

# START

BHO-CD-678

Volume 1

0012795

1 of 3

## Handbook

## 200 Areas Waste Sites

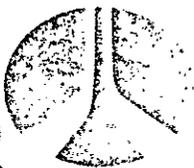
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Prepared for the United States  
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Rockwell Hanford Operations  
Energy Systems Group  
Richland, WA 99352

0012795  
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Volume I

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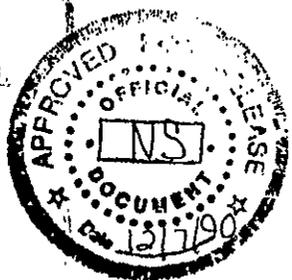
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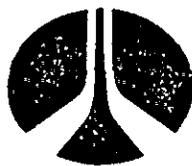
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## INTRODUCTION

Document RHO-CD-673 has been written as a handbook of radioactive waste sites and associated radiation areas within the 200 Areas and related environs. It does not include those sites within the confines of the Tank Farms.

It is primarily an updating and extension of the 200 Areas section of Document BNW-MA-88 (Resource Book - Disposition [Decontamination and Decommissioning] of Retired Contaminated Facilities at Hanford).

The document consists of three volumes:

- Volume I - Contains information about those sites within the 200 East Area.
- Volume II - Contains information about those sites within the 200 West Area.
- Volume III - . Contains information about those sites East of 200 East Area, south of 200 East Area, south of 200 West Area, within the 200 North Area, and the Gable Mountain Storage Vaults.

Volumes I and II are each divided into four sections called Quadrants: the northeast quadrant is indexed NE, the southeast quadrant - SE, the southwest quadrant - SW, and the northwest quadrant - NW.

Volume III is divided into quadrants containing those sites east of 200 East Area, indexed E-200 E; those south of 200 East Area, indexed S-200 E; those south of 200 West Area, indexed S-200 W; those in the 200 North Area, indexed 200 N; and the Gable Mountain Vaults, indexed Gable Mountain.

Each of the three volumes contain a master numerical index listing all of the sites by number and quadrant. In the front of each quadrant is an index of those sites within that quadrant.

Each volume contains indexes of Burial Grounds, Unplanned Release Sites, Ditches, Ponds, and Retention Basins.

All information concerning a site, such as maps, illustrations and photos, have been grouped with that site.

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## INDEX - MASTER NUMERICAL

Number	Type	Volume and Quadrant
216-A-1	Crib	III. E-200 E
216-A-2	Crib	I. SE
216-A-3	Crib	I. SE
216-A-4	Crib	I. SE
216-A-5	Crib	I. SE
216-A-6	Crib	III. E-200 E
216-A-7	Crib	III. E-200 E
216-A-8	Crib	III. E-200 E
216-A-9	Crib	I. SE
216-A-10	Crib	I. SE
216-A-11	French Drain	I. SE
216-A-12	French Drain	I. SE
216-A-13	French Drain	I. SE
216-A-14	French Drain	I. SE
216-A-15	French Drain	I. SE
216-A-16	French Drain	I. SE
216-A-17	French Drain	I. SE
216-A-18	Crib	III. E-200 E
216-A-19	Crib	III. E-200 E
216-A-20	Crib	III. E-200 E
216-A-21	Crib	I. SE
216-A-22	Crib	I. SE
216-A-23A	French Drain	I. SE
216-A-23B	French Drain	I. SE
216-A-24	Crib	III. E-200 E
216-A-25	Pond	III. E-200 E
216-A-26A	French Drain	I. SE
216-A-26B	French Drain	I. SE
216-A-27	Crib	I. SE
216-A-28	Crib	I. SE
216-A-29	Ditch	III. E-200 E
216-A-30	Crib	III. E-200 E
216-A-31	Crib	I. SE
216-A-32	Crib	I. SE
216-A-33	French Drain	I. SE
216-A-34	Crib	III. E-200 E
216-A-35	French Drain	I. SE
216-A-36A	Crib	I. SE
216-A-36B	Crib	I. SE
216-A-37	Crib	III. E-200 E
216-A-38	Crib	I. SE
216-A-39	Crib	I. SE
216-A-40	Crib	I. SE
216-A-41	Crib	I. SE
216-A-42	Trench	III. E-200 E

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## INDEX - MASTER NUMERICAL

Number	Type	Volume and Quadrant
216-B-1	Crib (not built)	
216-B-2-1	Ditch	I. NE
216-B-2-2	Ditch	I. NE
216-B-2-3	Ditch	I. NE
216-B-3	Pond	III. E-200 E
216-B-3-1	Ditch	III. E-200 E
216-B-3-2	Ditch	III. E-200 E
216-B-3-3	Ditch	III. E-200 E
216-B-4	Reverse Well	I. SW
216-B-5	Reverse Well	I. NE
216-B-6	Reverse Well	I. SW
216-B-7A	Crib	I. NE
216-B-7B	Crib	I. NE
216-B-8	Crib and Tile Field	I. NE
216-B-9	Crib and Tile Field	I. NE
216-B-10A	Crib	I. SW
216-B-10B	Crib	I. SW
216-B-11A	Reverse Well	I. NE
216-B-11B	Reverse Well	I. NE
216-B-12	Crib	I. NW
216-B-13	French Drain	I. SW
216-B-14	Crib	III. S-200 E
216-B-15	Crib	III. S-200 E
216-B-16	Crib	III. S-200 E
216-B-17	Crib	III. S-200 E
216-B-18	Crib	III. S-200 E
216-B-19	Crib	III. S-200 E
216-B-20	Trench	III. S-200 E
216-B-21	Trench	III. S-200 E
216-B-22	Trench	III. S-200 E
216-B-23	Trench	III. S-200 E
216-B-24	Trench	III. S-200 E
216-B-25	Trench	III. S-200 E
216-B-26	Trench	III. S-200 E
216-B-27	Trench	III. S-200 E
216-B-28	Trench	III. S-200 E
216-B-29	Trench	III. S-200 E
216-B-30	Trench	III. S-200 E
216-B-31	Trench	III. S-200 E
216-B-32	Trench	III. S-200 E
216-B-33	Trench	III. S-200 E
216-B-34	Trench	III. S-200 E
216-B-35	Trench	I. NW
216-B-36	Trench	I. NW
216-B-37	Trench	I. NW
216-B-38	Trench	I. NW
216-B-39	Trench	I. NW

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## INDEX - MASTER NUMERICAL

Number	Type	Volume and Quadrant
216-B-40	Trench	I. NW
216-B-41	Trench	I. NW
216-B-42	Trench	I. NW
216-B-43	Crib	I. NW
216-B-44	Crib	I. NW
216-B-45	Crib	I. NW
216-B-46	Crib	I. NW
216-B-47	Crib	I. NW
216-B-48	Crib	I. NW
216-B-49	Crib	I. NW
216-B-50	Crib	I. NW
216-B-51	French Drain	I. NW
216-B-52	Trench	III. S-200 E
216-B-53A	Trench	III. S-200 E
216-B-53B	Trench	III. S-200 E
216-B-54	Trench	III. S-200 E
216-B-55	Crib	I. NW
216-B-56	Crib	I. NE
216-B-57	Crib	I. NW
216-B-58	Trench	III. S-200 E
216-B-59	Trench	I. NE
216-B-60	Crib	I. NW
216-B-61	Crib	I. NW
216-B-62	Crib	I. NW
216-B-63	Trench	I. NE
216-C-1	Crib	I. SE
216-C-2	Reverse Well	I. SE
216-C-3	Crib	I. SE
216-C-4	Crib	I. SE
216-C-5	Crib	I. SE
216-C-6	Crib	I. SE
216-C-7	Crib	I. SE
216-C-8	French Drain	I. NE
216-C-9	Pond	I. NE
216-C-10	Crib	I. SE
216-S-1 & 2	Cribs	II. SE
216-S-3	Crib	II. SE
216-S-4	French Drain	II. SW
216-S-5	Crib	III. S-200 W
216-S-6	Crib	III. S-200 W
216-S-7	Crib	II. SE

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## INDEX - MASTER NUMERICAL

Number	Type	Volume and Quadrant
216-S-8	Trench	II. SE
216-S-9	Crib	II. SE
216-S-10	Ditch and Pond	III. S-200 W
216-S-11	Pond	III. S-200 W
216-S-12	Trench	II. SE
216-S-13	Crib	II. SE
216-S-14	Trench (released)	III. S-200 W
216-S-15	Pond	II. SE
216-S-16	Pond	III. S-200 W
216-S-17	Pond	III. S-200 W
216-S-18	Crib	II. SE
216-S-19	Pond	III. S-200 W
216-S-20	Crib	II. SE
216-S-21	Crib	II. SW
216-S-22	Crib	II. SE
216-S-23	Crib	II. SE
216-S-24	Crib (not built)	II. SE
216-S-25	Crib	III. S-200 W
216-T-1	Ditch	II. NE
216-T-2	Reverse Well	II. NE
216-T-3	Reverse Well	II. NE
216-T-4-1	Ditch	II. NW
216-T-4-1	Pond	II. NW
216-T-4-2	Ditch	II. NW
216-T-4-2	Pond	II. NW
216-T-5	Crib	II. NW
216-T-6	Crib	II. NE
216-T-7	Crib	II. NW
216-T-8	Crib	II. NE
216-T-9	Trench	II. NE
216-T-10	Trench	II. NE
216-T-11	Trench	II. NE
216-T-12	Pit	II. NE
216-T-13	Trench (exhumed)	II. NW
216-T-14	Trench	II. NE
216-T-15	Trench	II. NE
216-T-16	Trench	II. NE
216-T-17	Trench	II. NE
216-T-18	Crib	II. NE
216-T-19	Crib and Tile Field	II. NW

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## INDEX - MASTER NUMERICAL

Number	Type	Volume and Quadrant
216-T-20	Crib	II. NE
216-T-21	Trench	II. NW
216-T-22	Trench	II. NW
216-T-23	Trench	II. NW
216-T-24	Trench	II. NW
216-T-25	Trench	II. NW
216-T-26	Crib	II. NE
216-T-27	Crib	II. NE
216-T-28	Crib	II. NE
216-T-29	French Drain	II. NE
216-T-30	Unplanned Release Site	II. NE
216-T-31	French Drain (exhumed)	II. NW
216-T-32	Crib	II. NW
216-T-33	Crib	II. NE
216-T-34	Crib	II. NE
216-T-35	Crib	II. NE
216-T-36	Crib	II. NW
216-U-1	Crib	II. SE
216-U-2	Crib	II. SE
216-U-3	French Drain	II. SE
216-U-4	Reverse Well	II. SE
216-U-4A	Dry Well	II. SE
216-U-4B	Dry Well	II. SE
216-U-5	Trench	II. SE
216-U-6	Trench	II. SE
216-U-7	French Drain	II. SE
216-U-8	Crib	II. SE
216-U-9	Ditch	III. S-200 W
216-U-10	Pond	II. SW
216-U-11	Old Trench	III. S-200 W
216-U-11	New Trench	III. S-200 W
216-U-12	Crib	II. SE
216-U-13	Crib	II. SW
216-U-14	Ditch	II. SE
216-U-15	Crib	II. SE
216-Z-1	Ditch	II. SW
216-Z-1 & Z-2	Cribs	II. SW
216-Z-1A	Tile Field	II. SW
216-Z-1AA	Tile Field	II. SW
216-Z-1AB	Tile Field	II. SW
216-Z-1AC	Tile Field	II. SW

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Number	Type	Volume and Quadrant
216-Z-3	Crib	II. SW
216-Z-4	Crib	II. NW
216-Z-5	Crib	II. NW
216-Z-6	Crib	II. NW
216-Z-7	Crib	II. NW
216-Z-8	French Drain	II. SW
216-Z-9	Crib	II. SW
216-Z-10	Reverse Well	II. NW
216-Z-11	Ditch	II. SW
216-Z-12	Crib	II. SW
216-Z-13	French Drain	II. SW
216-Z-14	French Drain	II. SW
216-Z-15	French Drain	II. SW
216-Z-16	Crib	II. NW
216-Z-17	Trench	II. NW
216-Z-18	Crib	II. SW
216-Z-19	Ditch	II. SW

BURIAL GROUNDS

218-E-1	Burial Ground	I. SE
218-E-2	Burial Ground	I. NW
218-E-2A	Burial Ground	I. NW
218-E-3	Exhumed	
218-E-4	Burial Ground	I. NW
218-E-5	Burial Ground	I. NW
218-E-5A	Burial Ground	I. NW
218-E-6	Exhumed	
218-E-7	Vault	I. SW
218-E-8	Burial Ground	I. NE
218-E-9	Equipment Storage	I. NW
218-E-10	Burial Ground	I. NW
218-E-12A	Burial Ground	I. NE
218-E-12B	Burial Ground	I. NE
218-E-13	Burial Site	I. SE
218-E-14	Burial Tunnel	I. SE
218-E-15	Burial Tunnel	I. SE

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## INDEX - MASTER NUMERICAL

Number	Type	Volume and Quadrant
218-W-1	Burial Ground	II. NW
218-W-1A	Burial Ground	II. NE
218-W-2	Burial Ground	II. NW
218-W-2A	Burial Ground	II. NW
218-W-3	Burial Ground	II. NW
218-W-3A	Burial Ground	II. NW
218-W-4A	Burial Ground	II. NW
218-W-4B	Burial Ground	II. NW
218-W-4C	Burial Ground	II. SW
218-W-7	Vault	II. SE
218-W-8	Vault	II. NE
218-W-9	Burial Site	II. SE
218-W-11	Burial Ground	II. NW

UNPLANNED RELEASE SITES - 200 EAST AREA

UN-216-E-1	Ground Contam. Div. Box	241-B-151	I. NE
UN-216-E-2	Ground Contam. Div. Box	241-B-152	I. NW
UN-216-E-3	Ground Contam. Div. Box	241-B-153	I. NE
UN-216-E-4	Line Break	241-B-153	I. NE
UN-216-E-5	Ground Contam. Div. Box	241-B-154	I. NE
UN-216-E-6	Ground Contam. Div. Box	241-BX-155	I. NW
UN-216-E-7	Line Break	242-B to 207-B	I. NE
UN-216-E-8	Line Break	221-B, R-3	I. NW
UN-216-E-9	Line Break	241-CR-151	I. NE
UN-216-E-10	Line Break	211-C-152	I. NE
UN-216-E-11	Ground Contam. B-C Cribs Area	Controlled	III. S-200 E
UN-216-E-12	Catch Tank Leak	241-ER-151	I. SW
UN-216-E-13	Line Break	221-B, R-13	I. NW
UN-216-E-14	Line Break	241-C, SW corner	I. NE
UN-216-E-15	Line Leak	224-B, Backside	I. SW

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Number	Type	Volume and Quadrant
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UNPLANNED RELEASE SITES - 200 WEST AREA

UN-216-W-2	207-S Retention Basin Contamination	II. SE
UN-216-W-4	Ground Contam. North of 233-S	II. SE
UN-216-W-5	Line Break 23rd & Camden	II. NE
UN-216-W-6	Line Break 221-T, R-19	II. NE
UN-216-W-7	Ground Contam. East of 241-TX	II. NE
UN-216-W-9	Ground Contam. 221-U, R-3 - R-5	II. SE
UN-216-W-11	221-U Vessel Vent Blower Pit Contam.	II. SE
UN-216-W-12	Line Leak Backside 224-T	II. NE
UN-216-W-13	Line Break 216-Z-18 Crib Line	II. SW
UN-216-W-14	Leach Trench NE 216-U-10 Pond	II. SW
UN-216-W-15	Leach Trench E. 216-U-10 Pond-N.	II. SW
UN-216-W-16	Leach Trench E. 216-U-10 Pond-S.	II. SW
UN-216-W-17	Overflow Plain Southside 216-U-10 Pond	II. SW
UN-216-W-18	Line Break South end 216-S-9 Crib	II. SE
UN-216-W-19	Line Break East side 218-W-9	II. SE
UN-216-W-20	Pu Spoil Trench Near 216-Z-1 Ditch	II. SW
UN-216-W-21	Sludge Pits South side 207-U	II. SE
UN-216-W-22	Sludge Pits North side 207-U	II. SE
UN-216-W-23	Ground Contam. Hillside West of 241-TX-155	II. NE

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## INDEX - DITCHES

Number	Type	Volume and Quadrant
216-A-29	Purex Chem. Sewer	III. E-200 E
216-B-2-1	B Covered Ditch	I. NE
216-B-2-2	B Covered Ditch	I. NE
216-B-2-3	B Ditch Presently in Use	I. NE
216-B-3-1	B Covered Ditch - E. of 200 East	III. E-200 E
216-B-3-2	B Covered Ditch - E. of 200 East	III. E-200 E
216-B-3-3	B Ditch, E. of 200 East, Pres. in Use	III. E-200 E
216-S-10	Redox Chemical Sewer	III. S-200 W
216-T-1	221-T Head End	II. NE
216-T-4-1	T-Plant Old Covered Ditch	II. NW
216-T-4-2	T-Plant Ditch - Presently in Use	II. NW
216-U-9	Overflow Ditch to 216-S-16 & 17 Partially Covered - Not in Use	III. S-200 W
216-U-11	Overflow from U-10 Pond	III. S-200 W
216-U-14	Laundry Ditch	II. SE
216-Z-1	Z-Plant Buried Ditch	II. SW
216-Z-11	Z-Plant Buried Ditch	II. SW
216-Z-19	Z Plant Ditch, Presently in Use	II. SW

