 and 1954.

The crib consisted of open jointed 4-in. drain tiles placed in a 16 in. deep gravel bed at the bottom of a 50 X 10 X 10 ft deep excavation. It was partially backfilled during use and completely backfilled when deactivated.

When deactivated, a 4-in. sand pad was laid above the crib and ureabor herbicide was applied. This was followed with 10-mil plastic sheeting, then 12 in. of sand and, finally, 4 in. of gravel (DOE/RL 1988). A gravel road leading to the 241-CX-70 storage tank decommissioning site runs across part of this crib site. The crib is described in Hanford Drawing H-2-4034.

Waste is characterized as acid waste from the 201-C process building, 215-C gas preparation building, and 271-C aqueous makeup building and includes the following inventory (WIDS):

- ^{137}Cs 4.240e-002 Ci
- ^{106}Ru 8.300e-011 Ci
- ^{90}Sr 8.040e+000 Ci
- Pu 1.000e+000 g
- Alpha 6.140e-002 Ci
- Beta 1.620e+001 Ci
- U Gross 1.510e-002 Ci
- Nitrate 20.0 kg

Currently, this site appears as a poorly defined waste site with no chain barrier unique to the crib. The site is within a radiologically controlled area that is delineated by barriers and warning signs. The surface is sand and gravel with little vegetation. A permanent concrete monument marks its location. The crib is partially covered by a gravel road leading to the 241-CX-71 storage tank decommissioning site and greenhouse. Plywood boxes containing radioactive waste from a tank decommissioning project are stored within this barricade (Site visit by author).

3.5 216-C-4 CRIB

The 216-C-4 crib is an inactive liquid waste site located in the southwest corner of Semi-works at Hanford coordinates N42060 W50430 (center). It is a drain field type crib that received 170,000 L of radiologically contaminated organic waste from the 276-C solvent handling building between 1955 and 1965.

It is constructed of about 46-ft of 6-in. galvanized, corrugated, perforated steel pipe. The pipe is arranged in two 20 ft lengths connected by a 6 ft connecting pipe to form an H shape. The pipe is buried about 12 ft belowgrade in a 5-ft deep bed of gravel. Two layers of substitute tar paper separate the gravel bed from backfill. The crib is described in Hanford Drawing H-2-4425.

When deactivated, a 4-in. sand pad was laid above the crib and ureabor herbicide was applied. This was followed with 10-mil plastic sheeting, then 12 in. of sand and, finally, 4 in. of gravel (DOE/RL 1988).

Liquid waste is characterized as low-salt and neutral/basic and includes the following inventory (WIDS):

- ¹³⁷Cs 4.330e-002 Ci
- ¹⁰⁶Ru 5.350e-010 Ci
- ⁹⁰Sr 1.180e+001 Ci
- Pu 1.000e+000 g
- Alpha 6.140e-002 Ci
- Beta 2.380e+001 Ci
- U Gross 1.130e-003 Ci
- Normal Paraffin Hydrocarbons 24,000 kg
- Tributyl Phosphate 14,000 kg

Currently, the site appears as a flat surface covered with gravel and is free of vegetation. Two metal 3-in. (approximate) pipes extend abovegrade from the crib area. The site is located between the outer two Critical Mass Laboratory security fences.

3.6 216-C-5 CRIB

The 216-C-5 crib is an inactive liquid waste site located a few yards south of the 216-C-3 crib at Hanford coordinates N42030 W50360 (center). The crib is a drain field type crib that received 37,900 L of high-salt and cold run waste from the 201-C process building between March and June 1955.

This crib is essentially identical to the 216-C-4 crib and is constructed of about 46 ft of 6-in. galvanized, corrugated, perforated steel pipe. The pipe is arranged in two 20 ft lengths connected by a 6 ft connecting pipe to form an H shape. The pipe is buried about 12 ft belowgrade in a 5-ft deep bed of gravel. Two layers of substitute tar paper separate the gravel bed from backfill. The crib is described in Hanford Drawing H-2-4425.

When deactivated, a 4-in. sand pad was laid above the crib and ureabor herbicide was applied. This was followed with 10-mil plastic sheeting, then 12 in. of sand and, finally, 4 in. of gravel (DOE-RL 1988).

Liquid waste is characterized as high-salt and cold run wastes and includes the following inventory (WIDS):

- ¹³⁷Cs 4.440e-002 Ci
- ¹⁰⁶Ru 1.380e-010 Ci
- ⁹⁰Sr 4.200e+000 Ci
- Pu 1.000e+000 g
- Alpha 6.140e-002 Ci
- Beta 8.510e+001 Ci
- U Gross 1.810e-002 Ci
- Nitrate 8,000 kg
- Sodium 3,000 kg.

Currently, the crib site appears as a flat surface covered with a fresh layer of 12 to 20 in. soil with no vegetation growing. A lightweight chain fence with underground contamination warning signs protects the crib. No vents are evident abovegrade.

3.7 216-C-6 CRIB

The 216-C-6 crib is an inactive liquid waste site located in the southeast corner of Semi-works at Hanford coordinates N42015 W50066 (center). It is a drain field type crib that received 530,000 L of process condensate from the 201-C process building and 241-CX vault floor drainage between 1955 and 1964.

This crib is essentially identical to the 216-C-4 and C-5 cribs. It is constructed of about 46 ft of 6-in. galvanized, corrugated, perforated steel pipe. The pipe is arranged in two 20 ft lengths connected by a 6-ft connecting pipe to form an H shape. The pipe is buried about 12 ft belowgrade in a 5-ft deep bed of gravel. Two layers of substitute tar paper separate the gravel bed from backfill. The crib is described in Hanford Drawing H-2-4425.

Liquid waste is characterized as acidic and contains the following inventory (WIDS):

- ¹³⁷Cs 4.650e-002 Ci
- ¹⁰⁶Ru 2.730e-008 Ci
- ⁹⁰Sr 2.880e+001 Ci
- Pu 1.000e-001 g
- Alpha 6.140e-003 Ci
- Beta 5.810e+001 Ci
- U Gross 1.510e-005 Ci
- Nitrate 330 kg

Currently, the crib appears as a poorly defined waste site with no chain barrier unique to the crib. The site is within a surface contamination zone that is delineated by barriers and warning signs. Its surface is sand and gravel with little vegetation. Four 4-in. galvanized steel vent pipes are evident. A permanent concrete monument marks its location. The crib is partially covered by a gravel road leading to the 241-CX-72 storage tank decommissioning site and greenhouse.

This site is also known as the 241-CX crib.

3.8 216-C-7 CRIB

The 216-C-7 crib is an active liquid waste site located 50 ft south of the 209-E Building Critical Mass Laboratory at Hanford coordinates N42000 W50672 (center). It is a drain field type crib that received 60,100 L of liquid waste from the laboratory between 1961 and 1987. The crib is classified as active even though the Critical Mass Laboratory is inactive and no plans exist for future operation.

The crib is constructed of about 55 ft of 6-in. diameter, perforated vitrified clay pipe (VCP) buried in a 5-ft deep gravel bed at the bottom of a

12-ft deep excavation. The gravel bed and backfill are separated by a 6-mil polyethylene barrier. The 6-in. VCP pipe is arranged in two parallel 20 ft lengths and a 15-ft cross pipe to form an H shape. Four 6-in. VCP vent pipes extend from the tips of the H to a point 36 in. abovegrade. Each is capped with a metal vent filter (Hanford Drawing H-2-44336).

Liquid waste is characterized as acidic and contains the following inventory (WIDS):

- ¹³⁷Cs 5.340e-002 Ci
- ¹⁰⁶Ru 1.060e-008 Ci
- ⁹⁰Sr 5.120e-002 Ci
- Pu 1.100e+000 g
- Alpha 6.770e-002 Ci
- Beta 2.130e-001 Ci
- U Gross 3.330e-005 Ci
- Nitrate 1.00 kg

The waste is further characterized by Neilsen (1990) as reflector tank water. Two sources fed the reflector tank water waste stream. These are two neutron reflector tanks (320 and 600 gal) in the Critical Mass Laboratory critical assembly room that were used in up to 50 criticality experiments per year.

Each of the tanks is rectangular and holds smaller critical mass tanks that contained nitric acid solutions of plutonium and/or uranium. These solutions sometimes contained small amounts of neutron poisons such as boron, cadmium, and gadolinium. The interstitial space between the critical mass tanks and the reflector tanks was filled with water during critical mass experiments. This water acted as a neutron shield and reflector and was sampled and drained to the 216-C-7 crib following experiments. Extensive waste characterization data was developed from these samples, which is beyond the scope of this report, but is presented in the reference (Neilsen 1990).

Currently, the crib appears as a flat surface covered with sand and gravel with no vegetation growing and it is protected by a lightweight chain fence with underground contamination warning signs. Four metal vents with vent covers extend about 36-in. abovegrade. A permanent concrete monument identifies the crib (site visit by author).

3.9 216-C-9 POND

The 216-C-9 pond is an inactive liquid waste site located immediately north of Semi-works. It was an 800 X 100 ft pond with a nominal water depth of 8 ft. The pond rested in a 25 ft deep excavation.

The 216-C-9 pond received 1,030,000,000 L of process cooling water and miscellaneous wastewaters from the 201-C process building, 215-C gas preparation building, 271-C aqueous makeup building, 276-C solvent handling building, and the 209-E Critical Mass Laboratory between 1957 and 1985. Most wastes came from the Semi-works, which became inactive in 1967, and by 1985 the pond had diminished to a mere marshy spot in the excavation bottom. A survey identified no contamination around the perimeter of the diminished pond.

The site was backfilled with 3 ft of gravel and was converted in 1985 to a solid waste burial ground. See 218-C-9 burial ground.

The following inventory is provided for the pond and excludes any inventory added after conversion of the site to a solid waste burial ground (WIDS).

- ¹³⁷Cs 7.030e-001 Ci
- ¹⁰⁶Ru 8.660e-008 Ci
- ⁹⁰Sr 2.430e+000 Ci
- Pu 3.380e-001 g
- Alpha 2.080e-002 Ci
- Beta 6.230e+000 Ci
- U Gross 3.050e-004 Ci

A concrete diversion box associated with the 216-C-9 pond was located between 7th Street and the pond. It is not visible today but may remain in place beneath the existing ash and gravel layer. It is described on Hanford Drawing H-2-4606.

Currently, the pond site appears as a flat surface covered with ash and gravel with little vegetation. It is surrounded by a lightweight chain fence with underground contamination warning signs. No permanent concrete monument is visible.

3.10 216-C-10 CRIB

The 216-C-10 crib is an inactive liquid waste site located east of Semi-works complex at Hanford coordinates N42100 W49870 (center). It is a drainfield type crib that received 897,000 L of process condensate and liquid waste from the 201-C process building from 1964 to 1969.

The 216-C-10 crib is constructed of a 32-ft long perforated 3-in. stainless steel pipe, which is placed in a 4-ft deep gravel bed at the bottom of a 7-ft deep, backfilled excavation. The 3-in. distribution pipe is about 4 ft belowgrade. A 12-in. VCP vent extends from the end of the distribution pipe to a point about 5 ft abovegrade. An 8-in. VCP gage well extends from the bottom of the crib to about 2.5-ft abovegrade. Hanford Drawing H-2-4540 describes the site.

Recent surveillance has identified surface contamination reading 30,000 dpm on the surface of the crib.

Waste fluids are characterized as acidic and contain the following inventory (WIDS):

- ¹³⁷Cs 8.550e-002 Ci
- ¹⁰⁶Ru 8.950e-008 Ci
- ⁹⁰Sr 3.450e+001 Ci
- Pu 1.500e-001 g
- Alpha 9.210e-003 Ci
- Beta 6.910e+001 Ci
- U Gross 1.510e-005 Ci

Well 27-5 monitors this waste site and tests indicate that breakthrough to groundwater has not occurred.

Currently, the crib appears as a flat surface covered with sand and gravel with little vegetation growing on it. It is protected by a lightweight chain barricade and underground contamination warning signs. Surface contamination flags are evident inside the barrier. Two clay pipes extend abovegrade.

3.11 218-C-9 BURIAL GROUND

The 218-C-9 burial ground is an inactive waste site located immediately north of 7th Street, just across from Semi-works and the Critical Mass Laboratory. The 218-C-9 burial ground received 2,265 m³ of Semi-works decommissioning rubble between 1985 and 1989.

The 218-C-9 burial ground is 283 X 283 X 22 ft deep and is located on the site of the 216-C-9 pond at Hanford coordinates N42473 W50108 (northwest corner). The 216-C-9 pond had essentially dried up by 1985 and was stabilized with 3 ft of fresh gravel. This then became the site of the 218-C-9 burial ground.

The 218-C-9 burial ground was filled in and covered with a 3-ft layer of bottom ash from the 200 East Area Powerplant at the same time that the ash barrier was placed on Semi-works.

Wastes placed in the 218-C-9 burial ground are characterized as rubble associated with the decommissioning of various Semi-works buildings and the following inventory is in addition to that reported for the 216-C-9 pond (WIDS):

- ¹³⁷Cs 8.123e+000 Ci
- ¹⁵⁴Eu 1.016e-006 Ci
- ¹⁰⁶Ru 5.423e-006 Ci
- ⁹⁰Sr 1.311e+001 Ci
- Pu 1.000e-004 g

Currently, the site appears as a flat surface covered with ash and gravel with little vegetation. It is surrounded by a lightweight chain fence with underground contamination warning signs. No permanent concrete monument is visible. This is also the site of the 216-C-9 pond. The site is defined on Hanford Drawings H-2-44501, Sheets 93 and 94.

Immediately north of the west end of the burial ground is a large metal tank. It is approximately 40 ft in diameter and 12 ft high and rests on a concrete foundation. It is about half filled with soil and has no radiation warning signs associated with it.

Aliases for this site include the Dry Waste No.0C9 and, if referring to the pond previously located at this site, the 216-C-9 pond or swamp.

3.12 241-CX-70 STORAGE TANK

The 241-CX-70 storage tank is located south of the 201-C process building at Hanford coordinates N42100 W50200. The 241-CX-70 storage tank operated from 1952 to 1957 to store high level process waste in support of Semi-works processes.

The 241-CX-70 storage tank (Figure 9) is a 30,000-gal storage tank located approximately 11 ft belowgrade. It is constructed of 1/4 in. stainless steel plate inside of a poured concrete covering. The concrete is 1 ft thick on the top and sides of the tank, with the bottom thickness varying from 2 ft at the edges to 9 in. at the center of the tank. Two fill pipes entering the side of the tank near the top have been blanked off. Nine risers extend out of the tank to abovegrade.

The 241-CX-70 storage tank was built in 1952 to store high level process waste. The liquid inventory was pumped out of the tank in 1979, leaving approximately 10,300 gal of sludge remaining in the tank.

The 241-CX-70 storage tank is being decommissioned as part of the Semi-works decommissioning project, which began in 1984. An Environmental Assessment (DOE/EA-0259) for the project was prepared and a finding of "no significant impact" was issued by the DOE in 1985. The Environmental Assessment listed the waste contents of the tank as 3 Ci of alpha emitters and 6,000 Ci of beta emitters. The Environmental Assessment finding of no significant impact was based on the waste inventory in the tank being removed "as far as practicable" (Cummings 1988).

The 241-CX-70 storage tank waste removal activities were initiated in the summer of 1987 with the construction of a sluicing/pumping system designed to loosen and dissolve the waste sludge and pump it via the 241-CR vault to a double-shell tank in the 200 East Area Tank Farms. Decommissioning is ongoing. Waste materials have been removed from the tank and decontamination activities are underway.

Currently, the site appears as a plywood structure constructed over the tank decommissioning site. A wood and sheet plastic greenhouse has been constructed over the tank inside the plywood structure. Contaminated wastes have been placed in steel barrels that are stored, temporarily in a metal storage unit immediately south of the decommissioning site. These will eventually be buried in 200 West Area Burial Grounds. Before waste removal, the tank inventory was estimated to be 3 Ci alpha and 5,000 Ci beta.

Detailed characterization of the wastes contained in the tank are beyond the scope of this document and are available in Cummings (1988).

3.13 241-CX-71 STORAGE TANK

The 241-CX-71 storage tank is an inactive liquid waste neutralization tank located south of the 201-C process building at Hanford coordinates N42107 W50914. It operated from 1952 until 1957 to neutralize 201-C process building process and decontamination wastes and for Hot Shop sink wastes. This waste site is not listed in the Tri-Party Agreement (Ecology et al. 1989).

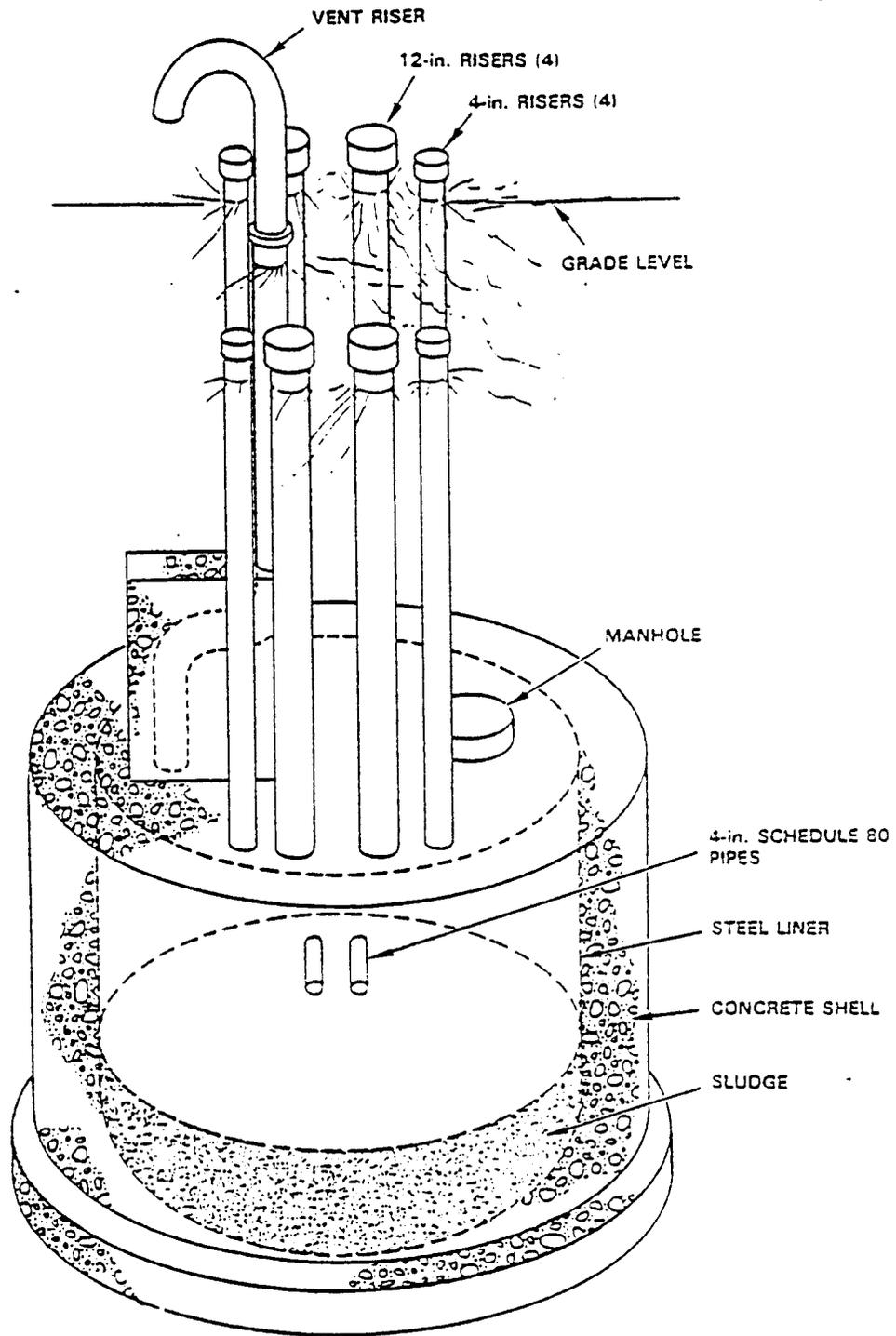


Figure 9. 241-CX-70 Storage Tank.

The 9 ft diameter X 9 ft tank is constructed of stainless steel. Two risers extend abovegrade (Figure 10). It is thought to be partially filled with crushed limestone used to neutralize 201-C process building acidic wastes that passed through the tank on the way to the 216-C-1 crib. The limestone was dissolved by the acidic waste and fresh limestone was periodically added as needed. WIDS estimates that the tank contains about 2,300 gal of solids (primarily limestone) and about 1,500 gal of water.

The 241-CX-71 storage tank void and risers were filled with low-density grout in 1986 in an early decommissioning effort. All lines to the tank have been cut and blanked. Further decommissioning is planned.

The 241-CX-71 storage tank was used during REDOX and PUREX pilot operations and for the decontamination flushes following completion of the PUREX operations. REDOX processes used a solvent extraction process to remove plutonium and uranium from dissolved fuels into a hexone solvent. Waste streams from the REDOX process were slightly acidic and contained fission products and large volumes of aluminum nitrate. The waste inventory is estimated at 6 Ci alpha and 6,000 Ci beta.

The PUREX process used TBP and kerosene solvent and its process condensates contained predominantly dilute nitric acid and other inorganic contaminants. Decontamination wastes included Turco 4182A (a tradename of Turco Products, Inc.) and Oakite #31 (a tradename of Oakite Products, Inc.). Chemical composition of these solvents is provided in Cummings (1989).

Cummings (1989) cautions researchers that because of the great length of time that the 241-CX-71 storage tank has been in existence and the nature of historical record keeping practices and resultant conflicting information, the accuracy of some of the information obtained from historical documentation is highly suspect. Although not necessarily true for the 241-CX-71 storage tank, the capacities and physical description of other tanks in the same document sources were highly inaccurate. In addition to the original historical inaccuracy, there was a tendency over the years to assume that a documented statement was accurate and, therefore, the same erroneous statement was repeated in subsequent documents.

Cummings also provides an indication of waste inventory received by the tank as follows:

- Although no historically reliable documentation of radionuclide inventory in the tank is available, there is radionuclide information on the associated 216-C-1 crib as follows:

- ³ H	70.000	Ci
- ⁶⁰ Co	.002	Ci
- ⁹⁰ Sr	93.800	Ci
- ¹³⁷ Cs	.0496	Ci
- ²³⁹ Pu	.4579	Ci
- ²⁴⁰ Pu	.1230	Ci
- ²³⁸ U	.0988	Ci

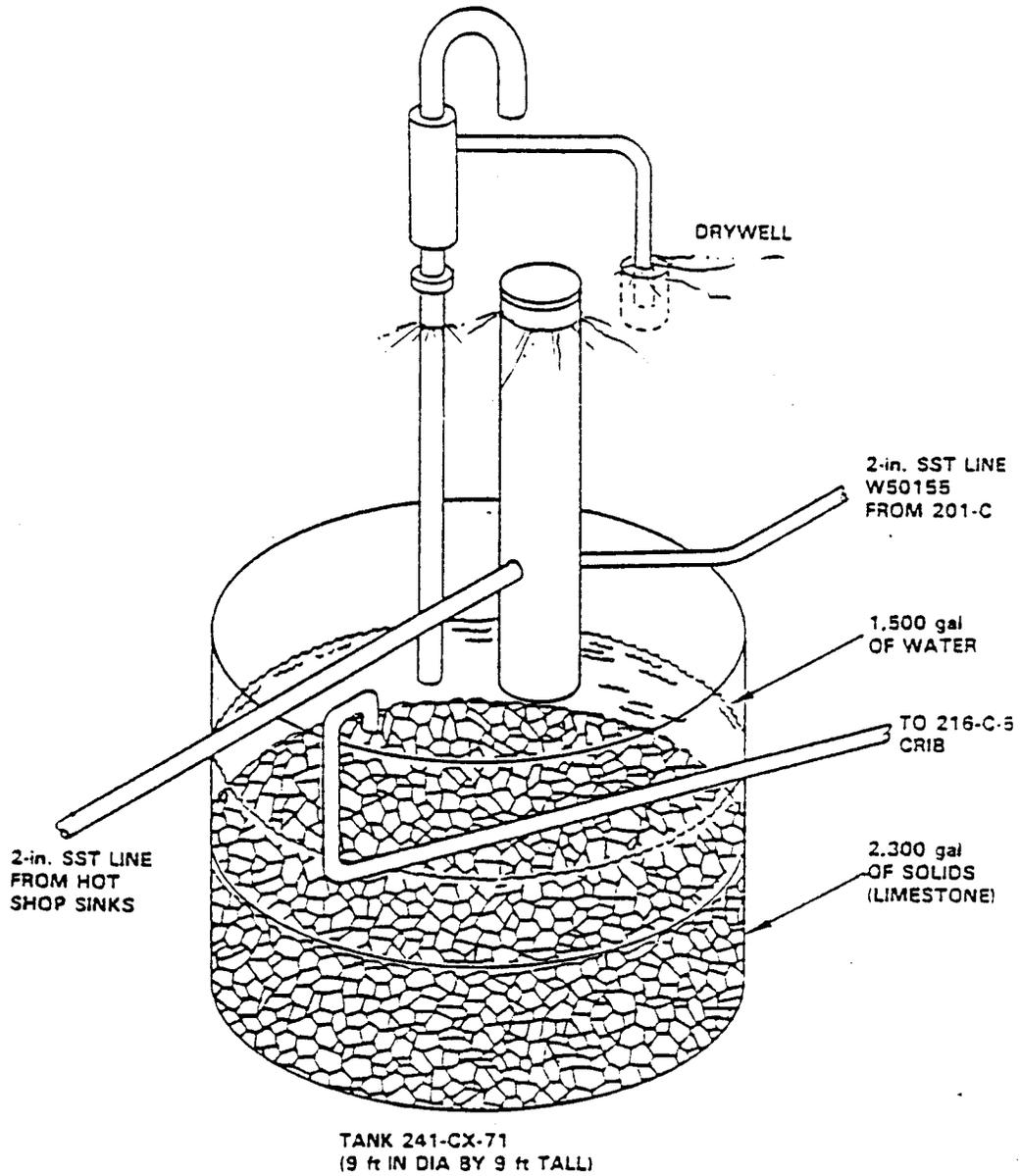


Figure 10. 241-CX-71 Storage Tank.

Although no correlation of the quantities of radionuclides estimated for the 216-C-1 crib can be made for the 241-CX-71 storage tank, it would be expected that the tank and the crib would share the same species of radionuclides (Cummings 1989).

Boechler (1989) provides the following data:

- Since no construction drawings have been found and records of physical work on the tank have been destroyed, only educated assumptions as to tank condition can be made. The following assumptions have been based on photographs, SAR description, H-2 drawings, and miscellaneous correspondence.
 - Tank is 9 ft X 9 ft circular single shell
 - Tank is constructed of stainless steel material
 - Tank is buried approximately 10 ft belowgrade
 - A 2-in. vent and a 12-in SST access header extend from the top of tank to abovegrade
 - Two blanked, 2-in. SST fill lines run into access header belowgrade
 - An overflow 2-in. SST pipe runs into tank per rerouted condition (See drawing H-2-5435)
 - The tank is filled close to the top with crushed limestone at 117-175 lb/ft³
 - Voids in and between limestone sections are occupied by a liquid fill
 - The access header had a grout cap poured into it in 1986
 - The grout appears to have the same strength as the tested grout from the 241-CX-72 storage tank (520 psi to 945 psi) and is not radioactive
 - The surrounding area is smearable from 300 to 500 counts.

* High confidence level (Boechler 1989)

The tank site may be identified today by several valve handles and steel pipe risers that protrude about 18 in. abovegrade. The surface in this area is gravel with no vegetation. This site is at the southern edge of the ash barrier over the 201-C process building and is within a surface contamination zone, which is unrelated to the tank.

3.14 241-CX-72 STORAGE TANK

The 241-CX-72 storage tank is in the process of re-decommissioning. It is an inactive waste site located southeast of the 201-C process building at Hanford coordinates N41900 W50100. The 241-CX-72 storage tank operated from 1957 to 1976 and has a 2,300-gal capacity.

The tank was recorded as being empty in 1978. This was confirmed in 1986 by a liquid level measurement. Based on this information, the tank was decommissioned and filled with grout later in 1986. In the fall of 1988, neutron and gamma measurements taken from a nearby drywell indicated that there was about 10 ft of contaminated sludge in the tank, beneath the grout. The sludge is believed to be TRU, containing a maximum of 200 g of ^{239/240}Pu.

The 241-CX-72 storage tank, with its associated vault and caisson, were operated experimentally in the 1950's as a Complex Waste Self Concentrator Facility. It was used for PUREX waste, which was then piped to the 241-C Tank Farm. It is an upright cylindrical vessel, 4-ft in diameter and 35 ft 8 in. in length and rests inside a carbon steel caisson. The tank has 3/8-in. steel walls with five stiffener rings. A cylindrical electric heater is mounted above each ring. Five pipes extend from the tank to abovegrade and two pipes enter the tank underground from the vault. A manually operated agitator extends from the vessel to aboveground. Its upper surface is about 15 ft belowgrade (Figure 11).

Tank waste inventory is estimated to include 3 Ci alpha and 6,000 Ci beta.

The site is covered by a plywood structure constructed over the tank decommissioning site. A wood and sheet plastic greenhouse has been constructed inside the plywood structure, over the tank, to facilitate current decommissioning efforts. The control building, which once existed just north of the tank, has been removed and its foundation (if any) is hidden beneath the 201-C process building ash barrier. The 241-CX-72 storage tank was sprayed with a fixative and filled with concrete and soil. The current decommissioning effort will remove the grout and waste materials from the tank.

Hanford Drawing H-2-4422 describes the tank. Aliases include the 241-CX-72 vault and tank and the 241-CX-72 waste self concentrator (WIDS).

3.15 241-C-154 DIVERSION BOX

The 241-C-154 diversion box is an inactive waste site located about 10 yd southeast of the southeast corner of the 201-C process building at Hanford coordinates N42175 W50140. This site is not listed in the Tri-Party Agreement (Ecology et al. 1991).

The 241-C-154 diversion box operated until 1985 in support of the promethium recovery phase of Semi-works operations and is referred to on Hanford Drawing H-2-32887 as the promethium transfer line diversion box. The diversion box is an 8 X 8 X 8-ft steel reinforced diversion box that connected promethium lines from B Plant to various Semi-works locations. A floor drain was connected by a 1 1/2-in. line to the Semi-works valve pit.

This site was decommissioned in the late 1980's as part of the general Semi-works decommissioning effort. Its lines were isolated and sealed and the diversion box filled with concrete, and verified with decommissioning personnel). This site is not visible today as it is buried beneath the ash barrier placed over the 201-C process building foundations.

No waste characterization or hazardous material inventory is available on this site.

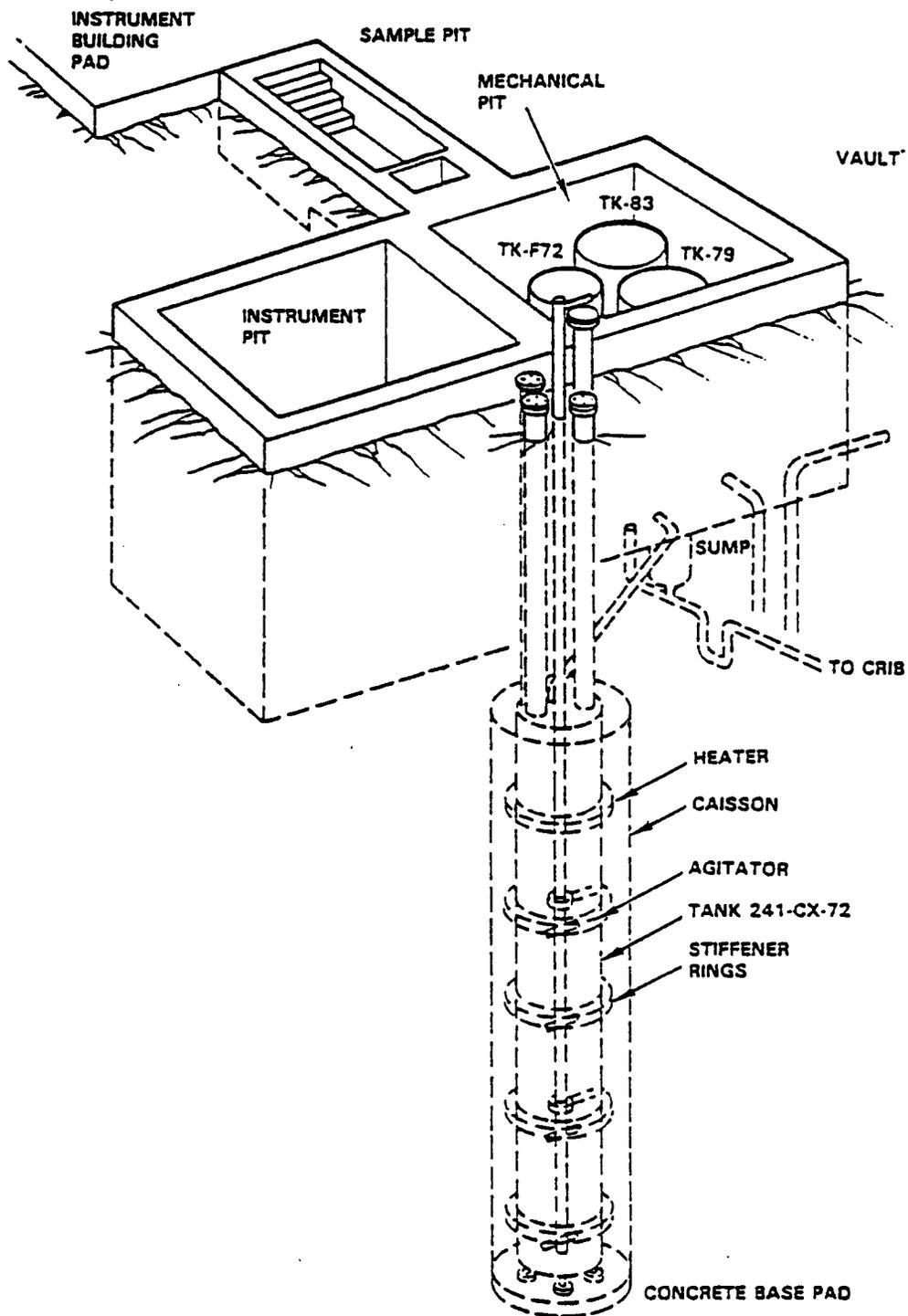


Figure 11. 241-CX-72 Tank.

3.16 SEMI-WORKS VALVE PIT

The Semi-works valve pit is a circular steel pit located adjacent to the east wall of the 201-C process building, near the southeast corner. The Semi-works valve pit served as a valve pit to connect lines from the 201-C process building to the C-44 vault, the 241-C Tank Farm, and the 241-CX-70 storage tank. This waste site is not included in the Tri-Party Agreement (Ecology et al. 1991).

The Valve Pit is described by Hanford Drawing H-2-4494 as a 5 1/2 ft inside diameter stainless steel tank that was placed belowgrade. The pit was decommissioned in the late 1980's as part of the general Semi-works decommissioning effort. Its lines were isolated and sealed and the diversion box filled with concrete.

Currently, this site is not visible as it is buried beneath the ash barrier placed over the 201-C process building foundations. No waste characterization or hazardous material inventory is available. It is referred to on Drawing H-2-4494 as a diversion box although Hanford Site diversion boxes do not normally contain valves.