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## INDEX - PONDS

Number	Type	Volume and Quadrant
216-A-25	Pond, Gable Mountain	III. E-200 E
216-B-3	Pond, B Plant	III. E-200 E
216-C-9	Pond, Bottom of 221-C excavation	I. NE
N-1	200 N Area - Released from Rad. Zone	III. 200 N
N-4	200 N Area - (Covered)	III. 200 N
N-6	200 N Area - (Covered)	III. 200 N
216-S-10	Old Redox Leach Pond	III. S-200 W
216-S-11	Old Redox Leach Pond (East of S-10)	III. S-200 W
216-S-15	Covered Small Pond - East of 241-S	II. SE
216-S-16	Redox Covered Ponds	III. S-200 W
216-S-17	Redox Covered Pond	III. S-200 W
216-S-19	222-S Lab Pond	III. S-200 W
216-T-4-1	T-Plant Pond - Released from Rad. Zone	II. NW
216-T-4-2	T-Plant new Pond - Not Contaminated	II. NW
216-U-10	U-Pond	II. SW

9 2 1 2 5 1 1 2 1 5

## INDEX - RETENTION BASINS

Number	Type	Volume and Quadrant
207-A	242-A Evaporator	III. E-200 E
207-B	B-Plant	I. NE
207-S	Redox (covered)	II. SE
207-SL	Redox Laboratory	II. SE
207-T	T-Plant	II. NE
207-U	U-Plant	II. SE

9 2 1 2 5 1 1 2 1 6

REFERENCE DOCUMENTS

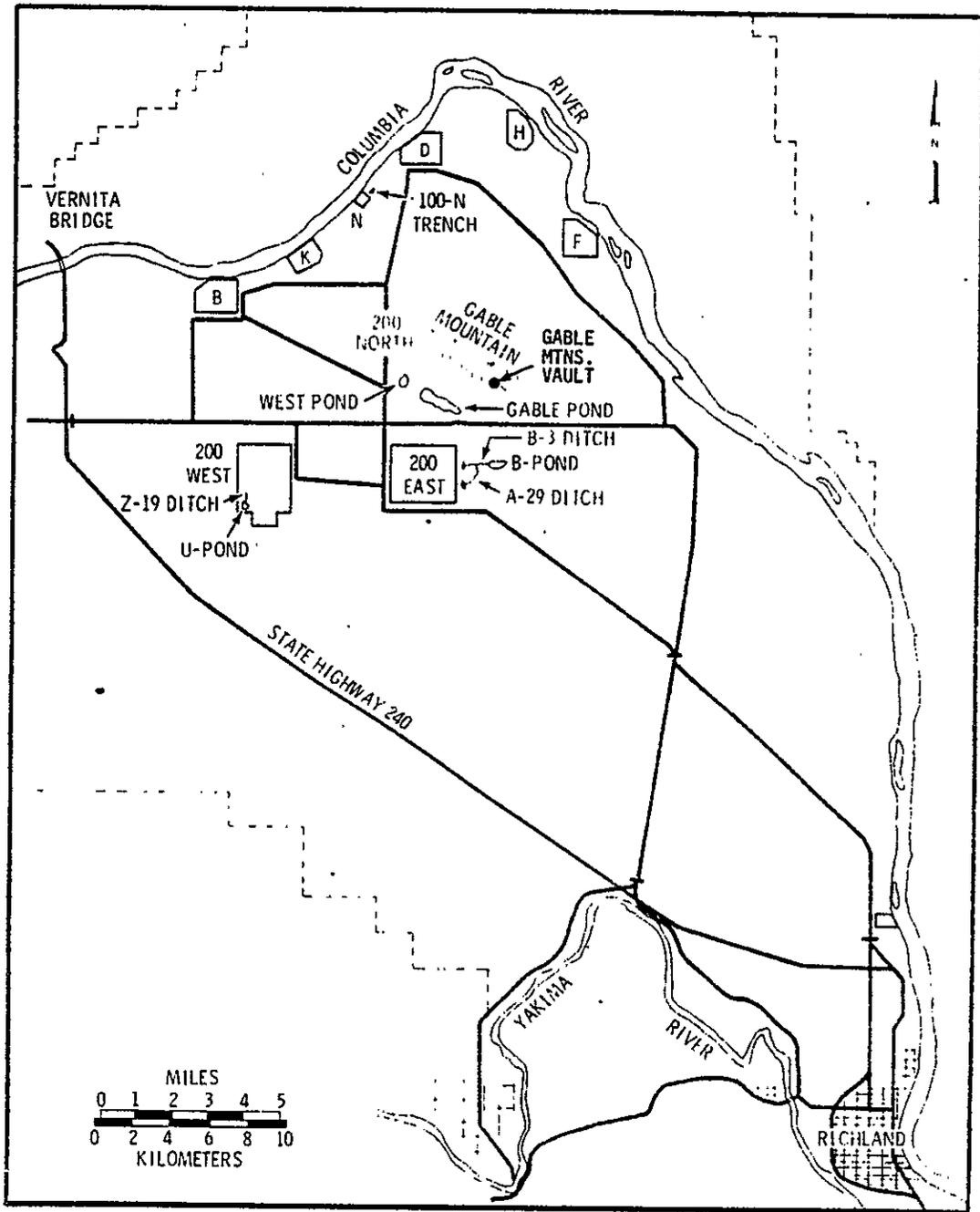
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  2. RHO-CD-78-34 2Qtr. Radioactive Liquid Wastes Discharged to Ground in the 200 Areas During the First Half of 1978.  
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  3. RHO-LD-78-24 3Qtr. Summary of Radioactive Solid Waste Burials in the 200 Areas During the First Three Quarters of 1978.  
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  9. ARH-2155 Radioactive Liquid Waste Disposal Facilities - 200 West Area.  
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  10. ARH-2190 Outdoor Radiation Zones in the 200 West Area.  
L. L. Lundgren
  11. Letterbook and Activity Report Book from 1957 through 1977. (Books in Possession of J. V. Panesko.)  
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13. ARH-2757 Part 4 Radioactive Contamination in Unplanned Releases to Ground Within the Chemical Separations Area Control Zone Through 1972.  
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J. M. Selby  
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16. HW-57830 Isolation of Abandoned or Depleted Waste Disposal Sites. 1958  
R. C. Tabasinske

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**HANFORD SITE MAP**

VOLUME I 200 EAST AREA - Northeast Quadrant (NE)

## Waste Disposal Sites and Associated Radiation Zones

## Quadrant Boundaries

- East Boundary - Canton Avenue, known as the "East Fenceline Road".
- South Boundary - 7th Street from Baltimore Avenue to Canton Avenue.
- West Boundary - Baltimore Avenue from 7th Street to 12th Street.
- North Boundary - 12th Street, known as the "North Fenceline Road".

See Area and Quadrant maps at the end of this section.

How to read the Index and locate a site:

Example - 216-B-2-1 Ditch

<u>Site Number</u>	<u>Volume</u>	<u>Quadrant</u>
216-B-2-1 Ditch	I.	NE (Northeast)

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## INDEX - VOLUME I 200 EAST AREA

## Northeast Quadrant

216-B-2-1 Ditch (covered)	I. NE
216-B-2-2 Ditch (covered)	I. NE
216-B-2-3 Ditch	I. NE
216-B-5 Ditch	I. NE
216-B-7A Crib	I. NE
216-B-7B Crib	I. NE
216-B-8 Crib and Tile Field	I. NE
216-B-9 Crib and Tile Field	I. NE
216-B-11A Reverse Well	I. NE
216-B-11B Reverse Well	I. NE
216-B-51 French Drain	I. NE
216-B-56 Crib	I. NE
216-B-59 Crib	I. NE
216-B-63 Crib	I. NE
216-C-8 French Drain	I. NE
216-C-9 Pond	I. NE
218-E-8 Burial Ground	I. NE
218-E-12A Burial Ground	I. NE
218-E-12B Burial Ground	I. NE
UN-216-E-1 Unplanned Release	I. NE
UN-216-E-3 Unplanned Release	I. NE
UN-216-E-4 Unplanned Release	I. NE
UN-216-E-5 Unplanned Release	I. NE
UN-216-E-7 Unplanned Release	I. NE
UN-216-E-9 Unplanned Release	I. NE
UN-216-E-10 Unplanned Release	I. NE
UN-216-E-14 Unplanned Release	I. NE
207-B Retention Basin	I. NE

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<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Ditch		B Ditch	216-B-2-1
<u>Location</u> 200 East, N.E. Quadrant		<u>Service Dates</u>	<u>Status</u>
Head end near the 207-B Retention Basins. Goes underground near the northeast corner of the 216-E-12-A Burial Grounds.		4/45-11/63	Covered
<u>Site Coordinates</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
Head end N-44975, W-51900 Lower end N-44175, W-48550	H-2-34761 H-2-2431	644 ft to 629 ft Water Table 404 ft(1973) <u>Site Depth</u> 6 ft	
<u>Source and Description of Waste</u>			
Received B Plant process cooling water. A transport system to the 216-B-3-1 Ditch and on into the 216-B-3 Pond.			
<u>Description of Facility</u>			
Open trench 15 feet wide at ground level and 6 feet deep. Approximately 3500 feet long.			
<u>Radionuclide Content</u> - Unknown - See following write up.			
<u>History:</u>			
On November 7, 1963, a coil leak developed in the 221-B Building 6-1 tank, which was utilized for storing the cerium-rare earth fraction of the fission product stream, which resulted in gross contamination of the 207-B Water Retention Basin and the head end of the 216-B-2-1 Ditch. It was estimated that less than a half a liter of tank contents were discharged to the cooling water stream.			
<u>Corrective Action Taken</u>			
After damming off the 216-B-2-1 Ditch, approximately 1000 feet downstream from the head end discharge pipe, the contaminated basin water was flushed into the ditch.			

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216-B-2-1  
(UN-216-E-16) continued

History:

Continued flushing of the north basin with a fire hose into the dammed off ditch greatly reduced the radioactivity in the basin. The walls of the north basin were then sealed with a oil-tar solution to contain the remaining smearable contamination.

Tumbleweeds driven by high winds into the contaminated ditch were removed and buried in the 200 East Area burial grounds.

Contaminated ground surfaces around the 207-E Retention Basins and along the 216-B-2-1 Ditch were scraped clean or covered with clean fill dirt.

A new ditch, 216-B-2-2, was dug parallel to the 216-B-2-1 Ditch.

Note: The new ditch was dug back into the old ditch near the west fence line of the 218-B-12A Burial Grounds, so that the last 1000 feet of the two ditches is common in the old 216-B-2-1 Ditch.

The contaminated 216-B-2-1 Ditch was covered with clean fill dirt.

In 1969 and 1970 contaminated Russian thistle were found growing above the 216-B-2-1 Ditch. Action was taken to cover the ditch with a plastic weed root barrier. The work was finished in the fall of 1973. It included the following:

Leveling of the ground surface over the ditch.

Spreading a 4-inch sand cushion on which to lay the plastic sheeting.

The laying of the plastic sheeting, 10 mil thick, 32 feet wide, and approximately 2400 feet long.

An 18-inch cover of sand.

A 4-inch topping of gravel to prevent erosion by wind.

No contaminated plant growth has been found since the plastic was laid.

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January 9, 1964

W. A. Haney  
Chemical Effluents technology  
Chemical Laboratory  
Hanford Laboratories

The coil failure in B-Plant tank 3-11-2 in November, 1963, resulted in the release of radioactivity, primarily Cerium-144, via the process cooling water effluent header to the B-Plant retention basins. This contaminated water was subsequently cribbed using the old B-Plant drainage ditch.

The total amount of liquid discharged to the trench was estimated to be 1.3 million gallons. of this amount, flushed and low activity level cooling water discharges during flushes accounted for approximately 1.1 million gallons. No complexing agents were used for the decontamination.

The amount of activity released was estimated from sample analyses and estimated retention basin volume prior to discharge. Pertinent data are as follows:

Ce-144	30 curies
Sr-90	.05 curies

The Ce-141 content was insignificant. The Sr 89/90 curie ration was approximately 4.

The contaminated section of the old ditch (approximately 1000 feet) has been backfilled and replaced with a new ditch. The retention basin walls were decontaminated and then coated with asphalt-oil emulsion.

S. G. Smolen, Manager  
Fission Products Processing  
Purex Operation

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November 26, 1963

W. M. Harty  
Manager - Purex

## B-PLANT COOLING WATER RETENTION BASINS

### INTRODUCTION

On November 7, 1963, a coil leak developed in the B-Plant 6-1 tank which is utilized for storing the cerium-rare earth fraction of the fission product stream resulting in gross contamination of the water retention basin. The cooling water detection device which monitors the water stream entering the basins functioned well and the burst of activity was detected immediately. It is estimated that less than a half liter of tank contents were discharged to the pond and no weight factor increase was noted in the 6-1 tank with full coil pressure on over an extended period of time. It is therefore postulated that the coil leak cannot be much greater than a hair line crack.

### ACTION TAKEN

Corrective measures were taken immediately to Fission Product Processing Supervision and consisted of the following action:

1. Basin samples were taken immediately to verify the validity of the cooling water monitor with positive results indicated by sample and general basin area radiation readings.
2. Dry wells behind the 221-B Building were monitored and the leak isolated to Cell 6.
3. Contents of the 6-1 tank were moved to another vessel.
4. Water flow to the basins was reduced to a minimum.
5. Coil discharge water from Coil 6 vessels was sampled to verify that the leak had been in the 6-1 tank coil.
6. High radiation levels in the piping to the basins and around the basin ponds were established as radiation zones.

### IMMEDIATE CORRECTIVE ACTION

Plans were made for the disposal of the contaminated cooling water in the basin with the following action taken:

1. The basin was emptied to the ditch which routes the water to the B-Plant swamp after damming the ditch approximately 1000 feet below the discharge pipe. Prior recommendations and approval of Soils Effluents Technology was solicited.

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WM Harty

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2. The basins were flushed and washed down with fire hoses numerous times to reduce radiation levels.
3. Tumbleweeds in the pond, which were highly contaminated, were bagged and removed to the burial garden. However, more weeds blew in at a later date during a period of high winds.
4. A new trench for diverting basin effluent water to the B-Plant swamp was excavated as the old ditch was used as a disposal crib to handle the contaminated water.
5. The walls of the north basin which had high radiation smears were sealed with an oil-tar solution.
6. Basin discharge water was diverted to the new ditch and the contaminated old ditch was backfilled.
7. Contaminated ground areas adjacent to the basins were covered with fresh dirt.

#### LONG RANGE CORRECTIVE PLANNING

The loss of very minute quantities of concentrated fission product fractions to the cooling water discharge system causes considerable risk to the environs which necessitates further preventative measures to this system. It can be assumed that additional leaks will be experienced in the future. The following longer range steps have been taken to minimize the consequences of future leaks:

1. An eight-foot hog-wire fence has been erected around the basin area to keep tumbleweeds out of the pond. This fence will also keep any weeds which come over the fence confined inside the basin area.
2. Since the possibility of getting contaminated solution in a leaking vessel cooling coil is greatest when steam is used on the coil, the steam inlets to all cooling coils have been isolated. When steam is required on any of these coils, it will be re-installed under closely controlled conditions.
3. Facilities Engineering is investigating a means of lining the basins with a plastic or similar coating to minimize the problem of cleaning basins if they should receive a batch of contaminated cooling water.
4. An alternate drain routing from the pond is being investigated to provide a ready means of discharge to an open crib area for rapid disposal of highly contaminated cooling water.

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11-26-63

5. A cost estimate for covering the disposal basins is being obtained and the basins will be covered if the wire fencing is found to be inadequate for tumbleweed control. These covered basins would then serve as temporary recoverable caverns in disposing of cooling water. Complete diversion of all B-Plant cooling water to underground cribs is impractical due to the large volumes of water discharged.