3.17 CRITICAL MASS LABORATORY VALVE PIT

The Critical Mass Laboratory valve pit is a concrete structure that abuts the south wall of the 209-E building. It is approximately 6 X 8 ft and stands about 4-ft abovegrade. It has a steel lid and is posted with 'Radioactive Contamination' warning signs. This site is not included in the Tri-Party Agreement (Ecology et al. 1991).

Hanford Drawing H-2-95501 suggests that the line running to the 216-C-7 crib originates in this pit. The ventilation stack and fan assembly for the Critical Mass Laboratory are also located at this point. The fan assembly and filters are also labeled with 'Radioactive Contamination' warning signs.

No information concerning nature of contaminants could be located for this site. The valve pit and ventilation hardware are integral to the Critical Mass Laboratory, which is not scheduled for decommissioning at this date.

3.18 2607-E-5 SEPTIC TANK

The 2607-E-5 septic tank is an active waste site located north of the Critical Mass Laboratory and south of 7th Street at Hanford coordinates N42400 W50850. It was reportedly constructed in 1944 (WIDS). However, the Semi-works was not constructed until 1949 and it is doubtful that the septic tank would have been constructed in advance of need. A more likely construction date is 1949.

The 2607-E-5 septic tank is a 21 X 9 X 12 ft deep concrete structure with a metal manhole cover. It has a 292-person capacity (35 gal per capita) and continues in use in support of the Critical Mass Laboratory and mobile offices at the Semi-works. It is described on Hanford Drawings H-2-4602 and H-2-4010.

The original drain field associated with this septic tank is located southwest of the tank but has been disconnected and abandoned. The 2607-E-5 septic tank is now connected in tandem with the 2607-E-7A septic tank and drain field.

There is no radioactive or hazardous waste inventory associated with this site.

Currently, the site appears as a flat surface with gravel cover. Wooden and metal manhole covers are in place on the tank. The site is located between the outer two Critical Mass Laboratory security fences and is marked with a sign. There is no surface evidence of the abandoned drain field located immediately south of this waste site.

3.19 2607-E-7A SEPTIC TANK

The 2607-E-7A septic tank and drain field is an active waste site located at the same site as the 2607-E-5 septic tank. The 2607-E-7A septic tank is connected in tandem with the 2607-E-5 septic tank.

Constructed in 1983, the 2607-E-7A septic tank consists of two 9 X 5 X 5-ft deep concrete septic tanks connected in tandem. A drain field exits to the west of the western tank. Hanford Drawing H-2-4602 describes this facility.

There is no radioactive or hazardous waste inventory associated with this site.

Currently, the site appears as a flat surface with gravel cover. Weeds have begun to grow on its surface. The site is located between the outer two Critical Mass Laboratory security fences and is marked with a sign.

3.20 TANK STORAGE AREA

Immediately east of the 216-C-5 crib is an area that has been barricaded with lightweight chain and 'Radioactive Materials' warning signs. Five large steel process tanks from the 201-C process building are stored inside the barricade. These are presumably contaminated and are temporarily stored here pending transfer. This site is not listed in the Tri-Party Agreement (Ecology et al. 1991).

3.21 UN-200-E-36 UNPLANNED RELEASE

The UN-200-E-36 unplanned release occurred in 1967 when a shipment of pumps that had been removed from the 201-C process building were being transferred by truck to another location. Leakage occurred that contaminated a 900 ft by 450 ft wide area along 7th Street in the vicinity of Semi-works.

Beta/gamma readings of 30,000 to 80,000 cpm were measured. The roadway was flushed with water and an unspecified program for decontamination was instituted.

3.22 UN-200-E-37 UNPLANNED RELEASE

The UN-200-E-37 unplanned release is a continued cleanup effort related to the UN-200-E-36 contamination. Approximately 1 wk after the original contamination and cleanup, contamination was discovered to have spread to 600 ft area east of Semi-works. Beta/gamma readings of 200 Mr/h were measured.

The area was stabilized by applying water sprinklers to move the contamination below the surface.

3.23 UN-200-E-98 UNPLANNED RELEASE

The UN-200-E-98 unplanned release occurred prior to 1980. Contamination was discovered on the ground at the base of the 291-C Stack and around the 216-C-2 reverse well.

The contaminants were identified as primarily ^{90}Sr particulate matter and has been removed and the site stabilized, although some residual contamination remains. This area is now located beneath the ash barrier that covers much of Semi-works.

3.24 UN-200-E-141 UNPLANNED RELEASE

The UN-200-E-141 unplanned release occurred in September 1984 when uranyl nitrate leaked from its container in the 2718 Building.

The 2718 Building is a small storage building located adjacent to the Critical Mass Laboratory (209-E Building). Containers of uranyl nitrate were stored in this building. The leakage occurred when a container failed due to corrosion.

Approximately 200 L of 450 gal/L solution of uranyl nitrate (corrosive), 84% ^{235}U , was spilled onto the concrete floor and asphalt and soil adjacent to the building. Contaminated soil and asphalt were removed and the concrete floor was decontaminated to background level.

4.0 REFERENCES

- Anderson, J. D., 1990, *A History of the 200 Area Tank Farms*, WHC-MR-0132, Westinghouse Hanford Company, Richland, Washington.
- Boechler, G. N., 1989, *Engineering Study, Tank 241-CX-71 Alternate Sampling Methods*, WHC-SD-DD-ES-007, Westinghouse Hanford Company, Richland Washington.
- Cummings, J. E., 1988, *Tank 241-CX-70 Waste Removal Assessment*, WHC-SD-DD-TI-034, Westinghouse Hanford Company, Richland Washington.

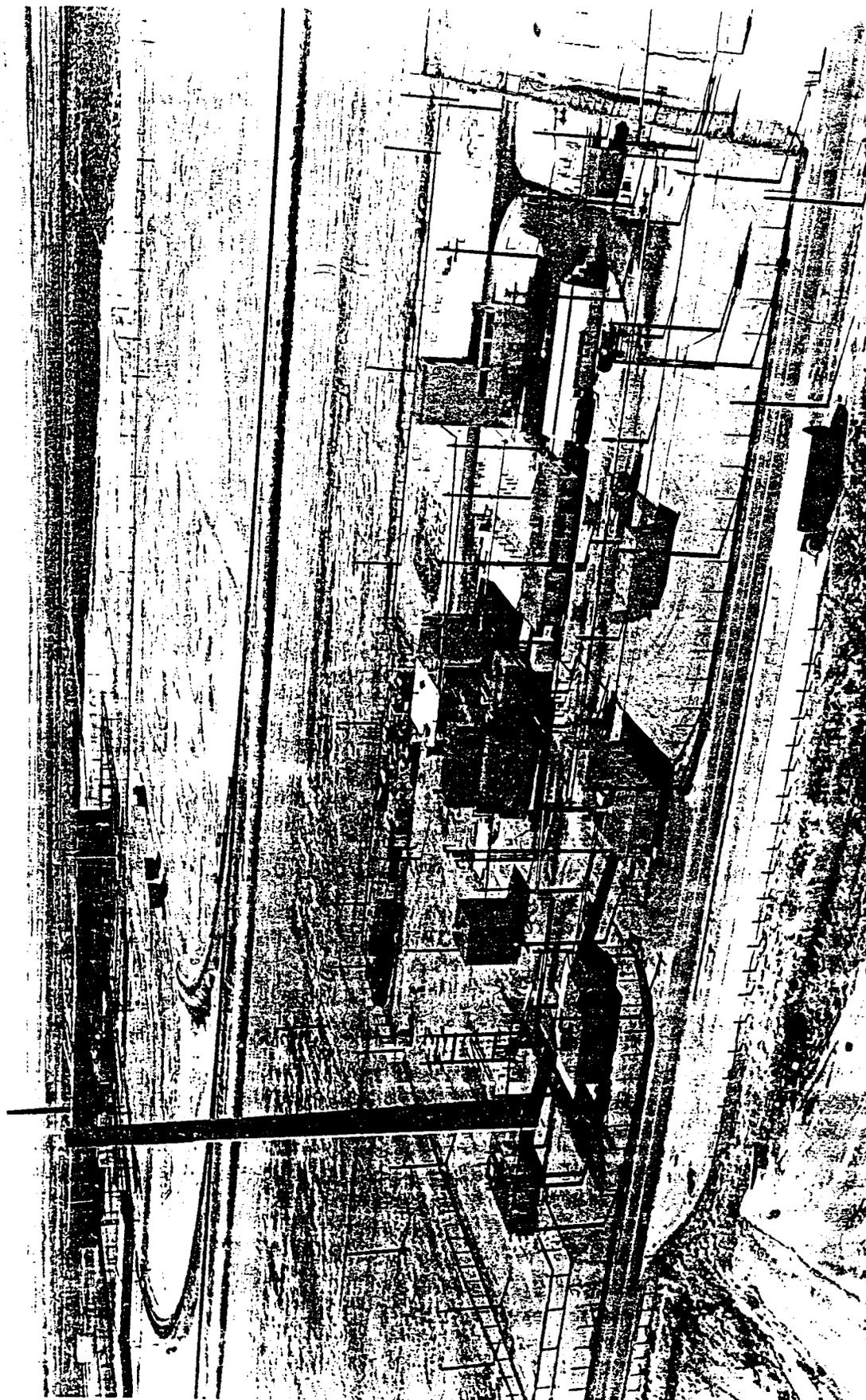
- Cummings, J. E., 1989, *Tank 241-CX-71 Preliminary Waste Characterization*, WHC-SD-DD-039, Westinghouse Hanford Company, Richland, Washington.
- DOE, 1988, *Environmental Assessment Relating to the Decommissioning of Strontium Semi-works Facility*, DOE EA-0259, U.S. Department of Energy, Richland Field Office, Richland, Washington.
- DOE/RL, 1988, *Hanford Site Waste Management Units Report*, DOE/RL-88-30, U.S. Department of Energy, Richland Field Office, Richland, Washington.
- Ecology, EPA, and DOE, 1991, *Hanford Federal Facility Agreement and Consent Order*, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.
- Louie, R. L. and D. R. Speer, 1989, "Decommissioning a 60-m-Tall Exhaust Stack" in *A Journal of the American Nuclear Technology - August 1989*, "
- Neilsen, E. G., 1990, *209-E Laboratory Reflector Water Stream-Specific Report*, WHC-EP-0342, Addendum 31, Westinghouse Hanford Company, Richland, Washington.
- WIDS, 1991, *Waste Information Data System*, an Automated Management Information System, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1990, *284-E Powerhouse Wastewater Stream-Specific Report*, WHC-EP-0342, App 24, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A
PHOTOGRAPHS

This page intentionally left blank.

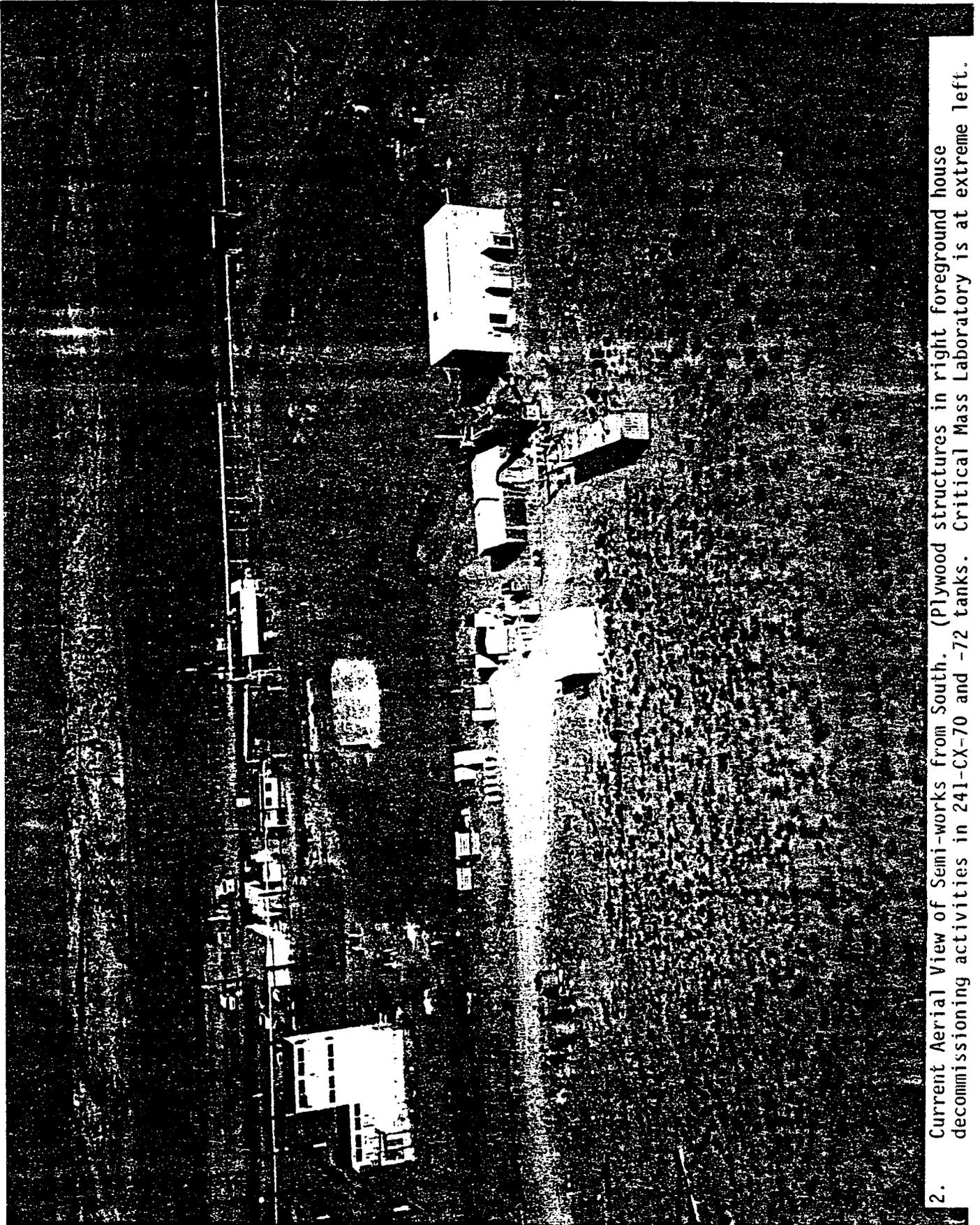
NO	PHOTOGRAPH DESCRIPTION
1	Aerial view of Semi-works Plant when operational, July 1963. Viewed from north with PUREX in left background.
2	Current aerial view of Semi-works Plant viewed from south. Plywood structures in right foreground house decommissioning activities at 241-CX-70 and -72 storage tanks. Critical Mass Laboratory is at extreme left.
3	Current aerial view of Semi-works from east. Critical Mass Laboratory is in background.
4	216-C-1 crib and 241-CX-71 storage tank viewed from south. Crib is in near foreground. Tank is identified by valve handles and silver colored metal vent pipe. 201-C process building is in background. 201-C process building has since been decommissioned and covered with ash barrier which extends to edge of -71 Tank.
5	216-C-2 reverse well viewed from southwest over roof of fiberglass filter. Well is seen as short dark metal pipe with cover beside taller concrete monument. Is now buried beneath ash barrier.
6	216-C-3 crib viewed from west. Concrete post is Crib marker. Temporary tank storage area is in right background.
7	216-C-4 crib viewed from south. Crib is identified by two yellow riser pipes immediately beyond wooden light pole.
8	216-C-5 crib viewed from west. Temporary tank storage area is in background. Crib area is now covered with a fresh layer of sand.
9	216-C-6 crib viewed from north. 241-CX-72 storage tank and sampling pit are in foreground. Vault and pit have since been decommissioned and covered with ash barrier.
10	216-C-9 pond viewed from east with B Plant in left background. Pond has since been stabilized and backfilled to grade.
11	216-C-10 crib viewed from west. Yellow concrete pipe to right of crib barrier is test well.

This page intentionally left blank.



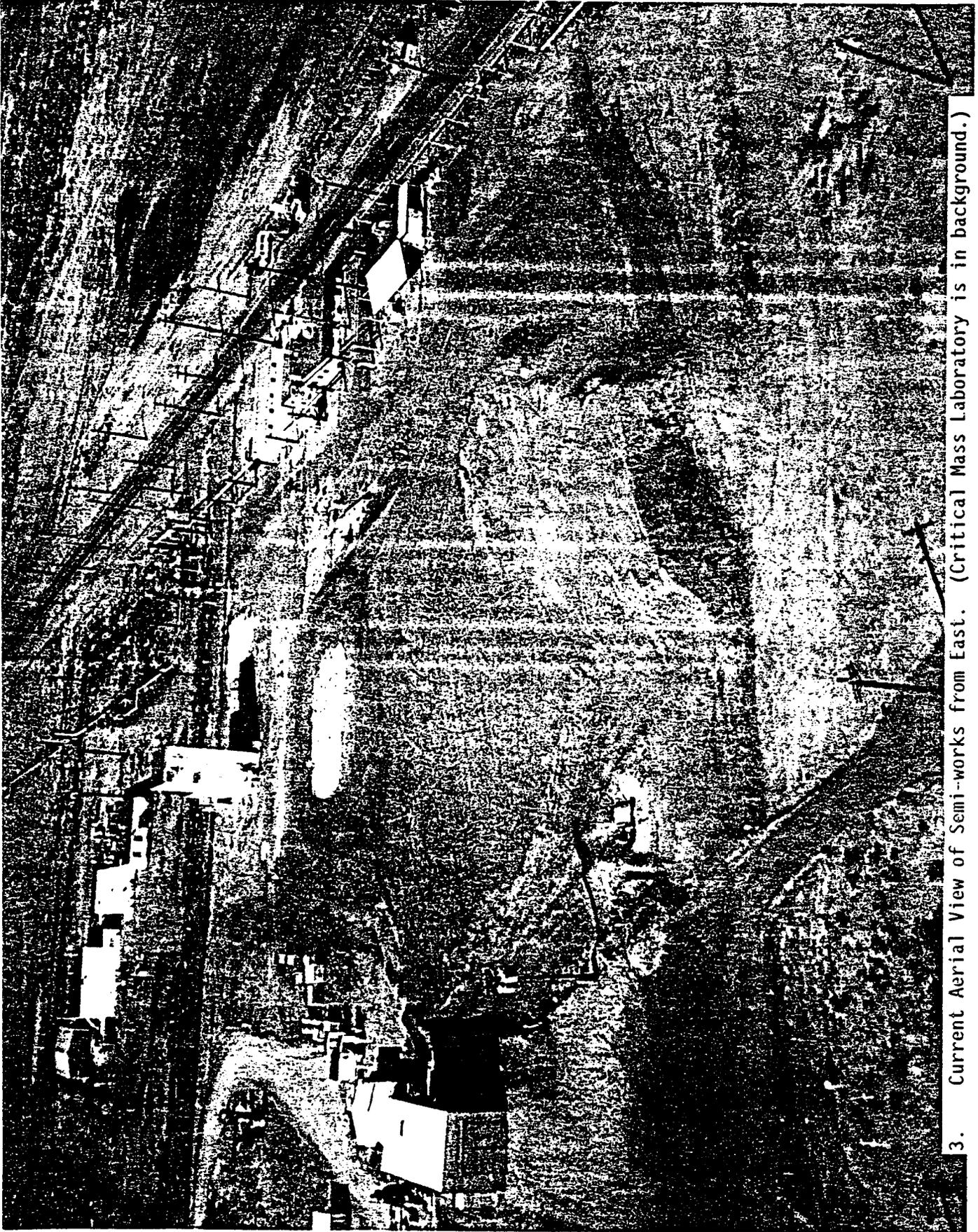
I. Semi-works When Operational (July 1963). (Viewed from north with PUREX in left background)

This page intentionally left blank.