S. G. Smolen, Manager  
Fission Products Processing  
Purex Operation

SGS:dc

cc: Shift Supervision  
File (2)

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
Ditch			216-B-2-2
<u>Location</u> 200 East, N.E. Quadrant Head end - Near the 207-B Retention Basin Lower end - Terminates into the 216-B-2-1 Ditch near the west fence line of the 218-E-12-A Burial Ground.		<u>Service Dates</u> 11/63-4/70	<u>Status</u> Covered
<u>Site Coordinates</u> (Approximate) Head end N-44930, W-51950 Lower end N-44400, W-49600	<u>Reference Drawings</u> H-2-34761	<u>Elevations</u> 644 ft to 629 ft Water Table 404 ft (1973) <u>Site Depth</u> 6 to 8 ft	
<u>Source and Description of Waste</u> Process cooling water from the 221-B Processing Plant. ITS (In-tank-Solidification) cooling water from the 241-BY Tank Farm.			
<u>Description of Facility</u> Open trench approximately 15 ft wide at ground level and 6 to 8 feet deep at the upper end, 3500 feet long. A water transport system from B-Plant to the 216-B-3 Pond.			
<u>Radionuclide Content</u> (calculated from discharge data)  A breakdown of the release of radioactive materials to the B-2-2 Ditch and the B-3 Pond, March 22, 1970 incident is as follows:			
	<u>B-2 Ditch</u>	<u>B-3 Pond</u>	
Total Beta (Ci)	1495	154	
<sup>90</sup> Sr (Ci)	950	50	
<sup>144</sup> CePr (Ci)*	96	54	
<sup>137</sup> Cs (Ci)	1	13	
* <sup>144</sup> Ce is 1/2 of <sup>144</sup> CePr value			
<u>History:</u> The chain link fence along the south side of the 216-B-2-3 Ditch near the northeast corner of the 218-E-12-A Burial ground was mistakenly placed directly over the old covered 216-B-2-2 Ditch. Radioactive Russian thistle have been found to be growing under and on both sides of the fence at that location.  Also, further west where the road crosses the ditch (near the S.W. corner of the 218-E-12-A Burial Ground) radioactive weeds have been found to be growing over the combined 216-B-2-1 and 216-B-2-2 covered Ditches.			
(See following Attachments)			

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221-B BUILDING  
STRONTIUM 90 RELEASE  
March 22, 1970  
Contract AT(45-1)-2130

SUMMARY

An estimated 1,000 curie strontium 90 release occurred at B Plant during an attempted measurement of the liquid level in the strontium 90 product storage tank 8-1, March 22, 1970. A portable manometer system (temporary instrumentation) was being used during an upgrading program of the normal tank instrumentation. A leak at or near the gallery end of a Tygon tubing manometer sensing line allowed strontium 90 bearing solution to be pumped from the storage tank out through the leak in the sensing line by an airlift action created by purge air (air used for the dilution of radiolytically produced free hydrogen). This purge air was expelled through a line deep in the 8-1 tank, and bubbled up the adjacent weight factor line. This airlift pumping action was stopped by removing the connecting pipe jumper in the canyon cell. The product solution entered the pipe gallery floor drain and the chemical sewer, which empties into the "B" Ditch (an open ditch and some tile line approximately a mile and one half long) that empties into the "B" swamp (an open 25 acre pond). Radiation levels of 500 rads/hour at three or four inches existed in the pipe gallery. Water samples taken from the "B" swamp reached a maximum strontium 90 concentration of  $1.7 \times 10^{-3} \mu\text{Ci/ml}$ .

Action Taken

Three earthen dams were constructed at intervals across the ditch in the first 600 feet of the ditch. They served as settling ponds during the subsequent flushing of the piping system from B-Plant and the 207 Retention Basins. They also prevented additional contamination from further contaminating the B-3 Ditch and B-3 Pond. Chicken wire was placed over the three settling ponds to prevent tumbleweeds from blowing in or out of the ditch. The wire also acted as a barrier against intrusion by waterfowl.

216-B-2 Open Ditch Contamination:

## Check Points (In the Three Settling Ponds)

	B-2-1	B-2-2	B-2-3	B-2-4	B-2-5
3/23/70					
6:00 a.m.	5 rads/hr			500 mrad/hr	230 mrad/hr
4:00 p.m.	5 rads/hr	50 mrad/hr	180 mrad/hr	5 rads/hr	2.5 rads/hr
3/24/70					
6:00 a.m.	2 rads/hr	10 mrad/hr	5 mrad/hr	2 rads/hr	1 rad/hr

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216-B-2-2 continuedHistory continued

After the piping system from B-Plant had been flushed, a new ditch (216-B-2-3) was dug the entire length of the old original 216-B-2-1 Ditch, and the B-Plant cooling water was diverted to the new ditch. The contaminated 216-B-2-2 Ditch was covered with clean dirt to ground level.

A young Willow tree and numerous Russian thistle were found to be growing over the ditch during the summer of 1971. These were found to be internally contaminated to a maximum of 3000 c/m beta-gamma activity.

Action was taken to cover the first 2400 feet of the ditch with a plastic sheet root barrier (see 216-B-B-2-2):

- 4 inches of sand
- a 10 mil plastic sheet root barrier
- 18 inches of sand
- 4 inches of gravel topping

The work was finished in 1973. The lower 1200 feet of the ditch was not so treated. Since the summer of 1973, the plastic portion of the covered 216-B-2-2 Ditch has been free from radioactive contaminated vegetation growth. However, on the untreated end of the ditch there have been found Russian thistle growing bearing low level beta-gamma contamination to 1500 c/m.

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April 23, 1970

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ISSUING FILE

**Atlantic Richfield Hanford Company**

RICHLAND, WASHINGTON

TITLE AND AUTHOR

PART - I  
221-B BUILDING  
STRONTIUM 90 RELEASE  
MARCH 22, 1970  
Contract AT(45-1)-2130

N. P. Nisick (Secretary)

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18. L. I. Brecke	234-5	200W	34. A. E. Smith	703	700
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ARH-1648 PT1

PART I  
221-B BUILDING  
STRONTIUM 90 RELEASE  
MARCH 22, 1970  
Contract AT(45-1)-2130

By:

R. E. Smith (Chairman)  
R. C. Forsman  
D. J. Larkin  
B. J. McMurray  
N. P. Nisick (Secretary)  
R. C. Roal

April 23, 1970

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ARH-1648 PT1

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    C. Personnel Contamination and Exposure - - - - - 4

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ATTACHMENTS

- Exhibit A - Pre-Job Safety Plan for "Weight Factor Determination using Portable Manometer at Wall Nozzles".
- Exhibit B - Photograph of typical portable manometer.
- Exhibit C - Drawing No. SK-2-22057(Cross Section and Hydraulic Schematic).
- Exhibit D - Drawing No. H-2-32740(Jumper Assembly).
- Exhibit E - Drawing No. H-2-60908(Cell 8 Arrangement).
- Exhibit F - Drawing No. SK-2-22056(Chemical Sewer Plot Plan).
- Exhibit G - Analysis of the 8-1 tank strontium 90 product.

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ARH-1648 PT1

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PART - I  
221-B BUILDING  
STRONTIUM 90 RELEASE  
MARCH 22, 1970  
Contract AT(45-1)-2130

SUMMARY

An estimated 1,000 curie strontium 90 release occurred at B Plant during an attempted measurement of the liquid level in the strontium 90 product storage tank 8-1, March 22, 1970. A portable manometer system (temporary instrumentation) was being used during an upgrading program of the normal tank instrumentation. A leak at or near the gallery end of a Tygon tubing manometer sensing line allowed strontium 90 bearing solution to be pumped from the storage tank out through the leak in the sensing line by an airlift action created by purge air (air used for the dilution of radiolytically produced free hydrogen). This purge air was expelled through a line deep in the 8-1 tank, and bubbled up the adjacent weight factor line. This airlift pumping action was stopped by removing the connecting pipe jumper in the canyon cell. The product solution entered the pipe gallery floor drain and the chemical sewer, which empties into the "B" ditch (an open ditch and some tile line approximately a mile and one half long) that empties into the "B" swamp (an open 25 acre pond). Radiation levels of 500 rads/hour at three or four inches existed in the pipe gallery. Water samples taken from the "B" swamp reached a maximum strontium 90 concentration of  $1.7 \times 10^{-3}$   $\mu\text{Ci/ml}$ .

SCOPE OF INVESTIGATION

The incident is investigated as a Type B Occurrence following standards of investigation and reporting as defined in AEC Manual Chapter 0502.

DESCRIPTION OF THE OCCURRENCE

The installed piping to the instruments' normally used for determining the specific gravity and liquid level in the B Plant strontium 90 product storage tank 8-1 had been removed along with the instrument piping for several adjacent tanks in an instrument upgrading program. On Sunday, March 22, 1970, at approximately 7:25 a.m., the instrument technician on shift accompanied by a radiation monitor attempted to obtain the periodic 8-1 tank liquid level measurement, (Exhibit A, the procedure being followed: Pre-Job Safety Plan for "Weight Factor Determination using Portable Manometer at Wall Nozzles"). The portable manometer, (Exhibit B, photograph of typical portable manometer), used for this purpose was connected to 7-1 tank lines. Surveys made by the radiation monitor as the Tygon manometer lines were removed from the 7-1 tank, revealed no contamination. The instrument technician fastened the Tygon manometer lines, coming down from the operating gallery, to the 8-1 tank

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sensing lines at section 4 in the pipe gallery, and the radiation monitor left the pipe gallery (The services of a radiation monitor are no longer required on completion of the line breaking). The sensing line wall valves were closed and remained closed at this time, (Exhibit C, drawing No. SK-2-22057). The adjacent dilution air valve was open, and approximately 3 cfm of dilution air was being delivered to the 8-1 storage tank. The technician left the pipe gallery and went up to the operating gallery where the portable manometer was located. He checked the manometer valving and found the two inlet valves closed, and the equalizer valve open, as they should be. He then turned on the two purgerator air flows, and noted that one of the purgerator balls rose and then started to fall. He could not recall having observed the action of the other purgerator ball. (Both purgerator balls should have risen as air entered the Tygon lines, and should have returned to zero as the pressure equalized against the closed wall valves if there were no leaks in the system.) On returning to the pipe gallery, he opened the two valves to the 8-1 tank. He then returned to the manometer in the operating gallery where he opened the valve to the low pressure side of the manometer, closed the equalizer valve, opened the valve to the high pressure side of the manometer, and adjusted the purgerator air flows to approximately 1.5 cfh. He immediately noted that the manometer was fluctuating at a reading corresponding to 20 to 30 inches of water, when he had been expecting a steady reading of approximately 156 inches of water. He heard the operating gallery section 9-10 air monitor alarm, and quickly realized that something was wrong; valved out the manometer, and increased the purgerator airflow. As he went for radiation monitoring help (approximately 7:35 a.m.), he noted that the section 7-8 air monitor reading was up, but the instrument was not yet alarming. On obtaining radiation monitoring assistance, they headed back to the pipe gallery, but did not go past the entry to the gallery at section 11 due to the high radiation level encountered. The shift specialist was immediately notified, and he proceeded to section 5 of the pipe gallery to look at the manometer lines hooked up to the 8-1 tank. He observed that one of the Tygon lines was pulsating, and that a fan-shaped spray appeared to be coming from the line near the pipe gallery wall, a foot or two below the wall valves. Poor visibility, due to interfering pipes and a bad viewing angle, prevented his being able to see well, and high radiation levels prevented his going closer.

The purgerator air was shut off in the operating gallery, and the fan-shaped spray appeared to stop; but the line pulsating continued. The canyon remote crane operator proceeded to cell 8, cleared and removed the cover blocks and removed the pipe jumper from the leaking system at approximately 8:35 a.m., stopping any further airlifting of strontium 90 product into the pipe gallery, (Exhibit D, drawing No. H-2-32740)(Exhibit E, drawing No. H-2-60908). To prevent the drying and further spread of airborne strontium 90 contamination

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in the pipe and operating galleries, several small water hoses were directed at the contaminated area. The bulk of the strontium 90 product solution along with the water from the hoses ran to the floor drains and into the chemical sewer which empties to the open "B" ditch about one half mile away, which in turn empties into the "B" swamp, (Exhibit F, drawing No. SK-2-22056). Comprehensive radiation surveys, stabilization and contamination controls, air, water, and water fowl sampling, and decontamination efforts were promptly started and are continuing.

#### RADIATION MONITORING SURVEY INFORMATION

##### A. Building Contamination:

Initial radiation surveys on March 22, 1970, revealed the following radiation levels in the pipe gallery at the occurrence site:

Tygon tubing from the manometer	500 rads/hr at 4" 20 rads/hr at 6'
Floor drain at cell 8	500 rads/hr at 3"
Smearable contamination	1 rad/hr

Operating gallery radiation levels were found to be as follows:

Maximum at openings through the floor to the pipe gallery at cell 8	250 mrad/hr
Smearable contamination	20,000 c/m

Electrical gallery contamination resulting from water leaking from the pipe gallery above was found to a maximum of 400 mrad/hr.

Airborne contamination was expelled from the pipe gallery by exhaust fans into the following immediately adjacent areas:

Organic Make Up	6,000 c/m
Cold Chemical Storage Tank Farm	600 c/m
Loading Dock	5,000 c/m
Paint Storage	2,000 c/m

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Levels of contamination measured in the manholes of the chemical sewer at about 3:00 p.m., March 22, 1970, (reference Exhibit F, drawing No. SK-2-22056):

Manhole No. 1	55 mrads/hr
Manhole No. 2	5 mrads/hr
Manhole No. 3	30,000 c/m
Manhole No. 4	20,000 c/m
Manhole No. 5	2,000 c/m

B. 216-B-2 Open Ditch Contamination:

Check Points (reference Exhibit F, drawing No. SK-2-22056)

	B-2-1	B-2-2	B-2-3	B-2-4	B-2-5
3/23/70					
6:00 a.m.	5 rads/hr			500 mrads/hr	230 mrads/hr
4:00 p.m.	5 rads/hr	50 mrads/hr	180 mrads/hr	5 rads/hr	2.5 rads/hr
3/24/70					
6:00 a.m.	2 rads/hr	10 mrads/hr	5 mrads/hr	2 rads/hr	1 rad/hr

C. Personnel Contamination and Exposure:

One employee had general low-level skin contamination and nasal contamination up to 30,000 counts per minute. Five other employees received low-level contamination to small skin areas. Subsequent whole body counts have revealed internal deposition of strontium 90 to be less than 10 percent of the allowable.

All personnel exposures were less than 400 mrads for the period February 28, 1970, through March 27, 1970, as determined by their film badge dosimeters.

OBSERVATIONS

1. The limit for the surface disposal of radioactive liquid effluents was exceeded ( $5 \times 10^{-5}$   $\mu\text{Ci/ml}$ ).
2. The strontium product in tank 8-1 contained 0.2 Ci/ml  $^{90}\text{Sr}$  (800 Ci/gal), (Exhibit G, sample analysis results).
3. To reduce the amount of water going to the chemical sewer and on to the open "B" ditch, sprinkler nozzles were installed on the hoses later in the day, March 22, 1970.

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4. The jumper, as shown in Exhibit D, drawing No. H-2-32740, was mocked-up; and it was demonstrated that purge air from line "D" could enter and rise in line "B" resulting in an airlift action that could pump liquid out of a leaking manometer line.
5. The instrument technician followed normal procedures in attempting to obtain the liquid level measurement, (Exhibit A, Pre-Job Safety Plan for "Weight Factor Determination using Portable Manometer at Wall Nozzles").
6. Two simultaneous events were required to allow the release to occur:  
a) The airlift action in the canyon pipe jumper, and b) The undetected leak in the manometer line.
7. The instrument technician at no time heard or noted an air leak in the manometer lines.
8. The use of portable manometers for obtaining remote liquid level measurements, for verifying remote liquid level measurements, and for calibrating installed remote liquid level instruments is an accepted approved practice in all remote chemical processing facilities.
9. The chemical sewer normally discharges about 65 gal/min into the head end of the open "B" ditch.
10. Normally, about 500,000 gal/8 hours of cooling water from the 221-B Building is periodically emptied into the head end of the open "B" ditch.
11. No cooling water from the 221-B Building was emptying into the open "B" ditch at the time of the strontium release to the chemical sewer, and the retention basin drain was re-routed to the emergency retention ditch before either section had to be emptied again. (The cooling water goes to a two section retention basin. The sections are sequentially filled and emptied. The full section is sampled, the sample monitored for radioactivity, and then normally emptied to the open "B" ditch.)
12. About 350 gal/min of cooling water from the ITS (In-Tank Solidification) units I and II were also being discharged into the head end of the open "B" ditch via separate piping systems.
13. The ITS-I cooling water was re-routed through the retention basin to the emergency retention ditch on the evening of March 22, 1970.

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14. The ITS-II cooling water could not be diverted, so ITS-II was shut down the following morning leaving only water from the chemical sewer still entering the open "B" ditch by 10:30 a.m., on March 23, 1970.
15. There was no available way to divert the chemical sewer flow from the "B" ditch.
16. Strontium 90 contamination was detected in the head end of the open "B" ditch at 8:00 p.m., on March 22, 1970.
17. All employees except emergency personnel using proper protective equipment were removed from the 271-B Building from 10:00 a.m. until noon, on March 22, 1970, while the extent of airborne contamination was being determined.
18. To prevent the further spread of airborne contamination outside of the 221-B Building, the pipe gallery exhaust fans were shut off immediately following the occurrence on March 22, 1970.
19. Earthen dams were built in the open "B" ditch on the afternoon of March 23, 1970, to keep as much contamination as possible out of the "B" swamp.
20. Chicken wire was placed over the "B" ditch to keep tumble weeds from blowing in or out of the contaminated open ditch.
21. There has been no detectable spread of contamination out of the ditch or swamp due to wind action.
22. It was not possible to determine the exact nature and location of the leak at or near the gallery wall end of the manometer line due to the high radiation level (500 rads/hr at 4", 20 rads/hr at 6'). The line was removed remotely and buried.