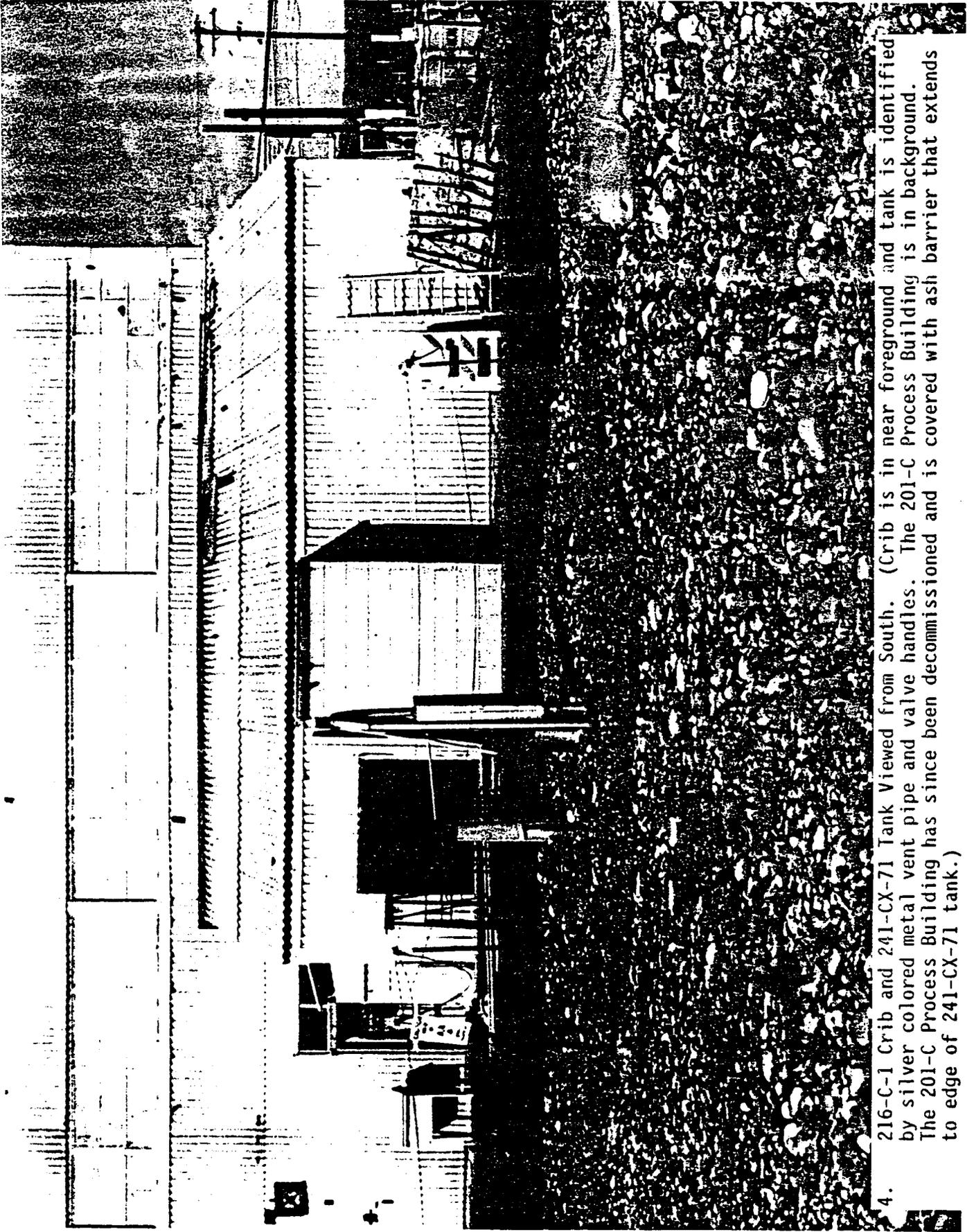
2. Current Aerial View of Semi-works from South. (Plywood structures in right foreground house decommissioning activities in 241-CX-70 and -72 tanks. Critical Mass Laboratory is at extreme left.

This page intentionally left blank.



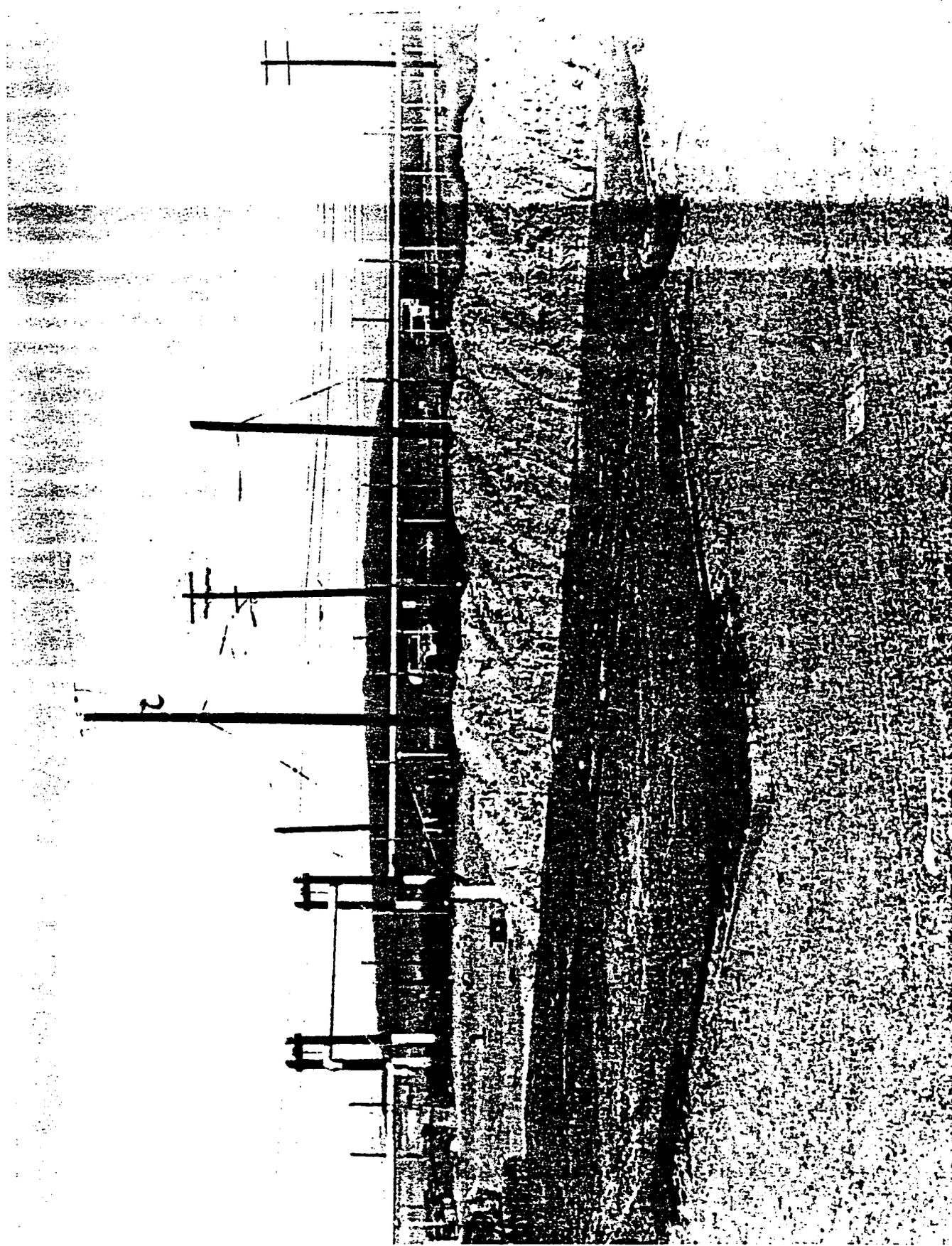
3. Current Aerial View of Semi-works from East. (Critical Mass Laboratory is in background.)

This page intentionally left blank.



4. 216-C-1 Crib and 241-CX-71 Tank Viewed from South. (Crib is in near foreground and tank is identified by silver colored metal vent pipe and valve handles. The 201-C Process Building is in background. The 201-C Process Building has since been decommissioned and is covered with ash barrier that extends to edge of 241-CX-71 tank.)

This page intentionally left blank.



5. 216-C-2 Reverse Well Viewed from Southwest Over Roof of Fiberglass Filter. (Well is seen as short dark metal pipe with cover beside taller concrete monument. Is now buried beneath ash barrier)

This page intentionally left blank.

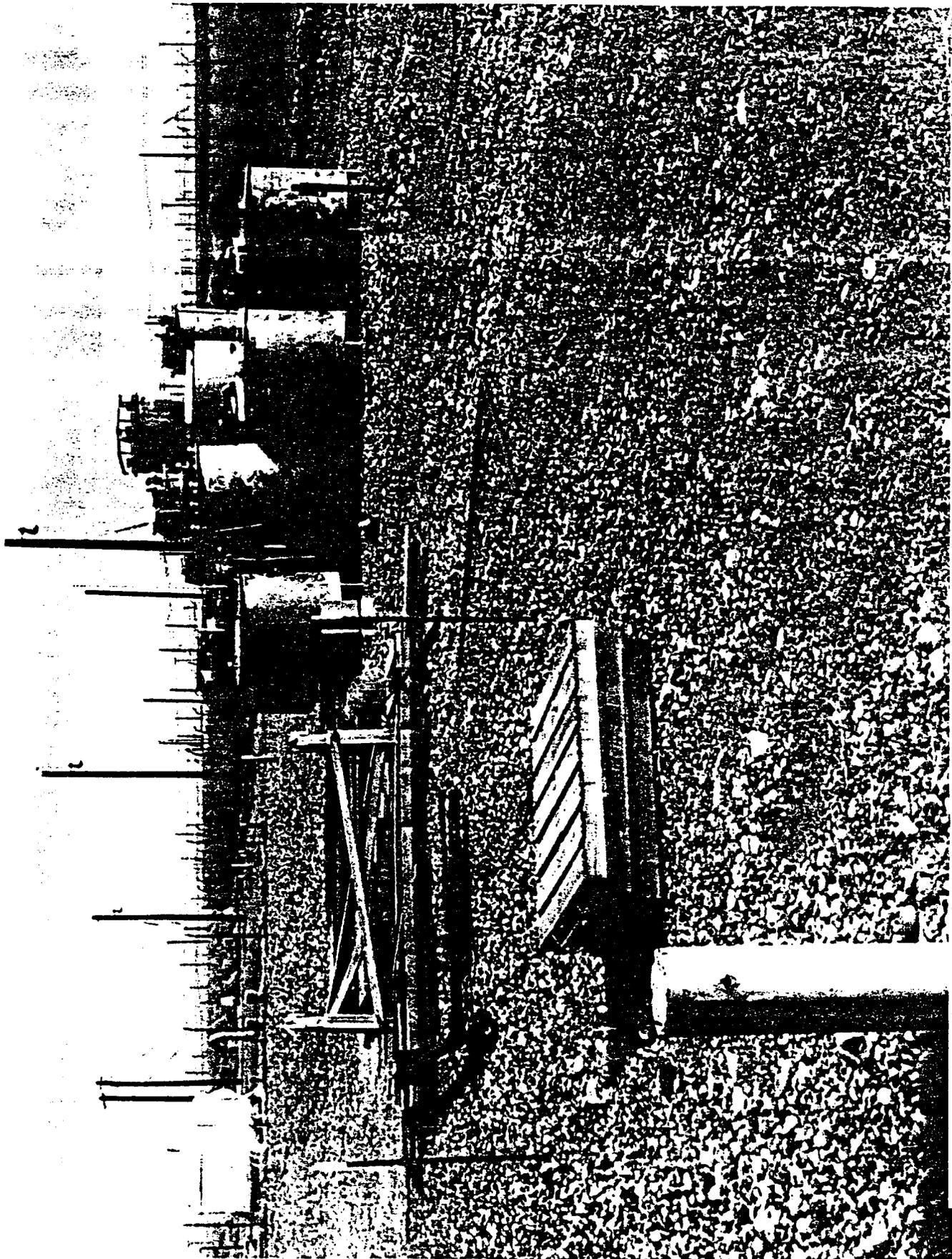
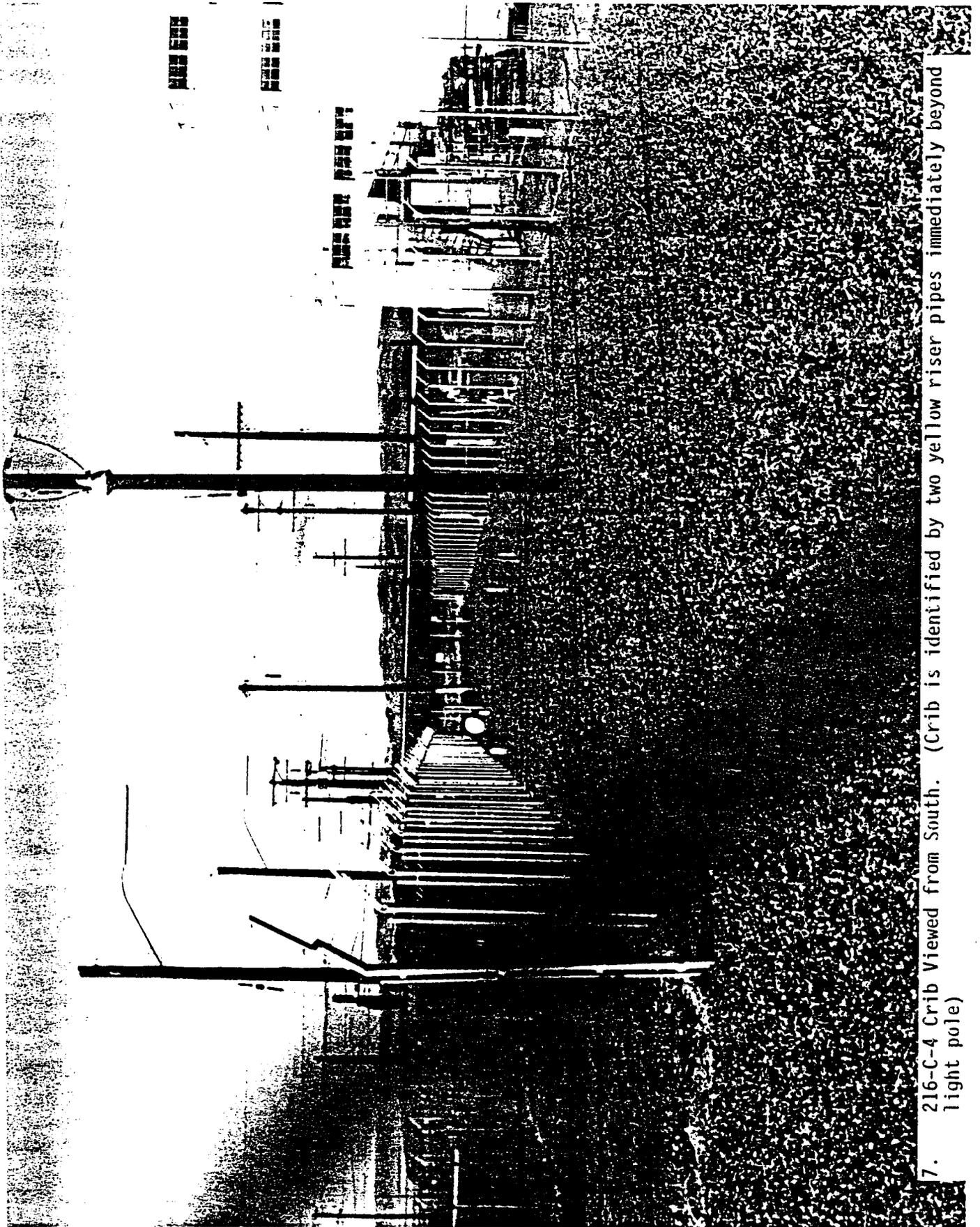


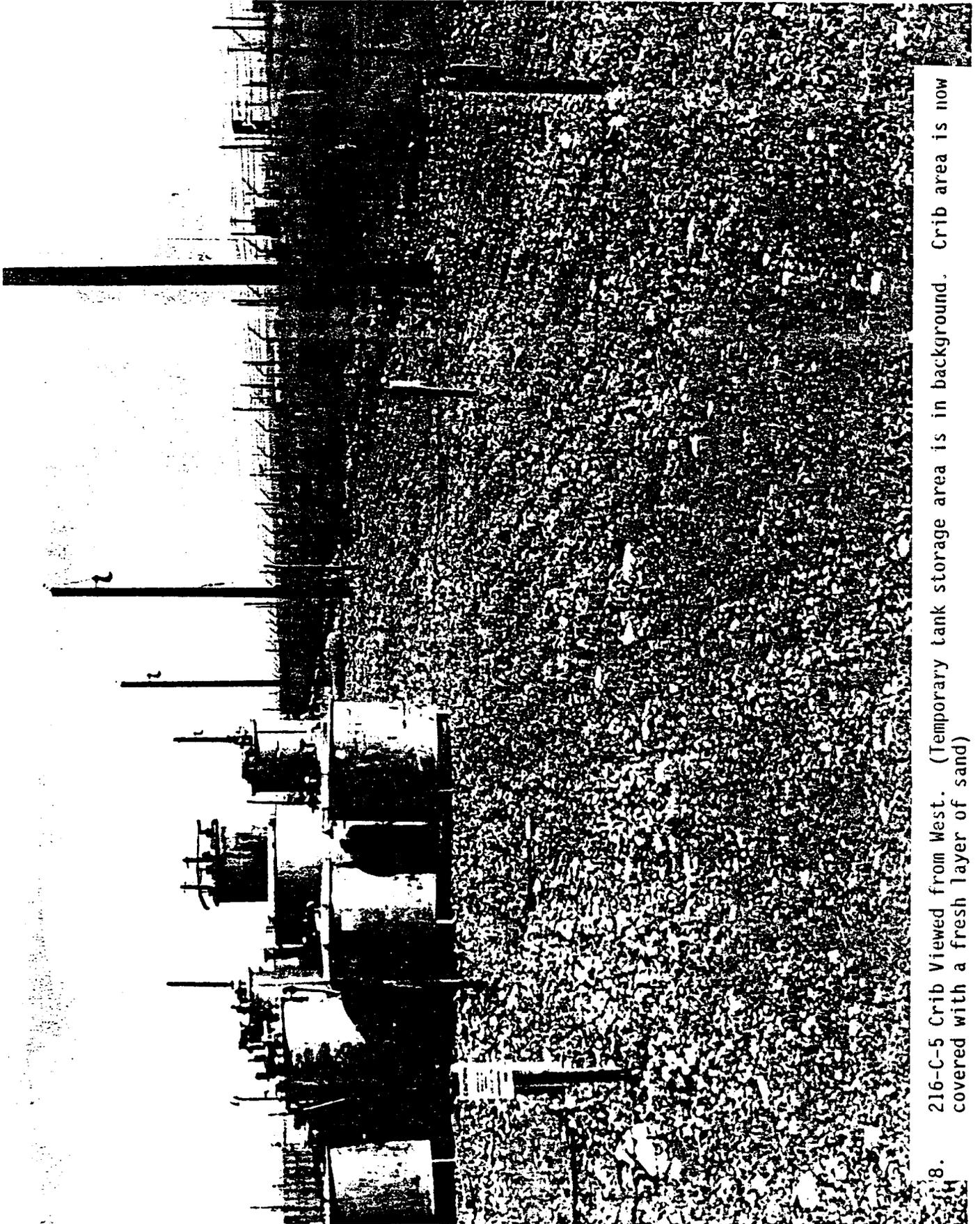
Fig. 6. 216-C-3 Crib Viewed from West. (Concrete post is crib marker. Temporary tank storage area is in right background)

This page intentionally left.



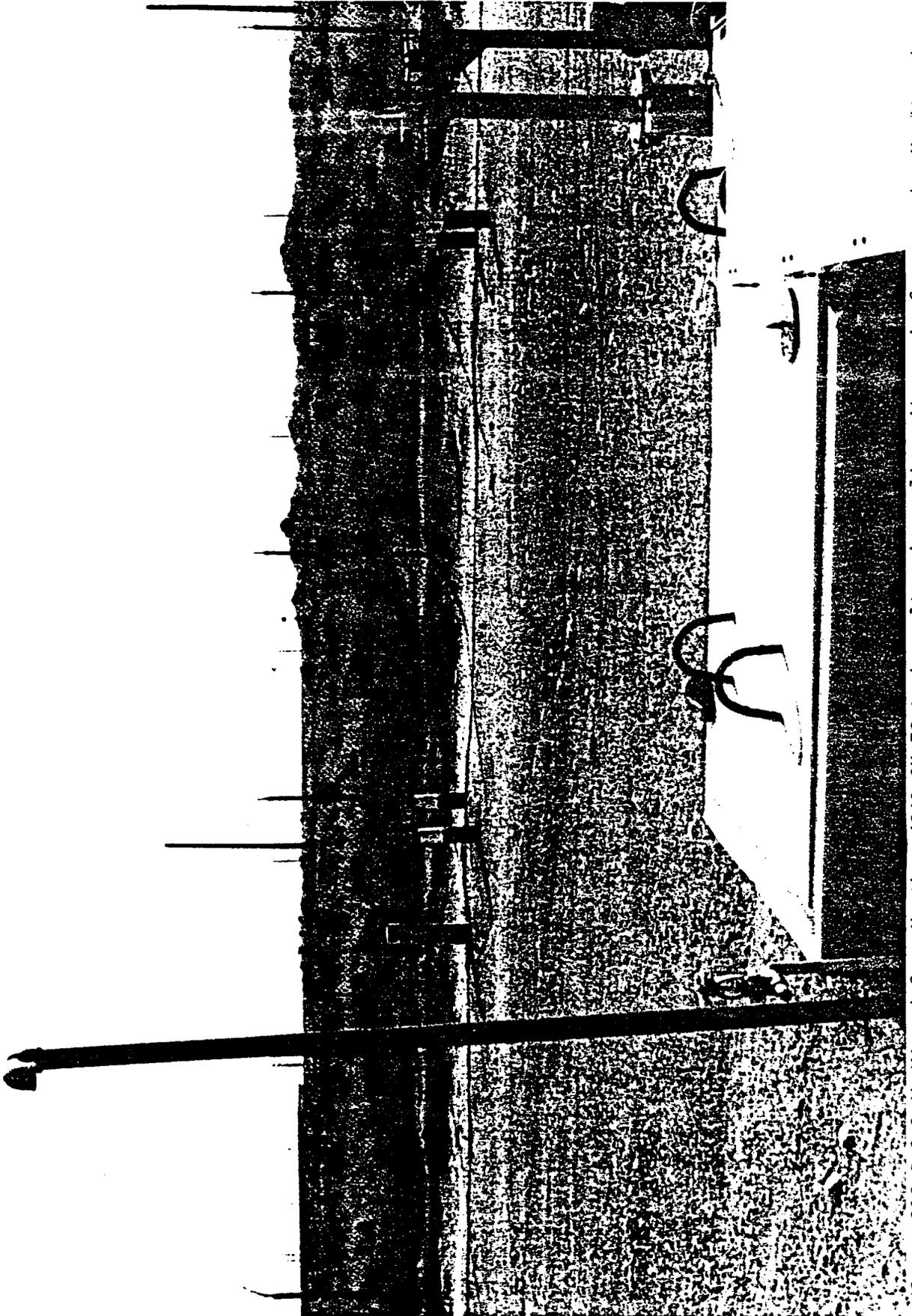
7. 216-C-4 Crib Viewed from South. (Crib is identified by two yellow riser pipes immediately beyond light pole)

This page intentionally left blank.



8. 216-C-5 Crib Viewed from West. (Temporary tank storage area is in background. Crib area is now covered with a fresh layer of sand)

This page intentionally left blank.



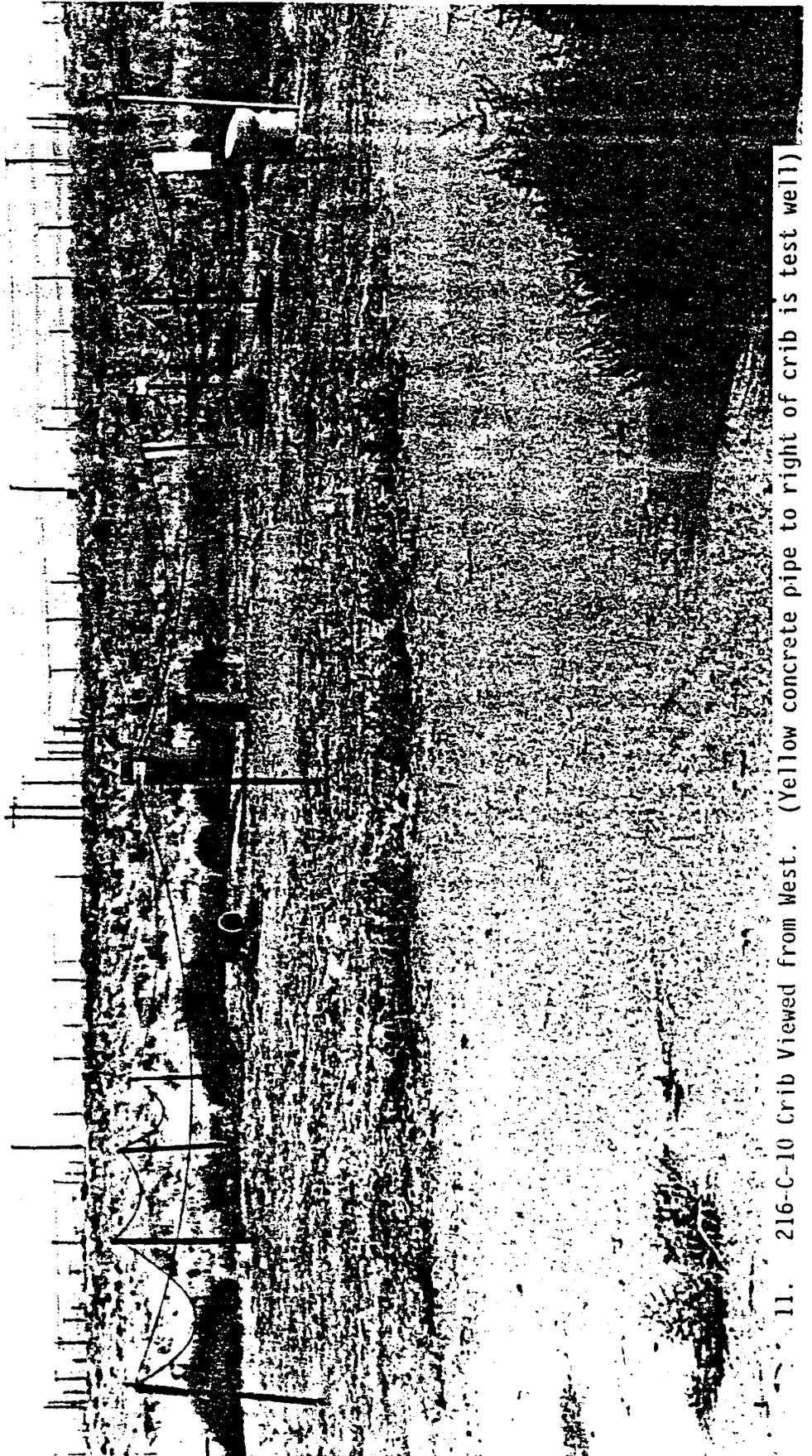
9. 216-C-6 Crib Viewed from North. (241-CX-72 tank vault and sampling pit are in foreground. Vault and pit have since been decommissioned)

This page intentionally left blank.



10. 216-C-9 Pond Viewed from East With B Plant in Left Background. (Pond has since been stabilized and filled to grade)

This page intentionally left blank.



11. 216-C-10 Crib Viewed from West. (Yellow concrete pipe to right of crib is test well)

This page intentionally left blank.

APPENDIX B
WASTE INFORMATION DATA SYSTEM (WIDS) DATA SHEETS

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 200-E Powerhouse Ditch [NR]

SITE TYPE: Ditch [NR]
WASTE CATEGORY: Nonhazardous/Nonradioactive [NR]
WASTE TYPE: Liquid [NR]
STATUS: Active [NR]
OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East Area [NR]
COORDINATES: N41640 W49800 [NR]

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 201-C Process Building [315]

SITE TYPE: Building [315]
 WASTE CATEGORY: Nonhazardous/Nonradioactive [360]
 WASTE TYPE: Solid [315]
 STATUS: Inactive [315] Pre-1980 [315]
 START DATE: 1949 [226]
 END DATE: 1976 ?1967 [226]? [309]
 OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Other [368]
 DOE/RL PROGRAM: Surplus Facilities Management Program (GF dollars) [358]

This site is not included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [315]
 COORDINATES: N42200 W50300 [226]

SITE DIMENSIONS: Length: 140.00 feet [315]
 Width: 80.00 feet [315]

SITE DESCRIPTION: Part of the Strontium Semiworks Project, the unit is constructed of concrete and transite. 30 ft is above grade and 30 ft below. There are more than 25 tanks in the cells with miscellaneous pumps and large amounts of process and service piping [315].

WASTE TYPES AND AMOUNTS: The unit consists of the radioactively contaminated structure, piping, and equipment. Contamination levels are estimated at less than 10 Ci of plutonium; 100,000 ct/min beta/gamma direct and smearable, and a dose rate of 4.5 R/h in one cell (estimated 9,000 Ci beta/gamma) [315].

ENVIRONMENTAL MONITORING: Routine radiation survey, airborne radionuclide monitoring, and visual inspections are performed [315].

RELEASE POTENTIAL: Prioritization of this facility for decommissioning classifies the relative radiological hazard as high in comparison with other 200 Area surplus facilities [315].

CLEANUP ACTIONS: The facility was decommissioned in situ [803].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 215-C Gas Preparation Building (315)

SITE TYPE: Test Treatment or Support Facility (315)
WASTE CATEGORY: Mixed Waste (360)
WASTE TYPE: Solid (315)

STATUS: Inactive (315) Pre-1980 (315)
END DATE: 1976 (315)

OPERABLE UNIT: 200-SO-1 (329)
O.U. CATEGORY: Other (368)
DOE/RL PROGRAM: Site Management Division (358)

This site is not included in the Tri-Party Agreement Action Plan (329)

HANFORD AREA: 200 East, C Plant (315)
COORDINATES: N42500 W50200 (226)
LOCATION: North of the 201-C Building (315)

SITE DIMENSIONS: Site Area: 820.00 square feet (226)
Length: 35.00 feet (226)
Width: 21.00 feet (226)

SITE DESCRIPTION: A single-story concrete structure in good condition. Visual inspection of the exterior revealed minor spalling in the concrete. The building is 13 ft high, has 4-in. concrete floors and a flat 6-in. concrete slab roof. There is a cylinder storage deck lean-to on the south side of the building (226). All equipment was removed from the building; it is now used for storage (803).

WASTE TYPES AND AMOUNTS: The unit consists of previously radioactively contaminated structure and equipment. The facility was part of the Hot Semiworks Project (315).

COMMENTS: This unit was built to provide compressed air for pneumatic equipment and instruments. Also provided inert gas system for use in 201-C when flammable solvents were used (226).

ENVIRONMENTAL MONITORING: Routine radiation survey, airborne radionuclide monitoring, and visual inspections are performed (315).

RELEASE POTENTIAL: There is no potential for release (315).

SITE NAME: 215-C Gas Preparation Building

WIDS
1/20/92
Page 2

CLEANUP ACTIONS: In 1985, the unit was decontaminated to background radiation levels
(315).

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-1 [309]

ALIASES:

216-C Crib [309]

SITE TYPE: Crib [309]
 WASTE CATEGORY: Mixed Waste [309]
 WASTE TYPE: Liquid [309]

STATUS: Inactive [309] Pre-1980 [309]
 START DATE: January 1953 [309]
 END DATE: June 1957 [309]

OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Undefined [323]
 DOE/RL PROGRAM: Radiation Areas Reduction [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 50.34 [309]

HANFORD AREA: 200 East, C Plant [58]
 COORDINATES: N42069 W50235 (center) [309]
 LOCATION: 250 ft south of the 2704-C Building and 450 ft south of 7th Street
 (within the Hot Semiworks Complex) [58]

WASTE VOLUME RECEIVED: 23,400,000.00 liters [309]
 CONTAMINATED SOIL VOLUME: 150.00 cubic meters [253]
 OVERBURDEN SOIL VOLUME: 550.00 cubic meters [253]

GROUND ELEVATION: 683.00 feet above MSL [309]
 WATER TABLE DEPTH: 282.00 feet below grade [309]

SITE DIMENSIONS: Length: 27.00 feet [309]
 Width: 12.00 feet [309]
 Depth: 13.00 feet [309]

SITE DESCRIPTION: The structure is 23 by 8 by 5.5 ft, constructed of 8-ft by 8-in. by 8-in. concrete ties, 8-ft by 8-in. by 4-in. spacer blocks, and 3.66-ft by 8-ft by 6-in. roof slabs. The unit has 5 ft (4,200 cu ft) of gravel fill backfilled over with 2 ft of soil, leaving 5 ft of the excavation unfilled. The distance from the release point to the site bottom is 4 ft. The side slope is 1:2 [309].

SITE NAME: 216-C-1

WIDS
1/20/92
Page 2**ASSOCIATED STRUCTURES:**

An 8-in.-diameter well casing, 35 ft long, extending vertically through the center from 4 ft above the structure to 25 ft below it;

A water level indicator extending vertically 4 ft above the top, consisting of a 1/2-in. SCH 40 pipe encased in a 4-in. SCH 40 pipe casing;

A 2-ft by 3-ft by 6-ft splash block;

A 4-ft drainline, 9 ft long;

2-in. #16 mesh galvanized wire around the outside (39).

WASTE TYPES AND AMOUNTS: Until 9/55, the site received high salt waste (HSW), cold-run waste, and the process condensate from the 201-C Building. From 9/55 to 6/57, the site received the HSW cold-run waste from the 201-C Building (309). The waste is high salt and neutral/basic (58).