INVESTIGATIVE COMMITTEE

*R. E. Smith*  
 R. E. Smith, Manager (Chairman)  
 Waste Management

4-23-70  
 Date

*R. C. Forsman*  
 R. C. Forsman, Senior Engineer  
 Purex

4-23-70  
 Date

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*D. J. Larkin*

D. J. Larkin, Senior Engineer  
Waste Management Process Engineering

4-23-70

Date

*B. J. McMurray*

B. J. McMurray, Manager  
Radiation Monitoring

4-23-70

Date

*N. P. Nisick*

N. P. Nisick, Senior Engineer (Secretary)  
Personnel Protection

4-23-70

Date

*R. C. Roal*

R. C. Roal, Manager  
Separations Process Design Engineering

4-23-70

Date

ATTACHMENTS:

- Exhibit A. Pre-Job Safety Plan for "Weight Factor Determination using Portable Manometer at Wall Nozzles".
- Exhibit B. Photograph of typical portable manometer.
- Exhibit C. Drawing No. SK-2-22057 (Cross Section and Hydraulic Schematic).
- Exhibit D. Drawing No. H-2-32740 (Jumper Assembly).
- Exhibit E. Drawing No. H-2-60908 (Cell 8 Arrangement).
- Exhibit F. Drawing No. SK-2-22056 (Chemical Sewer Plot Plan).
- Exhibit G. Analysis of the 8-1 tank strontium 90 product.

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ARH-1648 PT2

PART - II  
221-B BUILDING  
STRONTIUM 90 RELEASE  
MARCH 22, 1970  
Contract AT(45-1)-2130

By:

R. E. Smith (Chairman)  
R. C. Forsman  
D. J. Larkin  
B. J. McMurray  
N. P. Nisick (Secretary)  
R. C. Roal

April 23, 1970

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ATTACHMENT

Exhibit H - Letter setting up investigative committee.

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PART - II  
 221-B BUILDING  
 STRONTIUM 90 RELEASE  
 MARCH 22, 1970  
 Contract AT(45-1)-2130

SUMMARY

An estimated 1,000 curie strontium 90 release occurred at B Plant during an attempted measurement of the liquid level in the strontium 90 product storage tank 8-1, March 22, 1970. A portable manometer system (temporary instrumentation) was being used during an upgrading program of the normal tank instrumentation. A leak at or near the gallery end of a Tygon tubing manometer sending line allowed strontium 90 bearing solution to be pumped from the storage tank out through the leak in the sensing line by an airlift action created by purge air (air used for the dilution of radiolytically produced free hydrogen). This purge air was expelled through a line deep in the 8-1 tank, and bubbled up the adjacent weight factor line. This airlift pumping action was stopped by removing the connecting pipe jumper in the canyon cell. The product solution entered the pipe gallery floor drain and the chemical sewer, which empties into the "B" ditch (an open ditch and some tile line approximately a mile and one half long) that empties into the "B" swamp (an open 25 acre pond). Radiation levels of 500 rads/hour at three or four inches existed in the pipe gallery. Water samples taken from the "B" swamp reached a maximum strontium 90 concentration of  $1.7 \times 10^{-3}$   $\mu\text{Ci}/\text{ml}$ .

ADDITIONAL RADIATION MONITORING INFORMATIONA. 216-B-3 SwampTotal Beta Activity in  $\text{Ci}/\text{ml}$ 

<u>Date</u>	<u>B Swamp (Open Pond)</u>	<u>B Swamp (Inlet Ditch)</u>
3-23	$4.0 \times 10^{-6}$	$1.6 \times 10^{-2}$
3-24	$1.7 \times 10^{-3}$	$1.5 \times 10^{-2}$
3-25*	$8.9 \times 10^{-4}$	$1.5 \times 10^{-5}$
3-26	$8.3 \times 10^{-4}$	$8.4 \times 10^{-6}$
3-27	$7.6 \times 10^{-4}$	$1.4 \times 10^{-5}$

\* Purex cooling water added for dilution and water level control of the open pond.

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<u>Date</u>	<u>B Swamp (Open Pond)</u>	<u>B Swamp (Inlet Ditch)</u>
3-30	$6.8 \times 10^{-4}$	$1.6 \times 10^{-5}$
3-31	$5.4 \times 10^{-4}$	$3.3 \times 10^{-6}$
4-01	$8.4 \times 10^{-4}$	$3.4 \times 10^{-4}$
4-02	$5.2 \times 10^{-4}$	$5.0 \times 10^{-4}$
4-03**	$5.0 \times 10^{-4}$	$3.0 \times 10^{-5}$
4-04	$4.8 \times 10^{-4}$	$<2.5 \times 10^{-6}$
4-05	$4.5 \times 10^{-4}$	$<2.5 \times 10^{-6}$
4-06	$3.6 \times 10^{-4}$	$<2.5 \times 10^{-6}$

\*\* The chemical sewer and head end of the open ditch were completely isolated from the balance of the ditch and swamp by back filling part of the ditch.

B. Wild Fowl Sampling From 216-B-3 Swamp

<u>Date</u>	<u>Time</u>	<u>Type</u>	<u>Feathers c/m</u>	<u>Gizzard c/m</u>	
				<u>Whole</u>	<u>Contents</u>
3-22	1200	Coot	<200	<200	<200
	1200	Coot	<200	<200	<200
3-23	0930	Coot	25,000	500	500
	0945	Coot	2,500	600	600
	1050	Coot	8,000	1,000	---
	1050	Coot	15,000	600	600
	1430	Coot	15,000	3,000	5,000
	1430	Coot	2,500	500	650
3-24	1445	Lesser Scaup	850	450	3,000
3-25	1055	Coot	1,500	550	5,000
3-27	0920	Mallard	3,500	650	15,000
3-29	0945	Coot	6,000	<200	4,500
	1000	Coot*	6,000	5,000	30,000
3-30	1010	Coot	400	<200	350
	1015	Coot*	8,000	500	35,000

\* muscle analyzed.

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C. Gamma Energy Analysis of Sampled Wild FowlResults in  $\mu\text{Ci/g}$  of Muscle

	<u>Coot Taken at 10:00 a.m. on 3/29/70</u>	<u>Coot Taken at 10:15 a.m. on 3/30/70</u>
$^{89-90}\text{Sr}$	$2.0 \times 10^{-5}$	$1.5 \times 10^{-5}$
$^{60}\text{Co}$	$6.1 \times 10^{-7} \pm 2.5 \times 10^{-7}$	$7.3 \times 10^{-7} \pm 2.8 \times 10^{-7}$
$^{46}\text{Sc}$	$3.3 \times 10^{-6}$	$7.0 \times 10^{-6}$
$^{65}\text{Zn}$	$8.6 \times 10^{-7} \pm 6.2 \times 10^{-7}$	-----
* $^{134}\text{Cs}$	$9.6 \times 10^{-7} \pm 4.3 \times 10^{-7}$	$1.5 \times 10^{-6} \pm 5.1 \times 10^{-7}$
* $^{137}\text{Cs}$	$7.8 \times 10^{-6}$	$7.1 \times 10^{-6}$
$^{59}\text{Fe}$	$8.4 \times 10^{-7} \pm 2.6 \times 10^{-7}$	$8.0 \times 10^{-7} \pm 3.1 \times 10^{-7}$
$^{95}\text{Nb}$	$8.9 \times 10^{-7} \pm 5.0 \times 10^{-7}$	$1.1 \times 10^{-5}$
$^{95}\text{Zr}$	$7.0 \times 10^{-7} \pm 5.8 \times 10^{-7}$	$1.8 \times 10^{-6} \pm 1.1 \times 10^{-6}$
$^{144}\text{CePr}$	$2.5 \times 10^{-5}$	$2.0 \times 10^{-5}$
* $^{131}\text{I}$	$3.9 \times 10^{-7} \pm 2.3 \times 10^{-7}$	-----

\* Analytical procedure volatilized the samples so these isotopes were partially lost.

LEGAL INFORMATION

Since personnel involved are employees of Atlantic Richfield Hanford Company working under Contract AT(45-1)-2130, it is doubtful that a claim against the U. S. Government could be sustained. Any alleged injury would be compensable under the Washington State Workman's Compensation Act; therefore, an employee could not proceed against Atlantic Richfield Hanford Company.

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COST

It has been estimated that the costs of stabilization and recovery efforts resulting from the strontium 90 release on March 22, 1970 will be:

1. Decontamination - - - - -	\$ 40,000
2. Renovation - - - - -	10,000
3. Construct New "B" Ditch - - - - -	19,000
4. Chemical Sewer Outfall Modification - - - - -	10,000
5. Analytical, monitoring, etc. - - - - -	16,000
Total - - - - -	<u>\$ 95,000</u>

EFFECT ON NORMAL OPERATIONS

Operations in B Plant were deliberately suspended for 18 days while stabilization and decontamination efforts were under way. This action was taken to prevent additional problems from developing which could have extended or magnified recovery efforts.

CONCLUSIONS

1. The design of the canyon pipe jumper, as shown in Exhibit D, PT1, drawing No. H-2-32740, allowed purge air from line "D" to enter line "B" causing an airlift that propelled strontium 90 product solution up and out into the pipe gallery.
2. The Tygon manometer line had an undetected leak at or near the gallery wall valve.
3. Not detecting the leak in the manometer line prior to opening the gallery wall valve was contributory.

RECOMMENDATIONS

1. Redesign the canyon jumper, as shown in Exhibit D, PT1, drawing No. H-2-32740, to preclude airlift.
2. Review the design of similar canyon equipment to detect and correct like design deficiencies.

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3. Revise the Pre-Job Safety Plan "Weight Factor Determination using Portable Manometer at Wall Nozzles", Exhibit A, PT1, to include the determination that manometer lines are not leaking at the time the gallery wall valves are opened.
4. Review all drain systems that enter chemical sewers and that potentially could become contaminated with noxious process solutions with the objective of determining the feasibility of providing diversionary systems to avoid having contaminants enter the environs.
5. Review this serious contamination release with all instrument personnel and canyon equipment design personnel.

INVESTIGATIVE COMMITTEE

9 2 1 2 5 1 1 2 4 8

*R. E. Smith*  
 for R. E. Smith, Manager (Chairman)  
 Waste Management

4-23-70  
Date

*R. C. Forsman*  
 R. C. Forsman, Senior Engineer  
 Purex

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 Waste Management Process Engineering

4-23-70  
Date

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 B. J. McMurray, Manager  
 Radiation Monitoring

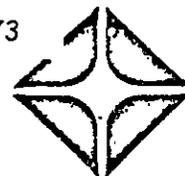
4-23-70  
Date

*N. P. Nisick*  
 N. P. Nisick, Senior Engineer (Secretary)  
 Personnel Protection

4-23-70  
Date

*R. C. Roal*  
 R. C. Roal, Manager  
 Separations Process Design Engineering

4/23/70  
Date



Date: March 9, 1971  
 To: File  
 From: G. L. Hanson *G. L. Hanson*  
 Subject: RATIONALE - 8-1 INCIDENT RELEASE TO  
 B-2 DITCH AND B-3 POND

1. ARH-1648, Page 1, in the Summary stated, "Water samples taken from the "B" Swamp reached a maximum strontium-90 concentration of  $1.7 \times 10^{-3} \mu\text{Ci/ml}$ ." This was in actuality a total beta vice strontium-90 maximum as shown in a letter from B.J. McMurray to P. W. Smith, July 31, 1970, "Release of Strontium-90 to B Pond." The maximum strontium-90 was  $\sim 5.5 \times 10^{-4} \mu\text{Ci/ml}$  (see charts attached to the reference letter).
2. ARH-1648 estimated the pond area as 25 acres. After discussions with several individuals familiar with the B-3 pond it was assumed that this pond has an average depth of 3 feet.

Then: 25 acres = 1,089,000 ft<sup>2</sup>

3 ft depth = 3,267,000 ft<sup>3</sup> = 24,502,500 gal

A volume of 24,000,000 gallons was assumed for the pond. If we assume the maximum concentrations of strontium-90 and total beta are present in the total volume of water in the pond we have:

a. Total beta =  $1.7 \times 10^{-3} \mu\text{Ci/ml}$

$24 \times 10^6 \text{ gal} \times 1.7 \times 10^{-3} \mu\text{Ci/ml} \times 3.785 \times 10^3$   
 ml/gal = 154 Ci total beta

b.  $^{90}\text{Sr} = 5.5 \times 10^{-4} \mu\text{Ci/ml}$

$24 \times 10^6 \text{ gal} \times 5.5 \times 10^{-4} \mu\text{Ci/ml} \times 3.785 \times 10^3$   
 ml/gal = 50 Ci  $^{90}\text{Sr}$

3. The 8-1 tank solution also contained  $^{144}\text{CePr}$  at 130 Ci/gal and  $^{137}\text{Cs}$  at  $\sim 12$  Ci/gal. ( $^{137}\text{Cs}$  present from an 8-2 - 8-1 overflow in June 1969.)  $^{90}\text{Sr}$  was present at  $\sim 860$  Ci/gal.

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Best estimates indicate 1000 Ci  $^{90}\text{Sr}$  was lost via the B Plant chemical sewer (~1.16 gal of 8-1 solution).

∴ Discharge was:

$^{90}\text{Sr}$	1000 Ci
$^{137}\text{Cs}$	14 Ci
$^{144}\text{CePr}$	150 Ci

4. The B Plant chemical sewer and cooling waters from B Plant, ITS-1 and ITS-2 are normally basic (pH > 8). In this environment strontium and cerium will precipitate; however, cesium will remain in solution. Soil samples, taken from a number of locations in the B-2 ditch between the inlet and the outlet to the pond, were analyzed for strontium. Evaluation of these strontium analyses indicated that up to 1000 Ci of strontium could be present in the ditch. Analysis of the pond water indicated ~ 50 Ci strontium in the pond. This is in good agreement with the ~ 1000 Ci strontium release estimated by the investigative committee. If we then assume that a maximum of ~ 1000 Ci was released, and the maximum discharged to the pond was calculated to be 50 Ci, we shall assume that 950 Ci could be present in the ditch.
5. The concentration of total beta in the pond was  $1.7 \times 10^{-3} \mu\text{Ci/ml}$ ;  $^{90}\text{Sr}$  was  $5.5 \times 10^{-4} \mu\text{Ci/ml}$ . We would assume that the total beta includes  $^{90}\text{Sr}$ ,  $^{137}\text{Cs}$  and  $^{144}\text{CePr}$ . I would also assume that of the 14 Ci of  $^{137}\text{Cs}$  released ~ 1 curie would be removed by the soil in the ditch (on the way to the pond).

$$\therefore 13 \text{ Ci } ^{137}\text{Cs} \div 24 \times 10^6 \text{ gal} = 0.54 \mu\text{Ci } ^{137}\text{Cs/gal.}$$

This is the maximum  $^{137}\text{Cs}$  concentration in the pond.

We can convert the gamma emitting  $^{137}\text{Cs}$  to total beta as follows:

Beta counting efficiency for  $^{137}\text{Cs}$  using an instrument standardized at 0.3 Mev (Beta) is 0.47, for  $^{144}\text{CePr} = 0.42$ , for  $^{90}\text{Sr} = 0.508$ .