COMMENTS: The site was deactivated by blanking the effluent piping and valving the site off when specific retention capacity was reached (2).

CLEANUP ACTIONS: The 216-C-1, C-3, C-4, and C-5 crib complex along the south fence line of the Hot Semiworks, 200 East Area, was decontaminated and the ground surface stabilized against wind erosion and plant root invasion. The work was done as follows: 4 in. of ground surface was bladed off and the soil deposited in the cavity above the unit; the ground was covered with a 4-in. sand pad; ureabor herbicide was applied at the rate of 500 lb/acre; 10-mil plastic sheeting was installed over the entire surface; a 12-in. pad of sand was installed over the plastic; and the surface stabilized with 4 in. of pit run gravel (58).

SURVEILLANCE INFORMATION (487)

SURVEY DATE: 3/89
SURVEY SCHEDULE: Annual
SITE POSTING: Surface Contamination

RESULTS/STATUS: This site was covered with 4 ft of ash during the decommissioning of Hot Semiworks stack but remains within a Surface Contamination Area.

ACTION REQUIRED: No action required.

This unit is in compliance with the Environmental Compliance Manual.

WIDS Radionuclide Inventory
January 21, 1992
216-C-1

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 4.550e-002 Ci

¹⁰⁶Ru: 1.890e-008 Ci

⁹⁰Sr: 8.550e+001 Ci

Gross Data:

Plutonium: 8.000e+000 g [260]

Alpha: 4.910e-001 Ci [612]

Beta: 1.730e+002 Ci [612]

U-Gross: 9.830e-002 Ci [612]

1/21/92

Waste Information Data System
 Hazardous Chemical Inventory
 (In Kilograms)

Site Name: 216-C-1
 Operable Unit: 200-SO-1
 Bibliography: [315]

----- INORGANICS -----

Aluminum Nitrate:	Nitrite:	
Aluminum Fluoride/Nitrate:	Nitric Acid:	15000.00000
Ammonium Carbonate:	Oxalate:	
Ammonium Nitrate:	Phosphate:	
Beryllium:	Potassium:	
Calcium Nitrate:	Potassium Borate:	
Cadmium (II):	Silver (I):	
Chromium (VI):	Sodium:	
Copper (II):	Sodium Aluminate:	
Copper Sulfate:	Sodium Dichromate:	
Ferric Nitrate:	Sodium Hydroxide:	
Ferrocyanide:	Sodium Oxalate:	
Flouride:	Sodium Silicate:	
Lead (II):	Sodium Sulfamate:	
Magnesium Nitrate:	Sulfamic Acid:	
Mercury:	Sulfate:	
Nickel (II):	Sulfuric Acid:	
Nitrate:	Uranium	
	Zinc (II):	

----- ORGANICS -----

CCL4:	Normal Paraffin Hydrocarbons:
BP:	Tributyl Phosphate:
DBBP:	Tributyl Phosphonate:
MIBK:	Trichloroethylene:

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-2 (58)
 ALIASES:
 219-C Dry Well, 216-C-2 Dry Well (58)

SITE TYPE: Reverse Well (2)
 This unit is a registered underground injection well (324)

WASTE CATEGORY: Low-Level Waste (NR)
 WASTE TYPE: Liquid (58)

STATUS: Inactive (434) Post-1980 (434)
 START DATE: January 1953 (58)
 END DATE: May 16, 1988 (434)

OPERABLE UNIT: 200-SO-1 (329)
 O.U. CATEGORY: Undefined (323)
 DOE/RL PROGRAM: Surveillance and Maintenance (358)

This site is included in the Tri-Party Agreement Action Plan (329)

HANFORD AREA: 200 East, C Plant (58)
 COORDINATES: N42300 W50000 (center) (58)
 LOCATION: ~100 ft southeast of the 291-C Stack (within the Hot Semiworks complex) (58)

GROUND ELEVATION: 681.00 feet above MSL (58)
 WATER TABLE DEPTH: 284.00 feet below grade (NR)

SITE DIMENSIONS: Depth: 40.00 feet (58)
 Diameter: 12.00 feet (58)

SITE DESCRIPTION: The unit extends to a cap ~1 ft above grade, surrounded by a concrete collar at grade. The perforated section is 25 ft long (NR). The entire unit is ~40 ft long (39).

ASSOCIATED STRUCTURES:
 A 4-in. SST saran-lined inlet pipe from the 291-C-1 Stack;
 A 2-in. SST inlet pipe from the 291-C-1 Stack ventilation filter (39).

WASTE TYPES AND AMOUNTS: The site received 291-C Stack drainage and the seal water drainage from the stack ventilation filters. The volume discharged to the unit is unknown. The waste is low salt and neutral/basic. The site contains less than 1 Ci total beta activity (58).

SITE NAME: 216-C-2

WIDS
1/20/92
Page 2

COMMENTS: The unit was taken out of service by capping and isolating the two influent sources: the 291-C-1 Stack Drain by sealing it with concrete, and the 291-C Filter water seal by cutting and capping its inlet water source [434].

CLEANUP ACTIONS: The unit was decommissioned in 1988 and buried in place [803].

SURVEILLANCE INFORMATION [487]

SURVEY DATE: 3/89
SURVEY SCHEDULE: Annual
SITE POSTING: Surface Contamination

RESULTS/STATUS: This site was covered with 4 ft of ash during the decommissioning of Hot Semiworks but remains within a Surface Contamination Area.

ACTION REQUIRED: No action required.

This unit is in compliance with the Environmental Compliance Manual.

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 216-C-3 [309]
ALIASES:
201-C Leaching Pit, 216-C-3 Crib [58]

SITE TYPE: Crib [309]
WASTE CATEGORY: Mixed Waste [309]
WASTE TYPE: Liquid [309]
STATUS: Inactive [309] Pre-1980 [309]
START DATE: January 1953 [309]
END DATE: March 1954 [309]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]
DOE/RL PROGRAM: Radiation Areas Reduction [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 1.04 [309]

HANFORD AREA: 200 East, C Plant [58]
COORDINATES: N42055 W50390 (center) [309]
LOCATION: 400 ft south of 7th Street and 375 ft south-southwest of the 2704-C Building (within the Hot Semiworks Complex) [58]

WASTE VOLUME RECEIVED: 5,000,000.00 liters [309]
CONTAMINATED SOIL VOLUME: 31.00 cubic meters [253]
OVERBURDEN SOIL VOLUME: 560.00 cubic meters [253]

GROUND ELEVATION: 689.00 feet above MSL [309]
WATER TABLE DEPTH: 284.00 feet below grade [309]

SITE DIMENSIONS (Bottom) [309]: Length: 50.00 feet [309]
Width: 10.00 feet [309]
Depth: 10.00 feet [309]

SITE DESCRIPTION: The side slope is 1:1 [309].

ASSOCIATED STRUCTURES:
A 6-in. inlet V.C.P. extending horizontally into the unit 8 ft below grade, 3 ft long;
A concrete support for the inlet pipe, 38 in. by 48 in., with a 6-in.-thick pipe support [39].

WASTE TYPES AND AMOUNTS: The site received acid waste from the 201-C, 215-C, and 271-C buildings. The waste is acidic [309].

SITE NAME: 216-C-3

WIDS
1/20/92
Page 2

COMMENTS: The site was deactivated by blanking off the pipeline to the unit and backfilling the excavation when the specific retention capacity was reached [58], and the unit was backfilled [309].

CLEANUP ACTIONS: The 216-C-1, C-3, C-4, and C-5 crib complex along the south fence line of the Hot Semiworks, 200 East Area, was decontaminated and the ground surface stabilized against wind erosion and plant root invasion. The work was done as follows: 4 in. of ground surface was bladed off and the soil deposited in the cavity above the 216-C-1 Crib; the ground was covered with a 4-in. sand pad; ureabor herbicide was applied at the rate of 500 lb/acre; 10-mil plastic sheeting was installed over the entire area; a 12-in. pad of sand was installed over the plastic; the surface was stabilized with 4 in. of pit run gravel [58].

SURVEILLANCE INFORMATION [672]

SURVEY DATE: 2/90
SURVEY SCHEDULE: Annual
SITE POSTING: Underground Radioactive Material

RESULTS/STATUS: No contamination detected. No change since survey of 1989.

This unit is in compliance with the Environmental Compliance Manual.

WIDS Radionuclide Inventory
January 21, 1992
216-C-3

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 4.240e-002 Ci

¹⁰⁶Ru: 8.300e-011 Ci

⁹⁰Sr: 8.040e+000 Ci

Gross Data:

Plutonium: 1.000e+000 g [260]
Alpha: 6.140e-002 Ci [612]
Beta: 1.620e+001 Ci [612]
U-Gross: 1.510e-002 Ci [612]

1/21/92

Waste Information Data System
 Hazardous Chemical Inventory
 (In Kilograms)

Site Name: 216-C-3
 Operable Unit: 200-SO-1
 Bibliography: [315]

----- INORGANICS -----

Aluminum Nitrate:		Nitrite:
Aluminum Fluoride/Nitrate:		Nitric Acid:
Ammonium Carbonate:		Oxalate:
Ammonium Nitrate:		Phosphate:
Beryllium:		Potassium:
Calcium Nitrate:		Potassium Borate:
Cadmium (II):		Silver (I):
Chromium (VI):		Sodium:
Copper (II):		Sodium Aluminate:
Copper Sulfate:		Sodium Dichromate:
Ferric Nitrate:		Sodium Hydroxide:
Ferrocyanide:		Sodium Oxalate:
Flouride:		Sodium Silicate:
Lead (II):		Sodium Sulfamate:
Magnesium Nitrate:		Sulfamic Acid:
Mercury:		Sulfate:
Nickel (II):		Sulfuric Acid:
Nitrate:	20.00000	Uranium
		Zinc (II):

----- ORGANICS -----

CCL4:	Normal Paraffin Hydrocarbons:
BP:	Tributyl Phosphate:
DBBP:	Tributyl Phosphonate:
MIBK:	Trichloroethylene:

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-4 [309]

SITE TYPE: Crib [309]
 WASTE CATEGORY: Mixed Waste [309]
 WASTE TYPE: Liquid [309]
 STATUS: Inactive [309] Pre-1980 [309]
 START DATE: July 1955 [309]
 END DATE: May 1965 [309]

OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Undefined [323]
 DOE/RL PROGRAM: Radiation Areas Reduction [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 1.09 [309]

HANFORD AREA: 200 East, C Plant [58]
 COORDINATES: N42060 W50430 (center) [309]
 LOCATION: 375 ft southeast of the 2704-C Building and 375 ft south of 7th Street
 (within the Hot Semiworks Complex) [58]

WASTE VOLUME RECEIVED: 170,000.00 liters [58]
 CONTAMINATED SOIL VOLUME: 86.00 cubic meters [253]
 OVERBURDEN SOIL VOLUME: 440.00 cubic meters [253]

GROUND ELEVATION: 683.00 feet above MSL [309]
 WATER TABLE DEPTH: 293.00 feet below grade [309]
 OVERBURDEN: 6.00 feet [309]

SITE DIMENSIONS (Bottom) [309]: Length: 20.00 feet [309]
 Width: 10.00 feet [309]
 Depth: 16.00 feet [309]

SITE DESCRIPTION: The unit is composed of 6-in.-diameter galvanized, corrugated, perforated piping placed horizontally at 11.5 ft below grade. Two 20-ft lengths are placed perpendicularly to the inlet pipe, forming an H pattern. The side slope is 1:1. The site contains ~6 ft (2,600 cu ft) of gravel fill and has been backfilled. The waste release point is 5 ft from the site bottom [309].

SITE NAME: 216-C-4

WIDS
1/20/92
Page 2

ASSOCIATED STRUCTURES:

A 2-in. SCH 40 inlet pipe, 7 ft long, placed horizontally 11 ft below grade;

Four vertical 6-in. risers at each end of the distributor pipes (39), capped off below grade (NR), 13 ft high;

Two layers of sisalkraft paper, 1,408 sq ft, separating the gravel fill from the backfill (39).

WASTE TYPES AND AMOUNTS: The site received contaminated organic waste from the 276-C Building (309). The waste is low salt and neutral/basic (58).

COMMENTS: The site was deactivated by valving out the effluent pipeline when the specific retention capacity was reached (58).

CLEANUP ACTIONS: The 216-C-1, C-3, C-4, and C-5 crib complex along the south fence line of the Hot Semiworks, 200 East Area, was decontaminated and the ground surface stabilized against wind erosion and plant root invasion. The work was done as follows: 4 in. of ground surface was bladed off and covered with a 4-in. sand pad; ureabor herbicide was applied at the rate of 500 lb/acre; 10-mil plastic sheeting was installed over the entire surface; a 12-in. pad of sand was installed over the plastic; and the surface was stabilized with 4 in. of pit run gravel (58).

WIDS Radionuclide Inventory
January 21, 1992
216-C-4

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 4.330e-002 Ci

¹⁰⁶Ru: 5.350e-010 Ci

⁹⁰Sr: 1.180e+001 Ci

Gross Data:

Plutonium: 1.000e+000 g [260]

Alpha: 6.140e-002 Ci [612]

Beta: 2.380e+001 Ci [612]

U-Gross: 1.130e-003 Ci [612]

1/21/92

Waste Information Data System
 Hazardous Chemical Inventory
 (In Kilograms)

Site Name: 216-C-4
 Operable Unit: 200-SO-1
 Bibliography: [309]

----- INORGANICS -----

Aluminum Nitrate:	Nitrite:
Aluminum Fluoride/Nitrate:	Nitric Acid:
Ammonium Carbonate:	Oxalate:
Ammonium Nitrate:	Phosphate:
Beryllium:	Potassium:
Calcium Nitrate:	Potassium Borate:
Cadmium (II):	Silver (I):
Chromium (VI):	Sodium:
Copper (II):	Sodium Aluminate:
Copper Sulfate:	Sodium Dichromate:
Ferric Nitrate:	Sodium Hydroxide:
Ferrocyanide:	Sodium Oxalate:
Flouride:	Sodium Silicate:
Lead (II):	Sodium Sulfamate:
Magnesium Nitrate:	Sulfamic Acid:
Mercury:	Sulfate:
Nickel (II):	Sulfuric Acid:
Nitrate:	Uranium
	Zinc (II):

----- ORGANICS -----

CCL4:	Normal Paraffin Hydrocarbons:	24000.00000
BP:	Tributyl Phosphate:	
DBBP:	Tributyl Phosphonate:	14000.00000
MIBK:	Trichloroethylene:	

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-5 [309]

SITE TYPE: Crib [309]
 WASTE CATEGORY: Mixed Waste [309]
 WASTE TYPE: Liquid [309]

STATUS: Inactive [309] Pre-1980 [309]
 START DATE: March 1955 [309]
 END DATE: June 1955 [309]

OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Undefined [323]
 DOE/RL PROGRAM: Radiation Areas Reduction [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 1.09 [309]

HANFORD AREA: 200 East, C Plant [58]
 COORDINATES: N42030 W50360 (center) [309]
 LOCATION: 375 ft south-southwest of the 2704-C Building and 450 ft south of 7th Street (within the Hot Semiworks Complex) [58]

WASTE VOLUME RECEIVED: 37,900.00 liters [612]
 CONTAMINATED SOIL VOLUME: 86.00 cubic meters [253]
 OVERBURDEN SOIL VOLUME: 440.00 cubic meters [253]

GROUND ELEVATION: 683.00 feet above MSL [309]
 WATER TABLE DEPTH: 290.00 feet below grade [309]
 OVERBURDEN: 6.00 feet [NR]

SITE DIMENSIONS (Bottom) [309]: Length: 20.00 feet [309]
 Width: 10.00 feet [309]
 Depth: 16.00 feet [309]

SITE DESCRIPTION: The unit is composed of 6-in.-diameter galvanized, corrugated, perforated piping placed horizontally at 11 ft below grade. Two 20-ft lengths are placed perpendicularly to the inlet pipe, forming an H pattern. The side slope is 1:1. The site contains ~6 ft (2,600 cu ft) of gravel fill and has been backfilled. The waste release point is 5 ft from the site bottom [309].

SITE NAME: 216-C-5

ASSOCIATED STRUCTURES:

A 2-in. SCH 40 steel inlet pipe placed horizontally 11 ft below grade, 7 ft long;
 Four vertical 6-in.-diameter risers, each 13 ft high, one at each end of the distribution pipes (39), blanked off below grade (WR);
 Two layers of sisalkraft paper, 1,408 sq ft, separating the gravel fill from the backfill (39).

WASTE TYPES AND AMOUNTS: The site received the high salt waste (HSW) cold run waste from the 201-C Building. The waste is high salt (309).

COMMENTS: The site was deactivated by valving out the effluent pipeline when the specific retention capacity was reached (58).

CLEANUP ACTIONS: The 216-C-1, C-3, C-4, and C-5 crib complex along the south fence line of the Hot Semiworks, 200 East Area, was decontaminated and the ground surface stabilized against wind erosion and plant root invasion. The work was done as follows: 4 in. of ground surface was bladed off and the soil deposited in the cavity above the 216-C-1 Crib; the ground was covered with a 4-in. sand pad; ureabor herbicide was applied at the rate of 500 lb/acre; 10-mil plastic sheeting was installed over the entire surface; a 12-in. pad of sand was installed over the plastic; and the surface stabilized with 4 in. of pit run gravel (58).

SURVEILLANCE INFORMATION (672)

SURVEY DATE: 2/90
SURVEY SCHEDULE: Annual
SITE POSTING: Underground Radioactive Material

RESULTS/STATUS: No contamination detected and no change in activity since the survey of 3/88.

This unit is in compliance with the Environmental Compliance Manual.