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Then to convert  $0.54 \mu\text{Ci/gal } ^{137}\text{Cs}$  to total beta we multiply the counting efficiency (0.47) by the  $\mu\text{Ci/gal } ^{137}\text{Cs}$  (0.54) and divide by the counting efficiency of  $^{60}\text{Co}$  (0.35) used to calibrate the beta counter.

$$\text{a) } 0.47 \times 0.54 \mu\text{Ci/gal } ^{137}\text{Cs} \div 0.35 = 0.725 \mu\text{Ci/gal T. Beta}$$

$$\text{b) } 0.508 \times 2.08 \mu\text{Ci/gal } ^{90}\text{Sr} \div 0.35 = 3.02 \mu\text{Ci/ml T. Beta}$$

The total beta of the pond sample was  $1.7 \times 10^{-3} \mu\text{Ci/ml} \times 3.785 \times 10^3 \text{ ml/gal} = 6.43 \mu\text{Ci/gal}$  total beta. The total beta present in the pond water from  $^{144}\text{CePr}$  is then calculated by difference:

$$6.43 - 0.72 - 3.02 = 2.69 \mu\text{Ci/gal}$$

The  $^{144}\text{CePr}$  gamma concentration can be calculated as follows:

$$0.42 \times x (\mu\text{Ci/gal } ^{144}\text{CePr } \gamma) \div 0.35 = 2.69 \mu\text{Ci/gal T. Beta}$$

$$x = 2.24 \mu\text{Ci/gal } ^{144}\text{CePr } \gamma$$

Therefore  $24 \times 10^6 \text{ gal (pond water)} \times 2.24 \mu\text{Ci/gal} = \underline{54 \text{ Ci } ^{144}\text{CePr in pond}}$

6. Since we calculated  $\sim 54 \text{ Ci } ^{144}\text{CePr}$  in the pond the balance  $(150-54) = 96 \text{ Ci}$  in the ditch.
7. We can now estimate the breakdown of the release from Item 3 above as follows:

	<u>B-2 Ditch</u>	<u>B-3 Pond</u>
Total Beta (Ci)	1495	154
$^{90}\text{Sr}$ (Ci)	950	50
$^{144}\text{CePr}$ (Ci)*	96	54
$^{137}\text{Cs}$ (Ci)	1	13

\*  $^{144}\text{Ce}$  is 1/2 of  $^{144}\text{CePr}$  value

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Total beta to ditch calculated as follows:

$$^{90}\text{Sr} = 0.508 \times 950 \div .35 = 1379 \text{ Ci T. Beta}$$

$$^{144}\text{CePr} = 0.42 \times 96 \div .35 = 115 \text{ Ci T. Beta}$$

$$^{137}\text{Cs} = 0.47 \times 1 \div .35 = \sim 1 \text{ Ci T. Beta}$$

GLH:jas

cc: GL Hanson  
GR Kiel  
BJ McMurray  
GC Oberg  
FW Smith  
RE Smith  
LB

*Copy to AL Maxfield*

CONTAMINATED LIQUID DISPOSAL SITES

I. NE

<u>Name/Type of Facility</u> Ditch	<u>Past Designation</u> Replaced the 216-B-2-2 Ditch	<u>Number</u> 216-B-2-3
<u>Location</u> 200 East, N.E. Quadrant  Parallel to the 216-B-2-2 Ditch, East of the 207-B Retention Basin	<u>Service Dates</u>  1970 to Present	<u>Status</u>  Active
<u>Site Coordinates</u>  N-44650, W-52325 N-44175, W-48575	<u>Reference Drawings</u>  H-2-34761	<u>Elevations</u>  644 ft to 629 ft Water Table 404 ft(1973) <u>Site Depth</u> 6 to 8 ft
<u>Source and Description of Waste</u>  Process cooling water from the 221-B Processing Plant. Cooling water from the 241-BY Tank Farm.		
<u>Description of Facility</u>  Open trench approximately 20 ft wide at ground level and 6 to 8 ft deep at the upper end, 4000 ft long. A water transport system from B Plant to the 216-B-3 Pond.  <u>Radionuclide Content</u> (calculated from discharge data)  Very low level radioactivity. Generally less than 200 c/m, GM probe.  The 216-B-2-3 Ditch was dug in the summer of 1970 as a replacement for the old 216-B-2-2 contaminated ditch.		

9 2 1 2 5 3

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
Reverse Well		216-B-361 Reverse Well 241-B-361 Dry Well 216-B-5 Dry Well	216-B-5
<u>Location</u>	200 East, N.E. Quadrant	<u>Service Dates</u>	<u>Status</u>
	1000 ft northeast of the 221-B Plant, along Baltimore Avenue	4/45-10/47	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-43580, W-52855	H-2-1031 H-2-1123	Ground	683 ft
		Water Table	404 ft
		Site Depth	302 ft

Source and Description of Waste

3.06 x 10<sup>7</sup> liters. Cell drainage from 224-B and other liquid waste via Tank 5-6 in 221-B Bldg. Low-salt, neutral-basic.

Description of Facility

A reverse well, 8 in. diameter dry well structure 302 ft deep.  
Deactivation: The pipeline inlet to the well was blanked off when the radionuclide capacity was reached.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	4.3 x 10 <sup>3</sup>	4280.0
Beta, Ci	3.8 x 10 <sup>3</sup>	< 144.0
<sup>90</sup> Sr, Ci	76	34.4
<sup>106</sup> Ru, Ci	160	4.85 x 10 <sup>-8</sup>
<sup>137</sup> Cs, Ci	81	38.7

9 2 1 2 5 4

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Facility Designation</u>	<u>Number</u>
Crib		241-B-1 Crib 216-B-7 Crib 216-B-7A Sump	216-B-7A
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant  200 East area, north of 241-B Tank Farm along Baltimore Avenue. South of 216-B-8 crib.		9/46-5/67	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-45602, W-52764	H-2-558 H-2-579	Ground	644 ft
		Water Table	403 ft(1973)
		Site Depth	14 ft

Source and Description of Waste

4.36 x 10<sup>7</sup> liters was discharged to 216-B-7A and B-7B combined: These cribs were used variously to receive high-salt, neutral-basic liquid waste from 224-B Cell drainage, low-salt, neutral-basic waste from 221-B via Tank 5-6, and decontamination and construction waste during 224-B reactivation, decontamination and cleanup activities.

Description of Facility

One crib, wooden structure (6 in x 6 in. timbers), 14 ft x 14 ft bottom surface area. It is uncertain whether waste overflowed from 216-B-7A to a similar nearby crib, 216-B-7B, or was fed in parallel to the two cribs. Deactivation: Jumper in 241-B-252 Diversion Box removed.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	4300	4300.0
Beta, Ci	2.4 x 10 <sup>4</sup>	<6070.0
<sup>90</sup> Sr, Ci	5600	2980.0
<sup>106</sup> Ru, Ci	600	1.31 x 10 <sup>-5</sup>
<sup>137</sup> Cs, Ci	100	57.2
<sup>60</sup> Co, Ci	1	3.26 x 10 <sup>-2</sup>
U, kg	180	182.0

The above inventory was distributed between 216-B-7A and B-7B

Other Potential Hazards

Wooden structure of crib may collapse. Prompt remedial action would be required to prevent spread of contamination and to correct other hazards.

9 2 1 2 3 1 1 2 5 5

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Facility Designation</u>	<u>Number</u>
Crib		241-B-2 Crib 241-B-7 Crib 216-B-7A Sump	216-B-7B
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant  200 East Area, north of 241-B Tank Farm along Baltimore Avenue		9/46-5/67	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-45648, W-52790	H-2-558 H-2-579	Ground	644 ft
		Water Table	403 ft(1973)
		Site Depth	14 ft

Source and Description of Waste

4.36 x 10<sup>7</sup> liters was discharged to 216-B-7A and B-7B combined: These cribs were used variously to receive high-salt, neutral-basic liquid waste from 224-B cell drainage, low-salt, neutral-basic waste from 221-B via Tank 5-6, and decontamination and construction waste during 224-B reactivation, decontamination and cleanup activities.

Description of Facility

One crib, wooden structure (6 in. x 6 in. timbers), 14 ft x 14 ft bottom surface area. It is uncertain whether waste overflowed from 216-B-7A to a similar nearby crib, 216-B-7B, or was fed in parallel to the two cribs.  
Deactivation: Jumper in 241-B-252 Diversion Box removed.  
Radionuclide content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	4300	4300.0
Beta, Ci	2.4 x 10 <sup>4</sup>	<6070.0
<sup>90</sup> Sr, Ci	5600	2980.0
<sup>106</sup> Ru, Ci	600	1.31 x 10 <sup>-5</sup>
<sup>137</sup> Cs, Ci	100	57.2
<sup>60</sup> Co, Ci	1	3.26 x 10 <sup>-2</sup>
U, kg	180	182.0

The above inventory was distributed between 216-B-7A and B-7B

Other Potential Hazards

Wooden structure of crib may collapse. Prompt remedial action would be required to prevent spread of contamination and to correct other hazards.

9 2 1 2 5 1 1 2 5 6

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Facility Designation</u>	<u>Number</u>
Crib and Tile Field		241-B-3 Crib	216-B-8
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant  200 East Area, 250 ft north of 241-B Tank Farm along Baltimore Avenue, north of 216-B-7A and 216-B-7B Cribs.		4/45-12/51	Inactive
<u>Site Coordinates (Approximate)</u>		<u>Reference Drawings</u>	<u>Elevations</u>
Crib:	N-45880, W-52840	H-2-579	Ground 630 ft
Tile Field:	N-45880, W-52840	H-2-738	Water Table 403 ft(1973)
	to N-46143, W-52695	H-2-2928	Site Depth 14 ft

Source and Description of Waste

2.72 x 10<sup>7</sup> liters. Second cycle waste from B Plant (221-B) from 3/48 to 12/51; cell drainage and other liquid waste via Tank 5-6 in 221-B from 7/51 to 12/51; liquid waste from 224-B from 7/51 to 12/51. High-salt, neutral-basic.

Description of Facility

One crib, wooden structure (6 in. x 6 in. timbers), 12 ft x 12 ft bottom area, Tile Field, 300 ft x 4 ft bottom surface area.

Deactivation: Effluent pipeline to the crib was blanked.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	30	30.0
Beta, Ci	710	< 65.6
<sup>90</sup> Sr, Ci	15	7.54
<sup>106</sup> Ru, Ci	50	3.33 x 10 <sup>-7</sup>
<sup>137</sup> Cs, Ci	50	26.3
<sup>60</sup> Co, Ci	1	2.53 x 10 <sup>-2</sup>
U, kg	45	45.4

Other Potential Hazards

Wooden structure may collapse. Prompt remedial action would be required to prevent spread of contamination and to correct other hazards.

9 2 1 2 5 1 1 2 5 7

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib and Tile Field		241-B-361 Crib 216-B-361 Crib	216-B-9
<u>Location</u> 200 East, N.E. Quadrant		<u>Service Dates</u>	<u>Status</u>
1250 ft south of 241-B Tank Farm, along Baltimore Avenue		8/48-7/51	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
Crib: N-43757, W-52617	H-2-1031	Ground	682 ft
Tile Field: N-43764, W-52617 to N-43944, W-52617	H-2-1123	Water Table	404 ft(1973)
		Site Depth	17 ft
<u>Source and Description of Waste</u>			
3.6 x 10 <sup>7</sup> liters. Cell drainage and other liquid waste via Tank 5-6 in 221-B. Low-salt, neutral-basic.			
<u>Description of Facility</u>			
One crib, wooden structure, 14 ft x 14 ft bottom area. One Tile Field, 180 ft x 4 ft bottom surface area. Deactivated by removal of jumper in 241-B-154 Diversion Box when the crib reached its radionuclide capacity.			
<u>Radionuclide Content (calculated from discharge data)</u>			
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
Pu, g	170	174.0	
Beta, Ci	7800	26.9	
<sup>90</sup> Sr, Ci	15	7.46	
<sup>106</sup> Ru, Ci	100	3.78 x 10 <sup>-7</sup>	
<sup>137</sup> Cs, Ci	10	5.20	
<sup>60</sup> Co, Ci	0.1	2.41 x 10 <sup>-3</sup>	
U	45	45.4	
<u>Other Potential Hazards</u>			
Wooden structure may collapse. Prompt remedial action would be required to prevent spread of contamination and to correct other hazards.			

9 2 1 2 5 3

<u>Name/Type of Facility</u> Reverse Well	<u>Past Designation</u> 242-B-1 Crib 216-B-11 Crib	<u>Number</u> 216-B-11A
<u>Location</u> 200 East, N.E. Quadrant 250 ft north of 241-B Tank Farm 400 ft east of Baltimore Ave., east of 216-B-7A and 216-B-7B Cribs.	<u>Service Dates</u> 12/51-12/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45674, W-52619	<u>Reference Drawings</u> H-2-2021 H-2-2024	<u>Elevations</u> Ground 697 ft Water Table 404 ft('73) <u>Site Depth</u> 40 ft

Source and Description of Waste

2.96 x 10<sup>7</sup> liters. Process condensate from waste evaporator in 242-B.

Description of Facility

One pipe-encased well, 4 ft diameter bottom surface, 40 ft deep, dry well structure. Deactivation: Effluent pipeline to the reverse well was blanked in the 224-B Bldg. The waste from 216-B-11A overflowed into a similar adjacent reverse well, 216-B-11. Low-salt, neutral-basic.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.4	4.0
Beta, Ci	210	<59.7
<sup>90</sup> Sr, Ci	5	2.72
<sup>106</sup> Ru, Ci	50	1.99 x 10 <sup>-6</sup>
<sup>137</sup> Cs, Ci	50	28.3
<sup>60</sup> Co, Ci	0.1	3.86 x 10 <sup>-3</sup>
U, kg	14	13.6

The above is distributed between 216-B-11A and B-11B. Most of it is probably in 216-B-11A.

9 2 1 2 5 9

<u>Name/Type of Facility</u> Reverse Well	<u>Past Designation</u> 242-B-1 Crib 216-B-11 Crib	<u>Number</u> 216-B-11B
<u>Location</u> 200 East, N.E. Quadrant. 200 East Area, 250 ft north of 241-B Tank Farm. 400 ft east of Baltimore Avenue.	<u>Service Dates</u> 12/51-12/54	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-45734, W-52619	<u>Reference Drawings</u> H-2-2021 H-2-2024	<u>Elevations</u> Ground 697 ft Water Table 404 ft (1973) Site Depth 40 ft
<u>Source and Description of Waste</u> 2.96 x 10 <sup>7</sup> liters. Process condensate from waste evaporator in 242-B. Low-salt, neutral/basic.		
<u>Description of Facility</u> One pipe-encased well, 4 ft diameter bottom surface, 40 ft deep, dry well structure Deactivation: Effluent pipeline to the reverse well was blanked in the 224-B Bldg. The waste from 216-B-11A overflowed into a similar adjacent reverse well, 216-B-11B Low-salt, neutral-basic.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.4	4.0
Beta, Ci	210	< 59.7
<sup>90</sup> Sr, Ci	5	2.72
<sup>106</sup> Ru, Ci	50	1.99 x 10 <sup>-6</sup>
<sup>137</sup> Cs, Ci	50	28.3
<sup>60</sup> Co, Ci	0.1	3.86 x 10 <sup>-3</sup>
U, kg	14	13.6
The radionuclide inventory shown for 216-B-11A was distributed between 216-B-11A and B-11B. Most of it is probably in 216-B-11A.		

9 2 1 2 5 1 1 2 5 0

CONTAMINATED LIQUID DISPOSAL SITES

I: NE

<u>Name/Type of Facility</u> French Drain	<u>Past Designation</u> 216-BY-9 Crib	<u>Number</u> 216-B-51
<u>Location</u> 200 East, N. E. Quadrant N.E. corner of 241-B Tank Farm and 216-B-8 Tile Field Radiation Zone	<u>Service Dates</u> 1/56-1/58	<u>Status</u> Inactive
<u>Site Coordinates</u> N-46366, W-52567	<u>Reference Drawings</u> H-2-2908	<u>Elevations</u> Ground 625 ft Water Table 404 ft(1973) <u>Site Depth</u> NA
<u>Source and Description of Waste</u> Received flush drainage from BC Crib pipeline. Waste volume unknown.		
<u>Description of Facility</u> French drain, 5 ft. diameter.		
<u>Radionuclide Content</u> (calculated from discharge data)  <10 Ci total Beta		

9 2 1 2 3 1 1 2 6 1

CONTAMINATED LIQUID DISPOSAL SITES

I. NE

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u>	<u>Number</u> 216-B-56
<u>Location</u> 200 East, N.E. Quadrant. ~1000 ft northeast of 221-B Building ~400 ft north of 7th Street		<u>Service Dates</u> Never used	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-42885, W-52600 to N-42955, W-52600	<u>Reference Drawings</u> H-2-60329 SK-2-19674	<u>Elevations</u> Ground 692 ft Water Table 404 ft <u>Site Depth</u>	
<u>Source and Description of Waste</u> Future use: To receive organic waste from 221-B Building.			
<u>Description of Facility</u> Gravel-filled crib, 700 ft <sup>2</sup> bottom surface area.			

9 2 1 2 5 1 2 5 2

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u> Trench	<u>Past Designation</u> 216-B-58 Ditch 216-B-58 Trench	<u>Number</u> 216-B-59
<u>Location</u> 200 East, N. E. Quadrant About 700 ft northeast of the 221-B Building	<u>Service Dates</u> 12/67-Present	<u>Status</u> Active
<u>Site Coordinates (Approximate)</u> N-43001, W-52787 to N-43284, W-52504	<u>Reference Drawings</u> H-2-60310	<u>Elevations</u> Ground 690 ft Water Table 404 ft(1973) Site Depth NA
<u>Source and Description of Waste</u> 4.8 x 10 <sup>5</sup> liters. Diverted cooling water and steam condensate from the 221-B Building.		
<u>Description of Facility</u> A trench which is lined, compartmented and covered for retention of abnormal radioactive cooling water.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Beta, Ci	5.0	< 0.142
<sup>90</sup> Sr, Ci	0.050	3.91 x 10 <sup>-2</sup>
<sup>137</sup> Cs, Ci	0.020	1.59 x 10 <sup>-2</sup>

9 2 1 2 5 1 2 5 3

CONTAMINATED LIQUID DISPOSAL SITES

I. NE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Ditch	B-Plant Chem Sewer	216-B-63
<u>Location</u> 200 East, NE Quadrant Approximately 1500 ft northeast of Baltimore Ave. North of and parallel to the head end of the 216-B-2 Ditches.	<u>Service Dates</u> 3/70-Present	<u>Status</u> Active
<u>Site Coordinates</u> N-45110, W-51793 to N-44635, W-50254	<u>Reference Drawings</u> H-2-44500 Sheet 5	<u>Elevations</u> Ground 630 ft Water Table 404 ft Site Depth 10 ft
<u>Source and Description of Waste</u>		
1.4 x 10 <sup>7</sup> liters as of 12/31/73. Chemical sewer wastes from B Plant.		
<u>Description of Facility</u>		
Open ditch, bottom dimensions are approximately 1400 ft x 4 ft. This is a specific retention ditch that does not flow to a pond.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	<2.3 x 10 <sup>-1</sup>	< 0.402
Beta, Ci	<8.7 x 10 <sup>0</sup>	< 4.30
<sup>90</sup> Sr, Ci	1.7 x 10 <sup>0</sup>	1.44
<sup>106</sup> Ru, Ci	<1.4 x 10 <sup>-1</sup>	< 1.12 x 10 <sup>-3</sup>
<sup>137</sup> Cs, Ci	<6.8 x 10 <sup>-1</sup>	< 0.574
<sup>60</sup> Co, Ci	<1.3 x 10 <sup>-2</sup>	< 8.10 x 10 <sup>-3</sup>
U, kg	<7.6 x 10 <sup>-0</sup>	<21.2
<u>History</u>		
In August of 1970, the bottom and sides of the 216-B-63 Ditch were dredged out and buried in the 218-E-12B Burial Ground. The dredgings were contaminated to approximately 3000 c/m beta-gamma activity.		

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u> French Drain		<u>Past Designation</u> 271-CR Crib 216-C-8 Crib	<u>Number</u> 216-C-8
<u>Location</u> 200 East, N.E. Quadrant. About 250 ft E by NE of the 241-CR Vault in 200 East Area. Approx. 75 ft SE of the 241-C Tank Farm SE perimeter fence.		<u>Service Dates</u> 6/62-6/65	<u>Status</u> Inactive
<u>Site Coordinates</u> N-42625, W-48168	<u>Reference Drawings</u> H-2-32523	<u>Elevations</u> Ground 680 ft Water Table 405 ft(1973) Site Depth not available	
<u>Source and Description of Waste</u>  Waste volume unknown. Ion exchange regenerant waste from the 271-CR Bldg. Pilot Plant.			
<u>Description of Facility</u> French drain, 6 ft in diameter.			
<u>Radionuclide Content</u> (calculated from discharge data) k10 Ci Total Beta			

9 2 1 2 5 1 1 2 6 5

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u> Pond		<u>Past Designation</u> 216-C-7 C-Canyon Excavation Semiworks Swamp	<u>Number</u> 216-C-9
<u>Location</u> 200 East, NE Quadrant.  North of 7th Street, opposite C Area. (In the bottom of the old 221-C Bldg. excavation).		<u>Service Dates</u>  6/53-	<u>Status</u>  Inactive
<u>Site Coordinates</u>  N-42581, W-49870 N-42581, W-50694	<u>Reference Drawings</u>  H-2-4010 H-2-4606 H-2-32523	<u>Elevations</u>  Ground 681 ft Water Table 402 ft (1973) <u>Site Depth</u> Surface	
<u>Source and Description of Waste</u>  Volume unknown. Process cooling water from 201-C; floor drainage from 201-C. 215-C, 271-C, 276-C; miscellaneous water from 209-E and semiworks facilities.			
<u>Description of Facility</u>  Pond, approximately 80,000 ft <sup>2</sup> surface area.			
<u>Radionuclide Content</u> (calculated from discharge data)  Not known.			
<u>Note:</u> Since shutdown of the Hot Semiworks, the pond has decreased in size until it is now a mere marshy wet spot in the bottom of the excavation. No radioactivity was found at the swamp perimeter in a radiation survey of 6/22/78. The little water that still feeds the site originates as steam condensate from the 209-E Building.			

9 2 1 2 5 1 1 2 6 6

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. NE

<u>Name/Type of Facility</u> Burial Ground	<u>Fast Designation</u> 200 East/Construction (no number)	<u>Number</u> 218-E-8
<u>Location</u> 200 East, N.E. Quadrant 200 East Area, about 5,000 ft north of Purex. (202-A) Located on the hillside between the old burning pit and the 218-E12B Burial Ground.	<u>Service Dates</u> 1958-1959	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45284, W-48411 N-45282, W-48419 N-44882, W-48534 N-44884, W-48526	<u>Reference Drawings</u> H-2-31269	<u>Elevations</u> Ground ~617 ft Water Table ~405 ft(1973) Site Depth NA
<u>Source and Description of Waste</u> Repair and construction waste (approx. $8.0 \times 10^4$ ft <sup>3</sup> ).		
<u>Description of Facility</u> Backfilled trenches, surface area: $7.5 \times 10^4$ ft <sup>2</sup> .		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$2.0 \times 10^3$	$2.0 \times 10^3$
Pu, g	20	20.
Total Beta, Ci	10	.51
<sup>90</sup> Sr, Ci	0.20	0.122
<sup>106</sup> Ru, Ci	0.43	$5.52 \times 10^{-7}$
<sup>137</sup> Cs, Ci	0.21	0.135
<u>NOTE:</u> The location and number of burial trenches in this site are unknown. February 21, 1979 - Residue from broken tumbleweeds blown in along the west boundary line of this burial ground was found to be reading greater than 100,000 c/m, beta-gamma activity.		

9 2 1 2 5 1 1 2 6 7

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Burial Ground		200 East/Dry Waste No. 12A	218-E-12A
<u>Location</u> 200 East, N.E. Quadrant		<u>Service Dates</u>	<u>Status</u>
West and north of 241-C Tank Farm about 3250 ft north of Purex.		1953-1967	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-44080, W-48497 N-43213, W-48520 N-43217, W-49520 N-43400, W-49685 N-44340, W-49685			
<u>Source and Description of Waste</u>			
Trenches - 4, 5, 6, 7, 8, 9, 10, 11, 15, 16 contains acid soaked waste from the operations facilities in 200 East Area.			
Trenches - 1, 2, 3, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, and 25 contain boxed dry waste from the operations facilities in 200 East Area.			
<u>Description of Facility</u> 26.8 Acres			
Twenty-eight dry waste burial trenches varying in length, width, and depth. See attached print for details of layout.			
<u>Radionuclide Content (calculated from discharge data)</u>			
	<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
	U, g	$9.9 \times 10^5$	$9.9 \times 10^5$
	Pu, g	$8.9 \times 10^3$	$8.9 \times 10^3$
	Total Beta, Ci	$8.9 \times 10^2$	52.1
	<sup>90</sup> Sr, Ci	18	12.2
	<sup>106</sup> Ru, Ci	38	$5.74 \times 10^{-3}$
	<sup>137</sup> Cs, Ci	19	13.4
<u>History:</u>			
In April of 1963 the burial ground was extended to the west 350'. Approximately 200 ft of the extension has never been used.			
During the past years many of the trenches settled and created voids into the waste buried below. These holes were subsequently filled to ground level.			
The acid soaked radioactive waste is buried shallow. Early practices required the process operator to make the initial cover by hand shovel.			
Radioactive tumbleweeds have been found growing above a number of the trenches.			

9 2 1 2 5 1 1 2 3 3

Burial Ground: 218-E-12A

Interim stabilization activities were initiated in burial ground 218-W-2A during the summer and fall months of the year 1979. The purpose of the work was to eliminate the hazards of subterranean voids, reduce wind surface erosion, remove ground surface contamination, and establish deterrents against the growth of undesirable vegetation.

In addition to the above, the 218-E-12A Burial Ground was chosen as a test site for interim stabilization materials and techniques. Details of the test procedure are presented in Work Procedure D0101WP0106.

"Work Procedure for the Stabilization of Roads in Burial Grounds -D0101WP0001, by: S. M. O'Toole, and Work Procedure for the Stabilization of Trenches - D0101WP0102, by: S. M. O'Toole, give full details of the ground surface preparation prior to establishing test plots.

In summary, the work accomplished which was confined to those trenches west of Trench #1 was as follows:

General Work Applicable to All Trenches

- o Land coordinates taken were made to determine the location of each trench and to establish safe road routes between trenches.
- o The west fence line was moved eastward 120 feet so as to reduce the unused portion of the 218B-12A Burial Ground.
- o The total surface area of the burial ground was determined to be 26.8 acres.
- o Six thousand five hundred yards of pit run gravel were spread at a depth of three to six inches over the roadways between trenches.
- o The surface of each trench was load tested to determine the location of subterranean voids.
- o Fill dirt (36,000 cubic yards) was used to bring all trench surfaces to normal ground level, and to provide soil for seed beds.
- o A three- to four-inch deep sand cushion was spread over the surface of each trench.

Trenches 15, 3, 16, and 12: (Treflan - no plastic treatment)

- o Trenches 15, 3, 16, and 12 were treated as a single test site. Treflan (herbicide) was sprayed over the sand cushion at the rate of 5 gal/acre. The site was then divided in half, with the south half receiving two feet of seed bed soil and the north half receiving one foot of seed bed soil above the Treflan. The site was further divided lengthwise, with the west half being seeded to mixed perennial grasses, and the east half to cheatgrass. The perennial mix was composed of Siberian wheatgrass, thickspike wheatgrass and crested wheatgrass.

9 2 1 2 5 1 1 2 6 9

Burial Ground: 218-E-12A continued

- o An application of nitrogen fertilizer (21-0-0) was made at the rate of approximately 150 lbs. per acre.
- o A soil surface stabilizer consisting of wheat straw mulch was crimped into the seeded area at the rate of two tons per acre.

Trenches No's. 14 and 17 through 25 (Ureabor - and plastic treatment)

- o The sand cushions above the trenches were treated with an application of ureabor at the rate of 500 lbs. per acre.
- o Each trench was then covered with a sheet of 10 mil polyethylene to act as a biobarrier.
- o The polyethylene was covered with a six-inch deep sand cushion.
- o Trenches 14, 17, 18, 19, 20, and 25 received an additional 18 inches of good soil fill to bring the ground surfaces to 24 inches above the biobarrier.
- o Trenches 14 and 19 were seeded to a mixture of perennials (siberian, thickspike, and crested wheatgrasses). Trenches 17, 18, 20, and 25 were seeded to cheat grass.
- o All plantings were treated with 150 lbs. per acre of 21-0-0 fertilizer and stabilized with a wheat straw mulch crimped into the ground surface.

Trenches No's. 21, 22, 23 and 24 (Ureabor - and plastic treatment)

- o This series of trenches were treated in the same manner as those described above with the exception of a one-foot deep seed bed above the plastic biobarrier was used instead of the two foot seed bed.
- o Trenches 21 and 23 were seeded with the perennial grass seed mix, and trenches 22 and 24 were seeded with cheatgrass.
- o All plantings were treated with 150 lbs. per acre of 21-0-0 fertilizer and stabilized with a wheat straw mulch crimped into the ground surface.

Trench No. 13 (Ureabor and PVC pondliner treatment)

- o The three to six inch sand cushion was treated with ureabor at the rate of 500 lbs. per acre.
- o A 20 mil PVC pondliner was then laid over the entire length of the trench.
- o Two feet of soil was placed over the south half of the trench and one foot of soil was placed over the north half of the trench.
- o The trench surface was then divided lengthwise into two halves; with the west half being seeded with cheatgrass and the east half seeded with a perennial mix.
- o The plantings were treated with 150 lbs. per acre of 21-0-0 fertilizer and stabilized with a wheat straw mulch crimped into the ground surface.

9 2 1 2 5 1 1 2 7 0

TABLE 3 218-E-12A STATUS 1/16/80

TRENCH NO.*	INITIAL SAND CUSION	BIOBARRIER	SOIL DEPTH OVER BIOBARRIER	REVEGETATION SPECIES
7, 8, 9, 10, 26, 11, 27	3"-6"			
5, 4, 6	3"-6"			
28	3"-6"	To Be Completed FY '80		
2	3"-6"			
1	3"-6"			
15, 3, 16, 12	3"-6"	Treflan 5 gal/acre (No Plastic)	2' South Half 1' North Half	Perennials West Half Cheatgrass East Half
13	3"-6"	20 Mil PVC Pondliner Over 500#/ Acre Ureabor	2' South Half 1' North Half	Cheatgrass West Half Perennials East Half
14	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	2'	Perennial Mix
17, 18	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	2"	Cheatgrass
19	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	2'	Perennial Mix
20	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	2'	Cheatgrass
21	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	1'	Perennial Mix
22	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	1'	Cheatgrass
23	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	1'	Perennial Mix
24	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	1'	Cheatgrass
25	3"-6"	10 Mil Polythylene over 500#/ Acre Ureabor	2'	Cheatgrass

\*Roads are covered with 4" to 6" of pit run gravel treated with Ureabor at 500#/acre.

9212511271

January 18, 1980

65421-80-011

H. L. Maxfield  
Effluent Controls  
222-T/200-West

S. M. O'Toole  
D&D Unit  
2704-E/200-East  
942-2746

Status of Burial Ground Stabilization FY '79 and FY '80  
To Date

Interim stabilization activities have been initiated in seven burial grounds; W-2A, E-2, E-2A, E-5, E-5A, E-9 and E-12A. The W-2A and E-12A are being used as test sites for interim stabilization materials and techniques. Details are presented in the two attached Work Procedures, D0101WP0105 and D0101WP0106. Comparisons will be drawn from data collected over the next three years on cost, time, success rate, and transport of radionuclides. E-2, E-2A, E-5, E-5A and E-9 are being stabilized to eliminate surface contamination conditions and the potential spread of radionuclides from these sites.

During the last year aerial photographs, plans, and load testing have confirmed or indicated the location of the burial trenches. Seven trenches (three in E-12A, four in E-2, E-5, E-5A, and E-9) previously unrecorded have been identified. Additions and corrections are being made on H-2 drawings by drafting.

Earth moving to date is limited to the placement of clean fill dirt over the trenches and roads. The estimated amounts of rock and dirt are shown in Table 1.

TABLE 1 QUANTITIES OF DIRT AND ROCK USED

BURIAL GROUND	CUBIC YARDS DIRT.	CUBIC YARDS ROCK
W-2A	24,000	None
E-2, E-5, E-5A, E-9	9,000	3,000
E-12A	38,000	6,500

A description of the cross section of individual trenches are described in Table 2 thru 4. All work on these burial grounds will be completed during FY '80.

S. M. O'Toole  
D&D Unit  
Waste Technology  
SMO/cah

cc:  
File/LB  
J. E. Toomey

9212511272

218-E-12B continuedNOTE:

Six narrow trenches, approximately 3 ft wide and 4 ft deep were dug (north-south axis) on the east side of the 218-E-12B Burial Ground. These were filled with Pu contaminated piping, process pumps, and other long narrow shaped failed equipment. A small amount of Pu contaminated waste contained in plastic bags was also buried in these trenches.

Trench #17 received a number of 55 gallon drums containing retrievable transuranic waste. Service dates began May 1, 1970 and ended December 31, 1970. The waste was buried between coordinates N-44558 and N-44638. Again on January 1, 1971 through December 31, 1971 retrievable transuranic waste was buried at coordinates N-44653 through N-44793.

Trench 27 received a number of 55 gallon drums containing retrievable transuranic waste starting February 1971 and through March 1971. It was buried between coordinates N-44525 and N-44578.

Dry waste burial trench standards prior to December 15, 1970 required a minimum dirt overfill of 4 ft. (A number of trenches were observed to have less than the 4 ft.). The standard in ARH-1842, December 15, 1970, required an overfill of 8 ft. Those trenches filled since that date have received the required amount of overfill.

During the early 1970's radioactive Russian Thistle were found to be growing on the ground surfaces above trenches #8 and #9.

During the summer of 1975, many yards of excellent topsoil was trucked in and stockpiled near the northeast corner of the burial ground. It appears today as an elongated mound of dirt 3 or 4 feet high near the location of trenches #3 and # 7.

A work project was started to put three feet of additional fill dirt over the portion of the burial ground that was growing "hot" weed. The topsoil was to be used as a soil seed bed over the fill for the establishment of a cover crop of Siberian Wheatgrass. Unfortunately the only work accomplished was the stock piling of the topsoil. The stockpile does not cover a spill, nor does it contain contaminated soil.

See Document ARH-2757 for details of burials.

9 2 1 2 5 1 1 2 7 3

CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u> Unplanned Release		<u>Past Designation</u> 241-B-151	<u>Number</u> UN-216-E-1
<u>Location</u> 200 East, N.E. Quadrant Located inside B Tank Farm Area near 241-B-151 Diversion Box.		<u>Service Dates</u> 1951-1952	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-44960, W-52950	<u>Reference Drawings</u> H-2-44500 Sheet 7 H-2-34761	<u>Elevations</u> Ground 625 ft Water Table 392 ft(1973) Site Depth ~1 ft	
<u>Source and Description of Waste</u> Leaks and spills from work around the 241-B-151 Diversion Box.			
<u>Description of Facility</u> Soil around 241-B-151 Diversion box was contaminated during work on the diversion box during the fall of 1951 and in the summer of 1952. Most of the contamination was removed and that remaining was covered with about 1 ft of clean soil.			
<u>Radionuclide Content</u> (at time of discharge)  Approximately 10 Ci Mixed Fission Products.			
<u>History:</u> The area around the diversion box was contaminated as a result of diversion box work in the fall of 1951 and again in the summer of 1952. Most of the contamination was removed. That remaining was covered with approximately one-foot of clean soil.			