WIDS Radionuclide Inventory
January 21, 1992
216-C-5

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 4.440e-002 Ci

¹⁰⁶Ru: 1.380e-010 Ci

⁹⁰Sr: 4.200e+000 Ci

Gross Data:

Plutonium:	1.000e+000 g	[260]
Alpha:	6.140e-002 Ci	[612]
Beta:	8.510e+000 Ci	[612]
U-Gross:	1.810e-002 Ci	[612]

1/21/92

Waste Information Data System
 Hazardous Chemical Inventory
 (In Kilograms)

Site Name: 216-C-5
 Operable Unit: 200-SO-1
 Bibliography: [315]

----- INORGANICS -----

Aluminum Nitrate:		Nitrite:	
Aluminum Fluoride/Nitrate:		Nitric Acid:	
Ammonium Carbonate:		Oxalate:	
Ammonium Nitrate:		Phosphate:	
Beryllium:		Potassium:	
Calcium Nitrate:		Potassium Borate:	
Cadmium (II):		Silver (I):	
Chromium (VI):		Sodium:	3000.00000
Copper (II):		Sodium Aluminate:	
Copper Sulfate:		Sodium Dichromate:	
Ferric Nitrate:		Sodium Hydroxide:	
Ferrocyanide:		Sodium Oxalate:	
Flouride:		Sodium Silicate:	
Lead (II):		Sodium Sulfamate:	
Magnesium Nitrate:		Sulfamic Acid:	
Mercury:		Sulfate:	
Nickel (II):		Sulfuric Acid:	
Nitrate:	8000.00000	Uranium	
		Zinc (II):	

----- ORGANICS -----

CCL4:	Normal Paraffin Hydrocarbons:
BP:	Tributyl Phosphate:
DBBP:	Tributyl Phosphonate:
MIBK:	Trichloroethylene:

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-6 (309)
 ALIASES:
 241-CX Crib (309)

SITE TYPE: Crib (309)
 WASTE CATEGORY: Mixed Waste (309)
 WASTE TYPE: Liquid (309)
 STATUS: Inactive (309) Pre-1980 (309)
 START DATE: September 1955 (309)
 END DATE: September 1964 (309)
 OPERABLE UNIT: 200-SO-1 (329)
 O.U. CATEGORY: Undefined (323)
 DOE/RL PROGRAM: Radiation Areas Reduction (358)

This site is included in the Tri-Party Agreement Action Plan (329)

PNL Hazardous Ranking System Migration Score: 1.04 (309)

HANFORD AREA: 200 East, C Plant (58)
 COORDINATES: N42015 W50066 (center) (309)
 LOCATION: 450 ft south of 7th Street and 325 ft south of the 291-C Stack (within the Hot Semiworks complex) (58)

WASTE VOLUME RECEIVED: 530,000.00 liters (309)
 CONTAMINATED SOIL VOLUME: 86.00 cubic meters (253)
 OVERBURDEN SOIL VOLUME: 440.00 cubic meters (253)

GROUND ELEVATION: 683.00 feet above MSL (309)
 WATER TABLE DEPTH: 289.00 feet below grade (309)
 OVERBURDEN: 6.00 feet (NR)

SITE DIMENSIONS (Bottom) (309): Length: 20.00 feet (309)
 Width: 10.00 feet (309)
 Depth: 16.00 feet (309)

SITE DESCRIPTION: The unit is composed of 6-in.-diameter galvanized, corrugated, perforated piping placed horizontally at 11 ft below grade. Two 20-ft lengths are placed perpendicularly to the inlet pipe, forming an H pattern. The side slope is 1:1. The site contains ~6 ft (2,600 cu ft) of gravel fill and has been backfilled. The waste release point is 5 ft from the site bottom (309).

SITE NAME: 216-C-6

WIDS
1/20/92
Page 2

ASSOCIATED STRUCTURES:

A 2-in. SCH 40 steel inlet pipe placed horizontally 11 ft below grade,
7 ft long;

Four vertical 6-in.-diameter risers, 13 ft high, one at each end of the
distribution pipes, rising to a cap 2 ft above grade;

Two layers of sisalkraft paper, 1,408 sq ft, separating the gravel fill
from the backfill [39].

WASTE TYPES AND AMOUNTS: The site received the process condensate from the 201-C
Building and the 241-CX Vault floor drainage in the 241-CX area. The waste is acidic
[309].

COMMENTS: The site was deactivated by blanking the pipelines to the 241-CX area, and use
of the 241-CX Vault was discontinued [2].

SURVEILLANCE INFORMATION [495]

SURVEY DATE: 3/88
SURVEY SCHEDULE: Annual
SITE POSTING: Underground Radioactive Material

RESULTS/STATUS: No contamination detected. No change in activity since the last survey,
3/87.

ACTION REQUIRED: No action required.

This unit is in compliance with the Environmental Compliance Manual.

WIDS Radionuclide Inventory
January 21, 1992
216-C-6

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 4.650e-002 Ci

¹⁰⁶Ru: 2.730e-008 Ci

⁹⁰Sr: 2.880e+001 Ci

Gross Data:

Plutonium: 1.000e-001 g [260]
Alpha: 6.140e-003 Ci [612]
Beta: 5.810e+001 Ci [612]
U-Gross: 1.510e-005 Ci [612]

1/21/92

Waste Information Data System
 Hazardous Chemical Inventory
 (In Kilograms)

Site Name: 216-C-6
 Operable Unit: 200-SO-1
 Bibliography: [315]

----- INORGANICS -----

Aluminum Nitrate:		Nitrite:
Aluminum Fluoride/Nitrate:		Nitric Acid:
Ammonium Carbonate:		Oxalate:
Ammonium Nitrate:		Phosphate:
Beryllium:		Potassium:
Calcium Nitrate:		Potassium Borate:
Cadmium (II):		Silver (I):
Chromium (VI):		Sodium:
Copper (II):		Sodium Aluminate:
Copper Sulfate:		Sodium Dichromate:
Ferric Nitrate:		Sodium Hydroxide:
Ferrocyanide:		Sodium Oxalate:
Flouride:		Sodium Silicate:
Lead (II):		Sodium Sulfamate:
Magnesium Nitrate:		Sulfamic Acid:
Mercury:		Sulfate:
Nickel (II):		Sulfuric Acid:
Nitrate:	330.00000	Uranium
		Zinc (II):

----- ORGANICS -----

CCL4:	Normal Paraffin Hydrocarbons:
BP:	Tributyl Phosphate:
DBBP:	Tributyl Phosphonate:
MIBK:	Trichloroethylene:

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-7 (58)

ALIASES:

216-C-7 Crib (315)

SITE TYPE: Crib (315)
 WASTE CATEGORY: Low-Level Waste (NR)
 WASTE TYPE: Liquid (315)

STATUS: Active (315)
 START DATE: May 1961 (58)

OPERABLE UNIT: 200-SO-1 (329)
 O.U. CATEGORY: Undefined (323)
 DOE/RL PROGRAM: Surveillance and Maintenance (358)

This site is included in the Tri-Party Agreement Action Plan (329)

HANFORD AREA: 200 East, C Plant (315)
 COORDINATES: N42000 W50672 (center) (58)
 LOCATION: 50 ft southwest of the 209-E Building, inside 209-E exclusion area (315)

WASTE VOLUME RECEIVED: 60,100.00 liters (306)
 CONTAMINATED SOIL VOLUME: 130.00 cubic meters (253)
 OVERBURDEN SOIL VOLUME: 340.00 cubic meters (253)

GROUND ELEVATION: 686.00 feet above MSL (58)
 WATER TABLE DEPTH: 291.00 feet below grade (NR)

SITE DIMENSIONS (Bottom) (58): Length: 20.00 feet (58)
 Width: 20.00 feet (58)
 Depth: 12.00 feet (58)

SITE DESCRIPTION: The unit is composed of 6-in.-diameter, perforated V.C.P., placed horizontally 9 ft below grade. Two 20-ft lengths of the same V.C.P. are placed perpendicularly to the first, forming an H pattern. The site contains 6 ft (4,100 cu ft) of gravel fill and has been backfilled. The waste release point is 3.75 ft from the site bottom. The side slope is 1:1 (39).

ASSOCIATED STRUCTURES:

A 2-in. SCH 105 SST inlet pipe, 7 ft long, entering the horizontally 9 ft below grade;
 Four 13-ft-long, 6-in.-diameter vent risers, rising vertically to 3.5 ft above grade (39);
 6-mil-thick polyethylene barrier, 1,024 sq ft, separating the gravel fill from the backfill (NR).

SITE NAME: 216-C-7

WIDS
1/20/92
Page 2

WASTE TYPES AND AMOUNTS: The site has received liquid waste from the 209-E Building Critical Mass Laboratory. The site was placed on standby in 1983 (1983).

WIDS Radionuclide Inventory
January 21, 1992
216-C-7

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 5.340e-002 Ci

¹⁰⁶Ru: 1.060e-008 Ci

⁹⁰Sr: 5.120e-002 Ci

Gross Data:

Plutonium: 1.100e+000 g [260]
Alpha: 6.770e-002 Ci [612]
Beta: 2.130e-001 Ci [612]
U-Gross: 3.330e-005 Ci [612]

1/21/92

Waste Information Data System
 Hazardous Chemical Inventory
 (In Kilograms)

Site Name: 216-C-7
 Operable Unit: 200-SO-1
 Bibliography: [709]

----- INORGANICS -----

Aluminum Nitrate:		Nitrite:
Aluminum Fluoride/Nitrate:		Nitric Acid:
Ammonium Carbonate:		Oxalate:
Ammonium Nitrate:		Phosphate:
Beryllium:		Potassium:
Calcium Nitrate:		Potassium Borate:
Cadmium (II):		Silver (I):
Chromium (VI):		Sodium:
Copper (II):		Sodium Aluminate:
Copper Sulfate:		Sodium Dichromate:
Ferric Nitrate:		Sodium Hydroxide:
Ferrocyanide:		Sodium Oxalate:
Flouride:		Sodium Silicate:
Lead (II):		Sodium Sulfamate:
Magnesium Nitrate:		Sulfamic Acid:
Mercury:		Sulfate:
Nickel (II):		Sulfuric Acid:
Nitrate:	1.00000	Uranium
		Zinc (II):

----- ORGANICS -----

CCL4:	Normal Paraffin Hydrocarbons:
BP:	Tributyl Phosphate:
DBBP:	Tributyl Phosphonate:
MIBK:	Trichloroethylene:

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 216-C-9 [58]

ALIASES:

216-C-7 Swamp, C Canyon Excavation, 216-C-9 Swamp, Semi-Works Swamp [2]
216-C-9 C Canyon Excavation Semiworks Swamp [315]

SITE TYPE: Pond [315]
WASTE CATEGORY: Low-Level Waste [NR]
WASTE TYPE: Liquid [315]

STATUS: Active [315]
START DATE: June 1953 [2]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]
DOE/RL PROGRAM: Surveillance and Maintenance [358]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [58]
COORDINATES: N42581 W50694 (head), N42581 W49870 (end) [58]
LOCATION: North of 7th Street and north of 200-C Area [58]

WASTE VOLUME RECEIVED: 1,030,000,000.00 liters [410]
CONTAMINATED SOIL VOLUME: 2,600.00 cubic meters [253]
OVERBURDEN SOIL VOLUME: 6,900.00 cubic meters [253]

GROUND ELEVATION: 681.00 feet above MSL [58]
WATER TABLE DEPTH: 275.00 feet below grade [NR]

SITE DIMENSIONS (Bottom) [2]:

Site Area:	80,000.00 square feet [58]
Length:	800.00 feet [2]
Width:	100.00 feet [2]
Depth:	25.00 feet [436]

SITE DESCRIPTION: The site is backfilled with 3 ft (180,000 cu ft) of 3/4-in. to 1 1/2-in. washed gravel. The slope is 2:1.5. A field observation and engineering drawings confirmed that the original unit was ~8 ft deep. The distribution lines for the original section are ~5 ft above bottom, and the lines for the new section are 1 ft above the bottom [436].

ASSOCIATED STRUCTURES:

Two earth dikes spanning the excavation, one across the width at W50100 and a new one at W49975, ranging from 6 to 8 ft high;
Six inlet pipes, varying in size and location, leading to the pond from C facilities [436].

SITE NAME: 216-C-9

WIDS
1/20/92
Page 2

WASTE TYPES AND AMOUNTS: Until 8/60, the site received process cooling water from the 201-C Building; 201-C, 215-C, 271-C, and 276-C building floor drains; and miscellaneous water from the 209-E Building and the Hot Semiworks facilities. From 8/60 to 10/69, the site received the same effluents as above plus miscellaneous wastewater from the 209-E Building. From 10/69 to 12/85, the site received miscellaneous wastewater from the Hot Semiworks facilities and the 209-E Building (315,803).

COMMENTS: Since the shutdown of the Hot Semiworks, the unit has decreased in size until it is now a mere marshy spot in the excavation bottom. No radioactivity was found at the swamp perimeter in a survey performed on June 22, 1978 (2). Since December 1985, the site has been used as a solid waste burial ground to dispose of decontamination and decommissioning waste associated with the Semiworks plant. Refer to waste site 218-C-9 (NR).

ENVIRONMENTAL MONITORING: Radiological surveys of the surface are performed annually (349).

CLEANUP ACTIONS: All liquid discharges to the site were isolated, and it was stabilized in 1989 (803).

WIDS Radionuclide Inventory
January 21, 1992
216-C-9

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 7.030e-001 Ci

¹⁰⁶Ru: 8.660e-008 Ci

⁹⁰Sr: 2.430e+000 Ci

Gross Data:

Plutonium:	3.380e-001 g	[260]
Alpha:	2.080e-002 Ci	[612]
Beta:	6.230e+000 Ci	[612]
U-Gross:	3.050e-004 Ci	[612]

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 216-C-10 [309]

SITE TYPE: Crib [309]
 WASTE CATEGORY: Mixed Waste [309]
 WASTE TYPE: Liquid [309]
 STATUS: Inactive [309] Pre-1980 [309]
 START DATE: November 1964 [309]
 END DATE: October 1969 [309]
 OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Undefined [323]
 DOE/RL PROGRAM: Radiation Areas Reduction [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 47.82 [309]

HANFORD AREA: 200 East, C Plant [58]
 COORDINATES: N42100 W49870 (center) [309]
 LOCATION: 400 ft south of 7th Street and 300 ft southeast of the 201-C Building [58]

WASTE VOLUME RECEIVED: 897,000.00 liters [309]
 CONTAMINATED SOIL VOLUME: 66.00 cubic meters [253]
 OVERBURDEN SOIL VOLUME: 95.00 cubic meters [253]

GROUND ELEVATION: 689.00 feet above MSL [309]
 WATER TABLE DEPTH: 286.00 feet below grade [309]
 OVERBURDEN: 4.00 feet [435]

SITE DIMENSIONS (Bottom) [309]: Length: 32.00 feet [309]
 Width: 5.00 feet [309]
 Depth: 7.00 feet [309]

SITE DESCRIPTION: The unit consists of a 3-in.-diameter SST pipe, located horizontally, 4 ft below grade. The side slope is 1:1.5. The side contains 4 ft (1,700 cu ft) of gravel fill and has been backfilled with dirt [309].

SITE NAME: 216-C-10

ASSOCIATED STRUCTURES:

- A 2-in. SCH 40 SST inlet pipe, 5 ft long, placed 4 ft below grade;
- A 12-in. V.C.P. vent filter rising from the distribution pipe to 5 ft above grade. The vent filter is 8 ft long with a 5-ft stainless steel sleeve inside;
- An 8-in. V.C.P. gage well, 9.5 ft long, extending from the bottom to 2.5 ft above grade;
- A 2-ft by 2-ft by 1-ft concrete pad on which the gage well rests;
- A 2-in. sand layer over a polyethylene barrier [435].

WASTE TYPES AND AMOUNTS: The site received process condensate and liquid waste from the 201-C Building. The waste is acidic [309].

ENVIRONMENTAL MONITORING: Well 27-5 monitors this unit. Data from this well indicate that breakthrough to groundwater has not occurred at this site [9].

SURVEILLANCE INFORMATION [672]

SURVEY DATE: 2/90
SURVEY SCHEDULE: Annual
SITE POSTING: Underground Radioactive Material

RESULTS/STATUS: One speck of contamination reading 30,000 dis/min. No survey was done in 1989 due to stabilization efforts going on in the area.

ACTION REQUIRED: Remove the contamination and investigate the loop of wire protruding from the surface.

This unit is out of compliance with the Environmental Compliance Manual.

WIDS Radionuclide Inventory
January 21, 1992
216-C-10

Isotope data [612]

Curies decayed through 12/31/89

¹³⁷Cs: 8.550e-002 Ci

¹⁰⁶Ru: 8.950e-008 Ci

⁹⁰Sr: 3.450e+001 Ci

Gross Data:

Plutonium: 1.500e-001 g [260]
Alpha: 9.210e-003 Ci [612]
Beta: 6.910e+001 Ci [612]
U-Gross: 1.510e-005 Ci [612]

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 218-C-9 [315]
 ALIASES:
 Dry Waste No.0C9 [692]; 218-C-9 Burial Ground [315]

SITE TYPE: Burial Ground [315]
 WASTE CATEGORY: Low-Level Waste [315]
 WASTE TYPE: Solid [315]
 STATUS: Active [315]
 START DATE: 1985 [315]
 OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Undefined [323]
 DOE/RL PROGRAM: Storage and Disposal [358]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [315]
 COORDINATES: N42717 W50106, N42716 W49855, N42471 W49857, N42473 W50108 [692]
 LOCATION: North of 7th Street and north of 200-C Area [58] in the old 216-C-9
 Pond area [NR]

WASTE VOLUME RECEIVED: 2,265.00 cubic meters [692]
 CONTAMINATED SOIL VOLUME: 2,600.00 cubic meters [253]
 OVERBURDEN SOIL VOLUME: 6,900.00 cubic meters [253]

GROUND ELEVATION: 681.00 feet above MSL [58]
 WATER TABLE DEPTH: 275.00 feet below grade [NR]

SITE DIMENSIONS (Top) [692]:
 Site Area: 182,800.00 square feet [692]
 Length: 283.00 feet [NR]
 Width: 283.00 feet [NR]
 Depth: 22.00 feet [NR]

SITE DESCRIPTION: There is only one trench located at the disposal site [315].