9 2 1 2 3 1 1 2 7 4

CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
Unplanned Release		241-B-153	UN-216-E-3
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant 241-B-153 Diversion Box South West corner of 241-B Tank Farm		1954-1955	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-45100, W-52900	H-2-4450 Sheet 7	Ground	625 ft
		Water Table	392 ft(1973)
		Site Depth	Near surface
<u>Source and Description of Waste</u>			
Unplanned release of fission product waste to the ground surface.			
<u>Description of Facility</u>			
A general buildup of contamination resulted from work done on the 241-B-153 Diversion Box during 1954 and 1955. An area approximately 50 x 100 ft is marked as a radiation zone and has been covered with clean gravel.			
<u>Radionuclide Content (at time of discharge)</u>			
Approximately 1 Ci Fission Products.			

9 2 1 2 5 1 1 2 7 5

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. NE

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
Unplanned Release		241-B-153 Line Break	UN-216-E-4
<u>Location</u> 200 East, N.E. Quadrant		<u>Service Dates</u>	<u>Status</u>
241-B-153 Diversion Box		January 1968	
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-45100, W-52900	H-2-44500 Sheet 7	Ground	625 ft
		Water Table	392 ft
		Site Depth	Near surface
<u>Source and Description of Waste</u>			
Solution from 9-2 tank in 221-B Plant. High-salt, neutral/basic.			
<u>Description of Facility</u>			
Soil contaminated by leakage in the line from 9-2 tank in 221-B Plant to the 110-B underground storage tank. Volume lost to ground was approximately 5400 gal. The contaminated soil was covered with clean gravel.			
<u>Radionuclide Content (at time of discharge)</u>			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	
	<sup>106</sup> Ru, Ci	340	
	<sup>95</sup> ZrNb	850	
	<sup>144</sup> Ce	4780	
	(See Attachment)		

9 2 1 2 5 1 1 2 7 6

CONTAMINATED LIQUID DISPOSAL SITES

I. NE

<u>Name/Type of Facility</u> Unplanned Release		<u>Past Designation</u> 241-B-154 Diversion Box ground contamination		<u>Number</u> UN-216-E-5	
<u>Location</u> 200 East, N.E. Quadrant 241-B-154 Diversion Box			<u>Service Dates</u> 1946		<u>Status</u>
<u>Site Coordinates (Approximate)</u> N-42500, W-52800		<u>Reference Drawings</u> H-2-44500 Sheet 7		<u>Elevations</u> Ground 625 ft Water Table 392 ft(1973) Site Depth 1 ft	
<u>Source and Description of Waste</u> Metal waste solution from 221-B.					
<u>Description of Facility</u> The ground around 241-B-154 Diversion Box was contaminated due to a leaky jumper. The contamination was covered with 1 ft of clean soil.					
<u>Radionuclide Content (at time of discharge)</u> Approximately 1 Ci Fission Products.					

9 2 | 2 5 | 1 | 2 7 3

GENERAL PROCESSING DIVISION  
**RADIATION OCCURRENCE**

UN-216-E-4

TO:  L. W. Roddy	RADIATION OCCURRENCE FACTS	
	DATE 1-4-68	TIME 0830
	LOCATION 241-B Tank Farm	
RADIATION OCCURRENCE TYPE: <u>3-B, 3-C</u>	CAUSE CODE: <u>1-C</u>	
See other side.	Beyond reasonable control.	

## COMPLETE DESCRIPTION AND CAUSE

On 8-4 shift, 1-4-68, the background radiation levels at the 241-B tank farm had increased notably at the blacktop roadway and at the 242-B Building. Investigative surveys showed a cave-in at the southeast corner of the 152-B diversion box. There was a dose rate of 5 R/hr at a distance of 30 feet, and at the blacktop road, it was from 20 to 30 mR/hr (150 feet distance). Apparently, there was a leak in a line to the 152-B box, and the liquid escaping from the line caused the ground to be undermined. Liquid was observed in the hole. A contamination spread resulted from this leak (probably from gaseous fumes in the line with the liquid) to the northeast in a fan shape. The levels on the ground were from 2,000 to 6,000 c/m (plated out generally) for a distance of 200 yards and decreased gradually to less than background levels before reaching the perimeter road and fence. The line suspected to be leaking was one that carried the 221-B cell drain waste, as the line had been used twice the previous shifts.

CCI RW McCullugh GE Backman (2) RE Smith (2) BJ McMurray (2)	ACTION TAKEN	DATE OF INVESTIGATION
	<ol style="list-style-type: none"> <li>The area was surveyed and zoned.</li> <li>Backfill was dumped into the hole radically reducing the dose rate 20 mR/hr at the box and then other backfill spread on the contaminated area in the farm.</li> <li>The area outside the farm was zoned.</li> </ol>	1-4-68
	INVESTIGATED BY F. A. Perkins	

CLOSED EMPLOYEES

NONE

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u>		<u>Last Designation</u>	<u>Number</u>
Unplanned Release		242-B to 207-B line break	UN-216-E-7
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant Between 242-B and 207-B Retention Basins		6/53	--
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-44950, W-52600	H-2-44500 Sheet 7	Ground	625 ft
		Water Table	392 ft(1973)
		Site Depth	NA
<u>Source and Description of Waste</u>			
Waste from 242-B			
<u>Description of Facility</u>			
Five leaks were discovered in the waste line. The contaminated area was covered with 2 in. of clean soil.			
<u>Radionuclide Content (calculated from discharge data)</u>			
Approximately 10 Ci mixed fission products.			
<u>NOTE:</u> Not presently marked as a radiation zone.			

9 2 1 2 5 1 1 2 7 9

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u> Unplanned Release		<u>Fast Designation</u> 241-CR-151 Line break	<u>Number</u> UN-216-E-9
<u>Location</u> 200 East, N.E. Quadrant Near 241-CR-151 Diversion Box		<u>Service Dates</u> 10/69	<u>Status</u> --
<u>Site Coordinates</u> (Approximate) N-42600, W-48460	<u>Reference Drawings</u> H-2-44500 Sheet 7	<u>Elevations</u> Ground 683 ft Water Table 404 ft(1973) <u>Site Depth</u> NA	
<u>Source and Description of Waste</u> A leak in the line from Purex Plant to 102-C Tank.			
<u>Description of Facility</u> A leak in the above line near the 241-CR-151 Diversion Box. Approximately 36,000 gal. of waste was lost to the soil. Contamination was covered with clean gravel.			
<u>Radionuclide Content</u> (at time of discharge)			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	
	<sup>90</sup> Sr, Ci	360	
	<sup>137</sup> Cs, Ci	720	
	<sup>144</sup> Ce, Ci	360	
	<sup>95</sup> ZrNb	1,080	
	<sup>103</sup> Ru	1,080	

9 2 1 2 5 1 1 2 3 0

UN-216-E-9

CHEMICAL PROCESSING DIVISION  
RADIATION OCCURRENCE

TO:  L. W. Roddy	RADIATION OCCURRENCE FACTS	
	DATE October 15, 1969	TIME 1100
	LOCATION 244-CR	

RADIATION OCCURRENCE TYPE: <u>1-C, 3-C</u>	CAUSE CODE: <u>1-B</u>
1-C Uncontrolled dose rates greater than 6 mR/hr outside of a radiation zone.	Failure of equipment.
3-C Uncontrolled radiation inside a radiation zone.	

COMPLETE DESCRIPTION AND CAUSE

A puddle of contaminated liquid (approximately 6 x 40 feet) was discovered a few feet west of the 151-CR diversion box of the 244-CR vault. Dose rates of 50 mR/hr existed on 7th street at its closest approach and 100 mR/hr at the radiation zone boundary. The source was determined to be a leak in an underground transfer line from 202-A Building to the 102-C waste storage tank via the 151-CR box. When the transfer of Purex coating waste was stopped, most of the liquid seeped back into the soil. Radiation levels of 5 R/hr at 20 feet were measured.

Earth backfill was placed over the liquid which reduced the levels to a maximum of 3 R/hr at one foot above about 18 inches of fill dirt. There was no spread of contamination beyond the liquid and no uncontrolled personnel exposure.

CCI: GE Backman (2) CW Melody BJ McMurray (2) RE Smith File (FAP)	ACTION TAKEN 1. Barricades were immediately set up across roadways around the CR vault. (Security Patrol and the Hanford Fire Department were notified these barricades were in place.) 2. A person was in attendance at all times near the puddle to avoid unusual personnel exposure. 3. Quick action was taken to summon the shop crew and get the wet area backfilled.
	INVESTIGATED BY: FA Perkins/BV Snow

EXPOSED EMPLOYEES  
None

9212511231

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. NE

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
Unplanned Release		241-C-152 Line Break	UN-216-E-10
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant Near 241-C-152 Diversion Box		12/69	--
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-42570, W-48685	H-2-44500 Sheet 7	Ground	683 ft
		Water Table	404 ft (1973)
		Site Depth	

Source and Description of Waste

A leak in the line from Tank 105-C to B Plant.

Description of Facility

The above line leaked approximately 2600 gal. near the 241-C-152 Diversion Box. The contaminated soil was covered with clean gravel.

Radionuclide Content (at time of discharge)

<u>Radionuclide</u>	<u>At Time of Discharge</u>
<sup>106</sup> Ru, Ci	130
<sup>137</sup> Cs, Ci	11,300
<sup>144</sup> Ce, Ci	260
<sup>95</sup> ZrNb	260
<sup>134</sup> Cs, Ci	100

(See Attachment)

9212511232

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ARA-1945

CLASSIFICATION

DATE January 25, 1971 COPY NO. 6

ISSUING FILE

Atlantic Richfield Hanford Company

RICHLAND, WASHINGTON

TITLE AND AUTHOR

B PLANT ION EXCHANGE FEED LINE LEAK

K. H. Tanaka

UN-216-E-10

DISTRIBUTION

NAME

BUILDING AREA

NAME

BUILDING AREA

ROUTE TO

PAYROLL NO.

LOCATION

FILES ROUTE DATE

*K. H. Tanaka*

9212511233

UNCLASSIFIED

CLASSIFICATION

UNCLASSIFIED

ARH-1945

B PLANT ION EXCHANGE FEED LINE LEAK

By

K. H. Tanaka

Waste Management Process Engineering

January 25, 1971

DISTRIBUTION

- 1 - S. J. Beard
- 2 - H. L. Caudill
- 3 - J. B. Fecht
- 4 - T. R. Garland
- 5 - R. B. Guenther
- 6 - G. L. Hanson
- 7 - R. S. Holman
- 8 - R. E. Isaacson
- 9 - G. R. Kiel
- 10 - D. J. Larkin
- 11 - G. C. Oberg
- 12 - L. W. Roddy
- 13 - W. C. Schmidt
- 14 - P. W. Smith
- 15 - R. E. Smith
- 16 - K. H. Tanaka
- 17 - D. D. Tillson - PNL
- 18-19 - ARHCO Files
- 20-25 - Extra

UNCLASSIFIED

9 2 1 2 3 1 1 2 3 4



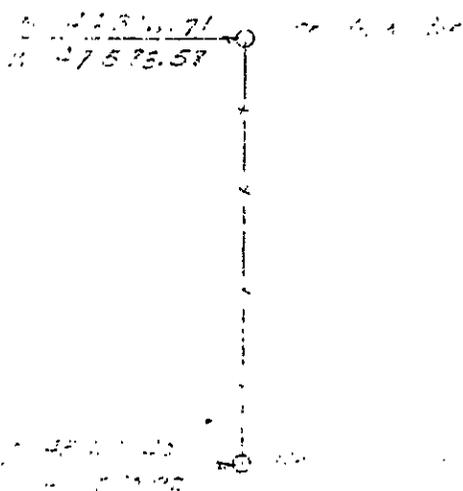
VITRO ENGINEERING CORPORATION  
 Engineers

# CONSTRUCTION LAYOUT CHECK LIST REPORT

1. NO. REQUESTED <i>101-11111</i>	2. REQUESTED BY <i>Gate St. 11111</i>	3. REPRESENTING: <i>Gate St.</i>	4. LOCATION OF WORK (AREA BLDG.) <i>218E, 218E-124</i>
5. A. O. NO.	6. CHANGE CORR.	7. PROJECT TITLE	
8. FIELD NO.	9. FIELD CONTACT <i>Gate St. 11111</i>	10. APPROVED REFERENCES (DWGS, SKETCHES, LETTERS, ETC.)	
11. DESCRIPTION OF WORK REQUESTED <i>Determine Coordinates of the new N/A &amp; E of corner of the 218E-124 Burial Ground.</i>			26. DISTRIBUTION <i>ORIG. Survey file 10 Gate Stiger/RHO</i>
12. ACCEPTED CONFIRMED			

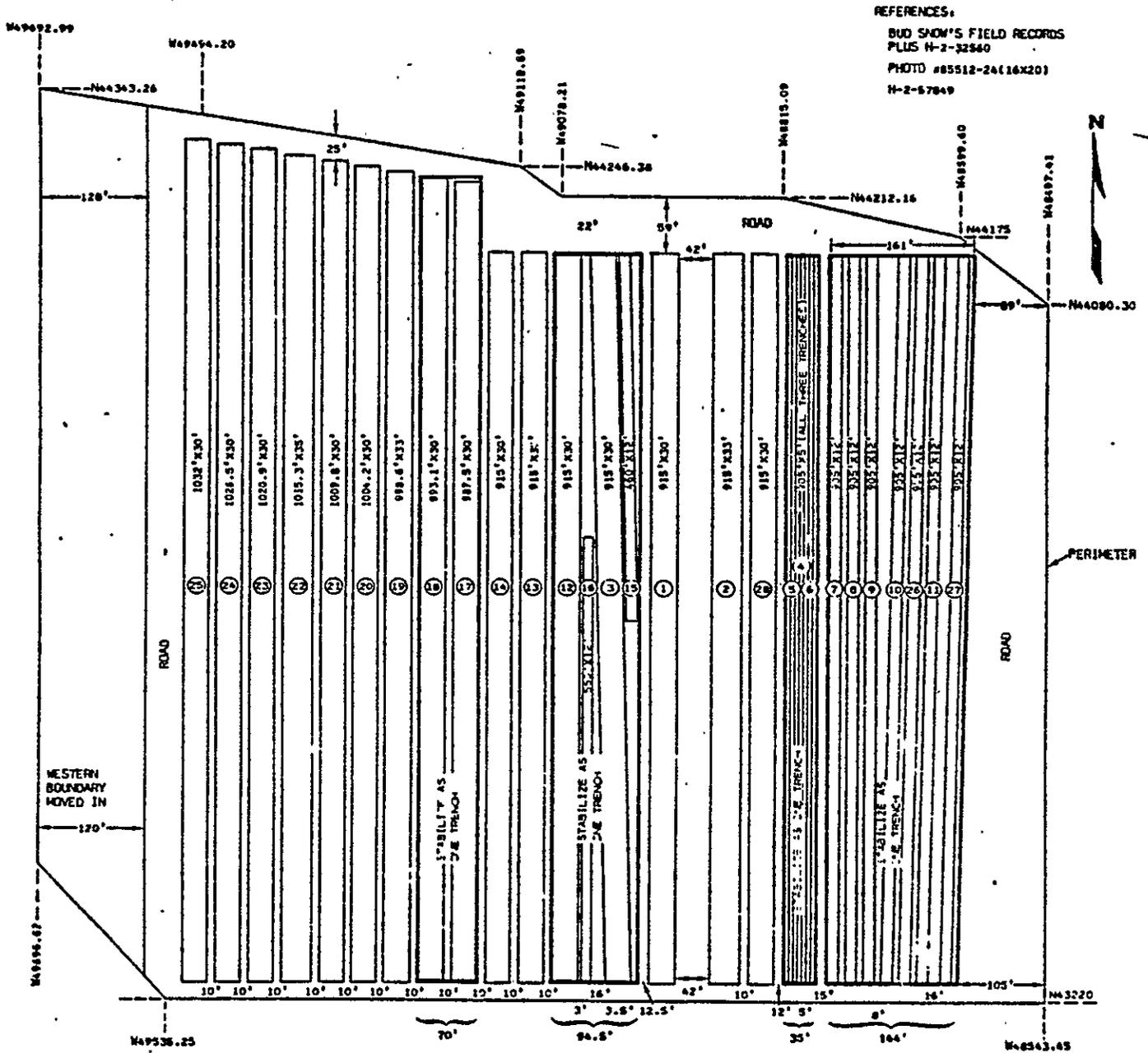
9 2 1 2 5 1 2 8 5

CHECK LIST	PERFORMED BY	CHECKED BY
13. FIELD SURVEY DETERMINED	<i>H. B. Biddle</i>	<i>H. B. Biddle</i>
14. DATA CHECKED UP BY	<i>H. B. Biddle</i>	<i>H. B. Biddle</i>
15. FIELD CHECKED BY	<i>H. B. Biddle</i>	<i>H. B. Biddle</i>
16. WORKING DRAWINGS		
17. REPEATED BY	<i>H. B. Biddle</i>	<i>H. B. Biddle</i>
18. DETERMINED & VERIFIED		
19. REVISIONS		
20. APPROVED		
21. COMMENTS		



12. SURVEY FILE NO.

FIGURE B.2: BURIAL GROUND 218-E-12-A



REFERENCES:

BUD SNOW'S FIELD RECORDS  
PLUS H-2-32840  
PHOTO #85512-24(16X20)  
H-2-57849

9 2 1 2 5 1 2 3 6

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. NE

<u>Name/Type of Facility</u> Burial Ground	<u>Past Designation</u> 200 East/Dry Waste No. 123	<u>Number</u> 218-E-12B
<u>Location</u> 200 East - N.E. Quadrant About 4,500 ft north of Purex.	<u>Service Dates</u> 1967	<u>Status</u> Active
<u>Site Coordinates</u> N-45485, W-48522 N-45505, W-48541 N-44485, W-49661 N-45504, W-49643	<u>Reference Drawings</u> H-2-33276	<u>Elevations</u> Ground 630 ft Water Table 405 ft(1973) Site Depth ~ 12 ft
<u>Source and Description of Waste</u> Miscellaneous dry waste. (approximately $3.6 \times 10^5$ ft <sup>3</sup> ).		
<u>Description of Facility</u> 29 trenches running north and south. 960 ft long. Surface area: $4.01 \times 10^5$ ft <sup>2</sup> Six of these trenches are narrow, shallow trenches - 960 ft long, 3 ft wide and 4 ft deep. The remaining 23 are 960 ft long, 40 ft wide and 16 ft deep with an approximate 5 ft bottom. Twenty trenches are filled and 2 are partially filled.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$2.80 \times 10^4$	$2.80 \times 10^4$
Pu, g	$1.3 \times 10^3$	$1.3 \times 10^3$
Total Beta, Ci	$1.05 \times 10^4$	$1.72 \times 10^3$
<sup>90</sup> Sr, Ci	$2.1 \times 10^2$	307.0
<sup>106</sup> Ru, Ci	$4.5 \times 10^2$	25.0
<sup>137</sup> Cs, Ci	$2.3 \times 10^2$	325.0
<u>NOTE:</u> See next page.		