WASTE TYPES AND AMOUNTS: The waste consists of rags, paper, cardboard, plastic, equipment, and various other dry waste [315].

COMMENTS: From 6/53 to 12/85, this site was known as 216-C-9 Pond. Previous history for the site during that time can be found under WIDS Sitename 216-C-9. In December 1985, the Waste Management Program Office, Decontamination and Decommissioning, converted the 216-C-9 Pond into a solid waste burial ground. This site receives waste from the D&D activities of the Hot Semiworks facilities [NR].

SITE NAME: 218-C-9

WIDS
1/20/92
Page 2

ENVIRONMENTAL MONITORING: The site is monitored for surface contamination [315].

CLEANUP ACTIONS: The site was interim stabilized in 1989 with ash from the 200 East Ash Pile [803].

SURVEILLANCE INFORMATION [680]

SURVEY DATE: 10/90
SURVEY SCHEDULE: Semiannual
SITE POSTING: Underground Radioactive Material

RESULTS/STATUS: No contamination detected. No change since the previous survey.
This unit is in compliance with the Environmental Compliance Manual.

WIDS Radionuclide Inventory
January 21, 1992
218-C-9

Isotope data [692]

Curies decayed through 12/31/90

¹³⁷Cs: 8.123e+000 Ci

¹⁵⁴Eu: 1.016e-006 Ci

¹⁰⁶Ru: 5.423e-006 Ci

⁹⁰Sr: 1.311e+001 Ci

Gross Data:

Plutonium: 1.000e-004 g [692]

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 241-CX-70 [226]
 ALIASES:
 241-CX-70 Tank [315]

SITE TYPE: Storage Tank [315]
 WASTE CATEGORY: Mixed Waste [360]
 WASTE TYPE: Liquid [315]

STATUS: Inactive [315] Pre-1980 [315]
 START DATE: 1952 [630]
 END DATE: 1957 [630]

OPERABLE UNIT: 200-SO-1 [329]
 O.U. CATEGORY: Undefined [323]
 TSD NUMBER: S-2-9 [610]
 DOE/RL PROGRAM: Surplus Facilities Management Program (GF dollars) [358]

This site is included in the Tri-Party Agreement Action Plan [329]

The following have been submitted for this site: Part A Permit [308]

HANFORD AREA: 200 East, C Plant [315]
 COORDINATES: N42100 W50200 [226]
 LOCATION: South of the 201-C Building [315]

OVERBURDEN: 11.00 feet [226]

SITE DIMENSIONS: Length: 15.00 feet [226]
 Diameter: 20.00 feet [226]

SITE DESCRIPTION: Concrete with a 1-in.-thick stainless steel plate liner. The sides and top are 1-ft-thick concrete and the bottom thickness varies from 2 ft at the edges to 9 in. at the center. It is located below grade, with several risers and vents visible above grade [226].

WASTE TYPES AND AMOUNTS: The unit was used to store high-level process waste in support of the Semiworks process. Before sluicing, the unit contained 10,300 gal of sludge containing: Pu-239/240, 20 Ci; Cs-137, 500 Ci; Sr-90, 2900 Ci; NaNO₃, 7.8 ton; NaNO₂, 1.1 ton; NaF, 1.2 ton; Al₂(SO₄)₃, 0.5 ton; Na₂CrO₄, 0.2 ton. After sluicing a small quantity of solids and residual caustic/water remain [630]. The tank now contains ~4.75 ft of sludge. The estimated contamination levels for piping and equipment are 3 Ci Pu and 6,000 Ci beta/gamma [315].

ENVIRONMENTAL MONITORING: Routine radiation survey, airborne radionuclide monitoring, visual inspections, and liquid level monitoring [315].

SITE NAME: 241-CX-70

WIDS
1/20/92
Page 2

RELEASE POTENTIAL: Prioritization of this facility for decommissioning classifies the relative radiological hazard as high in comparison with other 200 Area surplus facilities (315).

CLEANUP ACTIONS: In 1979, the liquid waste was pumped out via overground transfers to CR-Vault and Tank Farms. From 1987 to 1988, the solid waste was removed using a sluicing/pumping system (630). This unit is included in the Strontium Semiworks Decommissioning Project (315). Decommissioning operations are continuing (803).

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 241-CX-71 [400]

SITE TYPE: Neutralization Tank [398]
WASTE CATEGORY: Mixed Waste [398]
WASTE TYPE: Liquid [398]

STATUS: Inactive [398] Pre-1980 [400]
START DATE: December 1952 [400]
END DATE: June 1957 [400]

OPERABLE UNIT: 200-SO-1 [398]
O.U. CATEGORY: Undefined [398]

This site is included in the Tri-Party Agreement Action Plan [398]

HANFORD AREA: 200 East, C Plant [398]
COORDINATES: N42107 W50914 [398]
LOCATION: ~83 ft northwest from the center of 24-CX-70 [398]

OVERBURDEN: 10.00 feet [400]

SITE DIMENSIONS: Length: 9.00 feet [400]
Diameter: 9.00 feet [400]

SITE DESCRIPTION: Stainless steel, buried with a gooseneck vent riser visible above grade [400].

WASTE TYPES AND AMOUNTS: The unit was used for neutralizing the 201-C process condensate and the coil and condenser cooling water [630]. It received process condensates from the REDOX and PUREX pilot plant processes. From November 1956, the unit received flush wastes during decontamination. The unit contains ~2,300 gal of solids (primarily limestone) and ~1,500 gal of water. Estimated radiological inventory is 6 Ci plutonium and 6,000 Ci beta/gamma [400]. This estimate is highly subjective; apparently in the past the same estimate was given to most of the tanks [401]. It has been determined that the unit contains hazardous waste, and it will be permitted [803].

COMMENTS: The two 2-in. stainless steel fill lines and the 2-in. overflow line have been blanked, and the 12-in. access header has been filled with a grout cap [398].

RELEASE POTENTIAL: Small [401].

SITE NAME: 241-CX-73

WIDS
1/20/92
Page 2

CLEANUP ACTIONS: The unit was filled with a bulk-fill grade of concrete in 1986. The breather riser and moisture trap were removed and buried [630].

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 241-CX-72 [226]

ALIASES:

241-CX-72 Vault and Tank [315]; 241-CX-72 Waste Self Concentrator [226]

SITE TYPE: Storage Tank [315]

WASTE CATEGORY: Mixed Waste [360]

WASTE TYPE: Liquid [315]

STATUS: Inactive [315] Pre-1980 [315]

START DATE: 1957 [630]

END DATE: 1976 [315]

OPERABLE UNIT: 200-SO-1 [329]

O.U. CATEGORY: Undefined [323]

DOE/RL PROGRAM: Surplus Facilities Management Program (GF dollars) [358]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [315]

COORDINATES: N41900 W50100 [226]

LOCATION: Southeast of the 201-C Building [315]

OVERBURDEN: 14.00 feet [226]

SITE DIMENSIONS: Length: 35.66 feet [226]
 Width: 4.00 feet [226]

SITE DESCRIPTION: This unit is an agitator tank. It is set inside a caisson, which is a carbon steel cylinder 6 ft in diameter and 36 ft 6 in. long, buried upright ~14 ft below grade. Several risers extend from the top and are visible above grade. The associated vault is located below grade next to the unit [226]. The vault is 20 ft by 7 ft by 12 ft [315], constructed of reinforced concrete and divided into two major sections, with a smaller sample pit section on the north side. Exterior walls and floor are 1-ft-thick concrete. There are two pit covers visible above grade with concrete metal cover blocks and lids, respectively [226].

WASTE TYPES AND AMOUNTS: The unit contains solid radioactive waste. The estimated current inventory is 3 Ci of plutonium and 6,000 Ci of beta/gamma [315].

COMMENTS: The unit was constructed in 1956 as a waste self concentrator [630]. It was an experimental project operated in the 1950's by Hanford Laboratories [226].

ENVIRONMENTAL MONITORING: Routine radiation survey, airborne radionuclide monitoring, visual inspections, and liquid level monitoring [315].

SITE NAME: 241-CX-72

WIDS
1/20/92
Page 2

RELEASE POTENTIAL: There is no potential for release [315].

CLEANUP ACTIONS: The unit was filled with a bulk-fill grade of grout [630] and decommissioned in situ in FY 1986 [315]. Operations are planned to remove the grout and waste [803].

Waste Information Data System
 General Summary Report
 January 20, 1992

SITE NAME: 291-C Fan and Filter Building (359)
ALIASES:
 291-C Filter/Fan House (226)

SITE TYPE: Equipment (NR)
WASTE CATEGORY: Low-Level Waste (360)
WASTE TYPE: Solid (226)

STATUS: Inactive (306) Post-1980 (306)
END DATE: August 1987 (306)

OPERABLE UNIT: 200-SO-1 (329)
O.U. CATEGORY: Other (368)
DOE/RL PROGRAM: Surplus Facilities Management Program (GF dollars) (358)

This site is not included in the Tri-Party Agreement Action Plan (329)

HANFORD AREA: 200 East, C Plant (226)
COORDINATES: N42340 W50050 (370)

SITE DESCRIPTION: The unit includes an air tunnel from the 201-C cells, glass fiber filters, HEPA filters, and the fan house. The air tunnel is concrete with inside dimensions of 44 in. by 44 in. and is 8 to 10 in. thick. It is about 200 ft long, with the first 100 ft 20 ft below grade and the second 100 ft 5 ft below grade. There are forty removable aluminum cartridge glass fiber filters (5 by 5 by 4 ft) and an array of 22 HEPA filters. The fan house is a wood frame building 36 by 21.5 by 11 ft high on a 4-in. concrete slab. It has a flat built-up tar and gravel roof. It contains two 70- and one 30-HP electric fans and one 70-HP steam turbine fan. Visual inspection of the exterior revealed slight roof sag and deterioration of the walls (226).

COMMENTS: Built to provide exhaust air ventilation for operating cells and process vessel vents from 201-C (226).

CLEANUP ACTIONS: This building was demolished just prior to the 291-C-1 Stack in 1988 (803).

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 291-C-1 [226]
ALIASES:
291-C-1 Stack [226]

SITE TYPE: Stack [226]
WASTE CATEGORY: Low-Level Waste [360]
WASTE TYPE: Solid [226]

STATUS: Inactive [306] Post-1980 [306]
END DATE: August 1987 [306]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Other [368]
DOE/RL PROGRAM: Surplus Facilities Management Program (GF dollars) [358]

This site is not included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [226]
COORDINATES: N42340 W50050 [370]

SITE DIMENSIONS: Length: 200.00 feet [226]

SITE DESCRIPTION: This unit is a double-shell structure. The outer shell is made of reinforced concrete, and the inner shell is constructed of acid-resisting brick and mortar [226].

CLEANUP ACTIONS: The unit was demolished and buried in August 1988 [306].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 2607-E5 [315]

SITE TYPE: Septic Tank [315]
WASTE CATEGORY: Nonhazardous/Nonradioactive [315]
WASTE TYPE: Liquid [315]

STATUS: Active [315]
START DATE: 1944 [315]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East Area [315]
COORDINATES: N42400 W50850 [370]

SITE DIMENSIONS: Length: 21.00 feet [703]
Width: 9.00 feet [703]

SITE DESCRIPTION: This unit includes a drain field [315]. It is 12 ft 6 in. deep, constructed of reinforced concrete, and has a 292-person capacity (35 gal per capita) with an average detention period of 24 h. The walls and floor are 10 in. thick. The tile field is constructed of 4-in. vitrified pipe, concrete pipe or drain tile with a minimum of 8 linear feet per capita. The laterals are open jointed and spaced 8 ft apart [703].

WASTE TYPES AND AMOUNTS: Sanitary wastewater and sewage. Estimated rate of waste generation is 2.21 cu m/d [315].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: 2607-E7A [NR]

SITE TYPE: Septic Tank [315]
WASTE CATEGORY: Nonhazardous/Nonradioactive [315]
WASTE TYPE: Liquid [315]

STATUS: Active [315]
START DATE: 1983 [315]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East Area [315]
COORDINATES: N42400 W51100 [370]

SITE DIMENSIONS: Length: 4.00 feet [703]
Width: 2.00 feet [703]

SITE DESCRIPTION: This unit includes a drain field [315]. It is 8 ft 4 in. deep, constructed of reinforced concrete, and has an 8-person capacity (35 gal per capita) with an average detention period of 24 h. The walls are 8 in. thick, and the floor is 6 in. thick. The tile field is constructed of 4-in. vitrified pipe, concrete pipe, or drain tile with a minimum of 8 linear feet per capita. The laterals are open jointed and spaced 8 ft apart [703].

WASTE TYPES AND AMOUNTS: Sanitary wastewater and sewage. Estimated rate of waste generation is 1.64 cu m/d [315].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: Hot Semiworks Valve Pit [NR]

SITE TYPE: Valve Pit [NR]
WASTE CATEGORY: Mixed Waste [360]
WASTE TYPE: Liquid [NR]

STATUS: Inactive [803]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [NR]
COORDINATES: N43220 W51760 [370]

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: UN-200-E-36 [361]
ALIASES:
UPR-200-E-36 [309]

SITE TYPE: Unplanned Release [309]
WASTE CATEGORY: Mixed Waste [NR]
WASTE TYPE: Solid [309]

STATUS: Inactive [309] Pre-1980 [309]
OCCURRENCE DATE: July 24, 1967 [309]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]
DOE/RL PROGRAM: Environmental Restoration [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 1.25 [309]

HANFORD AREA: 200 East, C Plant [309]
COORDINATES: N42585 W50400 [309]
LOCATION: Road contamination in the general area north of Semiworks, ~150 yd wide
and 300 yd long [309]

GROUND ELEVATION: 657.00 feet above MSL [309]
WATER TABLE DEPTH: 259.00 feet below grade [309]

SITE DIMENSIONS: Length: 900.00 feet [309]
Width: 450.00 feet [309]

WASTE TYPES AND AMOUNTS: Beta/gamma with readings of 30,000 to 80,000 ct/min [309,806].

KNOWN RELEASES: While in transit, two pumps that had been removed from a cell
contaminated the roadway near the Hot Semiworks Plant (200-C) [309].

CLEANUP ACTIONS: The roadways were flushed with water. A program for decontamination
was instated [309].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: UN-200-E-37 [361]

ALIASES:

UPR-200-E-37 [309]

SITE TYPE: Unplanned Release [309]
WASTE CATEGORY: Mixed Waste [NR]
WASTE TYPE: Solid [309]

STATUS: Inactive [309] Pre-1980 [309]
OCCURRENCE DATE: July 31, 1967 [309]

OPERABLE UNIT: 200-SO-1 [329]
O.U. CATEGORY: Undefined [323]
DOE/RL PROGRAM: Environmental Restoration [358]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [309]

COORDINATES: N42375 W49950 [370]

LOCATION: An area east of Semiworks and a dirt road outside the east fence [309]

GROUND ELEVATION: 689.00 feet above MSL [309]

WATER TABLE DEPTH: 286.00 feet below grade [309]

SITE DIMENSIONS: Length: 600.00 feet [309]

WASTE TYPES AND AMOUNTS: Beta/gamma with readings to 200 mR/h [309,806].

KNOWN RELEASES: On July 31, 1967, residual contamination was detected from the UN-200-E-36 incident of July 24, 1967 [309].

CLEANUP ACTIONS: Sprinklers were set in the contaminated areas, and the blacktop was cleaned [309].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: UN-200-E-98 [361]

ALIASES:

UN-216-E-26, Ground Contamination East of C Plant [185];
UPR-200-E-98 [309]

SITE TYPE: Unplanned Release [309]

WASTE CATEGORY: Mixed Waste [NR]

WASTE TYPE: Solid [185]

STATUS: Inactive [309] Pre-1980 [309]

OCCURRENCE DATE: September 1980 [185]

OPERABLE UNIT: 200-SO-1 [329]

O.U. CATEGORY: Undefined [323]

DOE/RL PROGRAM: Environmental Restoration [358]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East, C Plant [309]

COORDINATES: N42250 W50000 [185]

LOCATION: The east side of C Plant near the base of the 291-C Stack and around the
216-C-2 Reverse Well [309]

GROUND ELEVATION: 680.00 feet above MSL [185]

WATER TABLE DEPTH: 405.00 feet below grade [NR]

WASTE TYPES AND AMOUNTS: Primarily Sr-90 [309].

KNOWN RELEASES: Radioactive particulate matter from the Hot Semiworks operations (1955
to 1965) was inadvertently spread to the ground surface. Residue contamination still
remains at the site [185].

COMMENTS: The actual occurrence date is unknown. It was established as a site in
September 1980 [185].

CLEANUP ACTIONS: The contamination has been removed and the site stabilized [803].

Waste Information Data System
General Summary Report
January 20, 1992

SITE NAME: UN-200-E-141 [361]

ALIASES:

2718-E Building Uranyl Nitrate Spill to Ground [315]

SITE TYPE: Unplanned Release [315]

WASTE CATEGORY: Mixed Waste [315]

WASTE TYPE: Liquid [315]

STATUS: Inactive [315] Post-1980 [315]

OCCURRENCE DATE: September 1984 [315]

OPERABLE UNIT: 200-SO-1 [329]

O.U. CATEGORY: Undefined [323]

DOE/RL PROGRAM: Environmental Restoration [358]

This site is included in the Tri-Party Agreement Action Plan [329]

HANFORD AREA: 200 East Area [315]

COORDINATES: N42000 W50790 [370]

WASTE VOLUME RECEIVED: 208.20 liters [315]

WASTE TYPES AND AMOUNTS: The release consisted of a 450-g/L solution of uranyl nitrate (corrosive), 84% U-235 (source radioactive) [315].

KNOWN RELEASES: The spill was caused by container failure due to corrosion [315].

ENVIRONMENTAL MONITORING: All liquids were removed from storage in the 2718-E Building. Contaminated asphalt and soil were removed until background levels of contamination were encountered [315].

RELEASE POTENTIAL: No potential for release exists [315].