9 2 1 2 5 1 1 2 3 7

B PLANT ION EXCHANGE FEED LINE LEAK

INTRODUCTION

One of the objectives of the Waste Management Program is to separate the long-lived heat emitter  $^{137}\text{Cs}$  from the bulk of the high-level liquid wastes. This separation is accomplished by the ion exchange process in the 221-B Building. Interim storage of the cesium is in solution as a nitrate. The cesium will later be converted to a solid salt as cesium chloride and encapsulated for permanent storage.

The feed for the B Plant cesium ion exchange process is pumped from the lag storage tank, 105-C, through a pipeline and several diversion boxes to the 221-B Building. On December 19, 1969, a leak was discovered near the 241-C-152 diversion box in the section of this line, V-122, from the 105-C tank.

Although the leak represented a loss of feed for the processing of  $^{137}\text{Cs}$ , more important, however, was the consequence of environmental contamination to the soil from the line leak. For this reason, an investigation was made to establish the extent of the radioactivity spread. This report summarizes the results of a well drilling operation undertaken to define the boundary and to estimate the extent of the leak.

SUMMARY

Ten wells were drilled at radial distances from 4 to 16 feet from the leak source and to depths of 30 feet, whenever possible. Analytical results of  $^{137}\text{Cs}$ , the major constituent of the waste solution, were used as the basis for determining the configuration and content of the leak volume. Three general concentration zones of 550, 100, and 10  $\mu\text{Ci } ^{137}\text{Cs}/\text{gram}$  of soil were plotted from the analytical data. The highest concentration zone, 550  $\mu\text{Ci } ^{137}\text{Cs}/\text{gm}$  of soil, corresponds to soil saturated with waste solution that contains 4.0 Ci  $^{137}\text{Cs}/\text{gal}$ . Within an error 10 percent, this saturated region is verified by the ion exchange feed concentration of 4.34 Ci  $^{137}\text{Cs}/\text{gal}$ .

The volume of waste solution that leaked to the soil was estimated at 2600 gallons. This volume, which included an approximate 100 gallons that surfaced and collected near a

9 2 1 2 3 8

fence line, contained 11,300 Ci  $^{137}\text{Cs}$ , 260 Ci  $^{144}\text{Ce}$ , 260 Ci  $^{95}\text{ZrNb}$ , 130 Ci  $^{106}\text{Ru}$ , and 100 Ci  $^{134}\text{Cs}$ . About 705 cubic feet of soil was contaminated with  $^{137}\text{Cs}$ . The  $^{144}\text{Ce}$  and  $^{95}\text{ZrNb}$  content of the soil is located in about 40 cubic feet of soil surrounding the leak source. The analytical results indicate that  $^{106}\text{Ru}$  has a greater radial migration and deeper penetration than  $^{137}\text{Cs}$ . Ruthenium-106 appears to have collected in a spheroidal band from 4 to 8 feet beyond the  $^{137}\text{Cs}$  boundary.

No heat problems are expected to result from an estimated maximum temperature increase of 30 °F in the soil, near the source of the leak. Also, the radioactivity from the leak will not reach the ground water because of the ion exchange properties of the soil, the depth of the water table level and the light regional rainfall.

LEAK DESCRIPTION

The ion exchange feed line, V-122, was buried about 11 feet below grade level. This line was installed in July 1964, and hydrostatic pressure tested to 200 psig for 30 minutes. It was placed into service in December 1967.

The leak was visually detected by Radiation Monitoring personnel who were passing in the vicinity of the 241-C-152 diversion box. The waste stream flowed through a surface area of about one square foot, northeastward, down a slightly declining grade, and pooled along the side of a small dike outside the tank farm fence line. The pool was estimated to be 5 feet square. Pumping from the 105-C tank to B Plant was immediately halted. Two to three feet of gravel and soil were spread over the leak area to absorb, cover, and shield the surface contamination.

The leak surfaced through an area directly above the location of the joint that connects a 3-inch stainless steel pipe to a 3-inch carbon steel pipe<sup>(1)</sup>. Between the flanges of these pipes is a 3/16-inch linear polyethylene gasket which is speculated to have ruptured. No attempt was made to determine the exact cause of the leak, since the high radioactivity in the vicinity of the leak prohibited the excavation and direct examination of the pipeline.

9 2 1 2 5 1 2 3 9

EVALUATION METHOD

Pacific Northwest Laboratory's Earth Sciences Department personnel drilled 10 wells and obtained all soil samples. These samples were analyzed by the Redox Analytical Laboratory. An excavation permit was issued describing the location of the initial wells, precautions to be taken while drilling, instructions for RM coverage, timekeeping, survey of leak vicinity, and staking of the well locations.

The suspected leak source, the flange near a 36° bend in the pipeline, was used as a base point. From this base point, four initial wells were surveyed and staked to surround the area of the leak. Thereafter, wells were drilled at varied radii closer to the source to obtain data for iso-concentration lines at various depths. The location of these subsequent wells was based upon the position of other existing pipelines<sup>(2)</sup>, the degree of contamination in preceding wells, and an effort to secure sufficient data to evaluate the leak. The number of wells was kept at a minimum to minimize the radiation exposure to the drillers. Well locations are shown in Figure 1.

The drilling rig used a 350-pound cylindrical hammer to drive the sectioned 2-1/4-inch OD steel pipe into the ground. Attached to the end of the steel pipe was a Shelby<sup>R</sup> sampler, a 24-inch long, split-barrel, stainless steel section with a tapered tip. With this sampler, 1-3/4-inch core samples were obtained. During drilling, the split-barrel sampler was withdrawn from the well at two-foot intervals, disassembled, and its contents examined. The exposed soil was then surveyed with a CP. If any contamination was detected, a field reading was recorded and samples were taken. For significantly high levels of radiation, greater than 50 mR/hr, samples were taken at smaller interval depths.

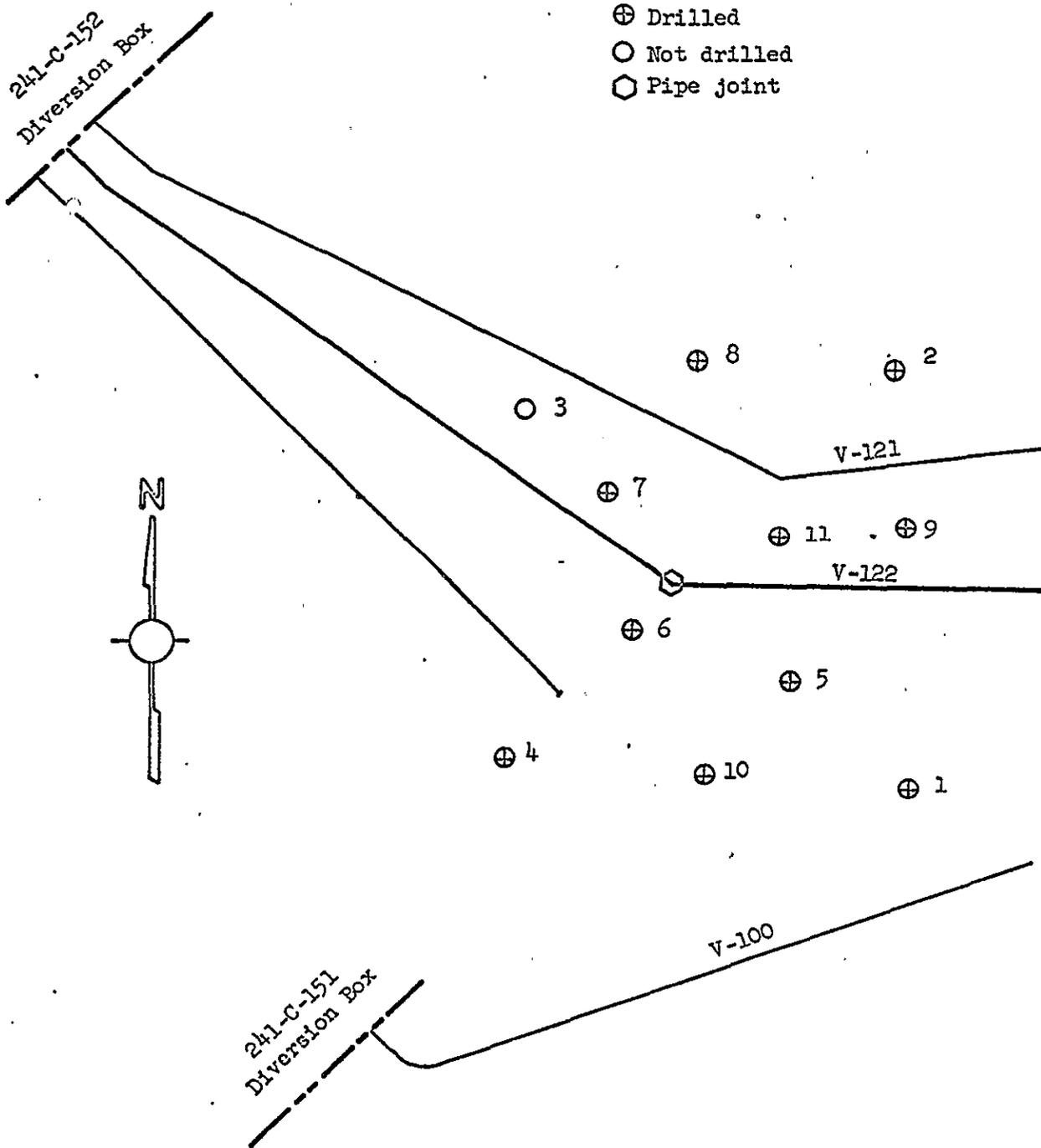
A variety of soil textures was encountered during drilling, as shown in Figures 2 and 3. The soil layers ranged from sandy clay to kaliche, an almost impenetrable rock-like layer. The very non-porous kaliche layer, nearly 6 inches thick, lay at a depth between 13 to 14 feet, sloping slightly eastward. Except for a few isolated areas, the results from the analytical data indicate that this layer had obstructed the movement of <sup>137</sup>Cs to lower depths. Most of the radioactive material was adsorbed more readily onto the sandy clay type of soil, rather than the coarser soils.

<sup>R</sup> Trade name

UNCLASSIFIED

9 2 1 2 5 1 1 2 9 0

FIGURE 1 - SKETCH OF WELL LOCATIONS



9 2 1 2 5 1 1 2 9 1

Samples were placed in pint-size glass jars. As the drilling operations progressed, aluminum cans were found to be more suitable sample containers to eliminate the breakage hazard of glass jars. Also, the aluminum cans could be accommodated within a 75-pound lead-shielded "pig". Highly radioactive samples, i.e., greater than 5 rad/hr., were handled in a special waste container designed to minimize surface contamination and exposure to the drillers prior to transfer into sample containers.

An attempt was made to obtain uniform sample volumes to aid in the laboratory analyses. The soil samples were analyzed by the quantitative gamma spectrum analyses and the results reported on a weight basis,  $\mu\text{Ci/gm}$  of soil. From these results, the vertical depth profiles were plotted. Concentration profiles for Wells 5 and 11 are shown in Figures 4 and 5. From these profiles, horizontal iso-concentration zones were mapped as shown in Figure 6. The slope of the soil layers and the incline of the pipeline places the center of the iso-concentration contours about two feet east of the base point.

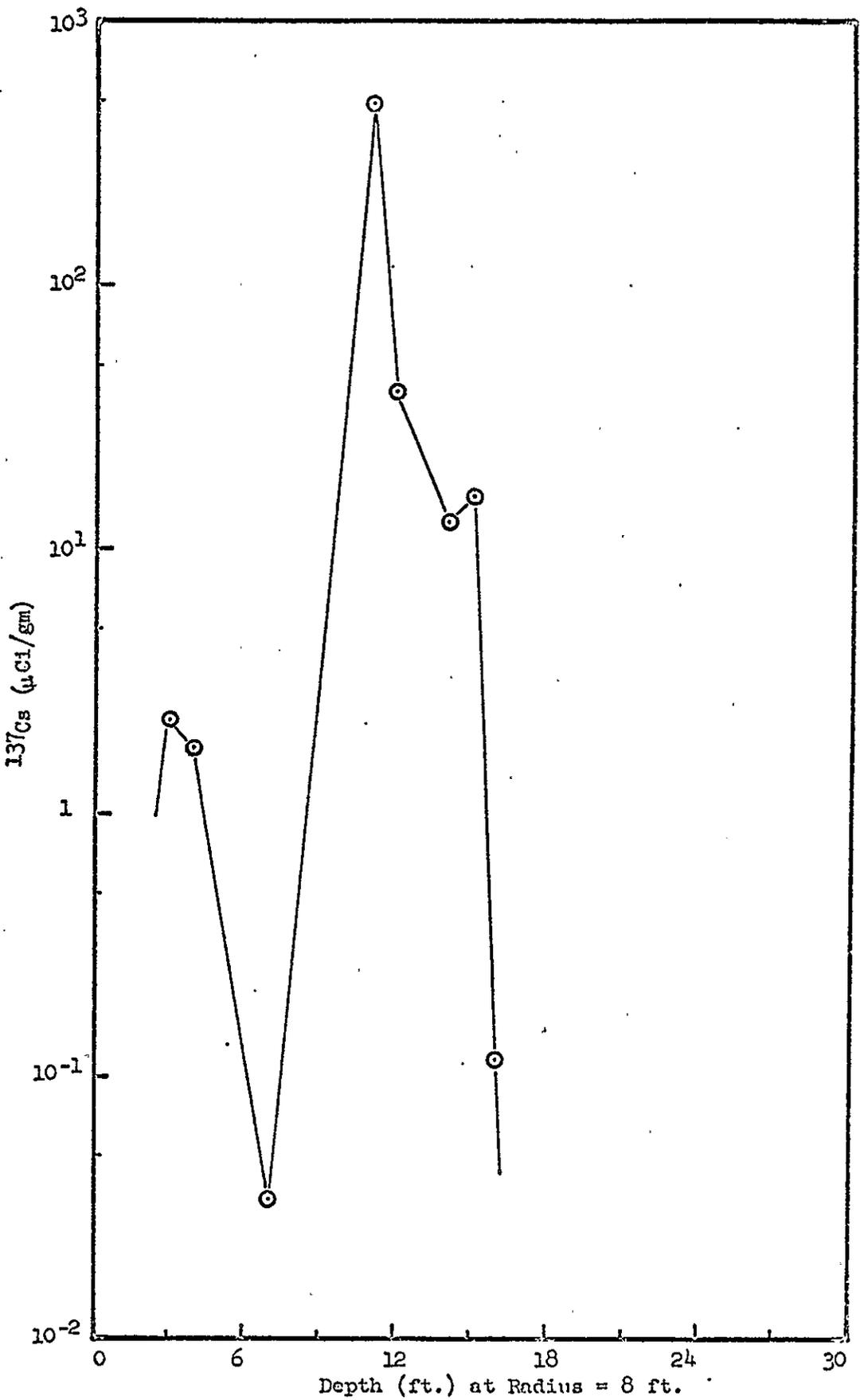
The theoretical shape of the leak in the soil is a sphere for low leak rates of 3 to 10 gpm or teardrop-shaped for higher flow rate leaks of 10 to 20 gpm or greater. The actual shape of the contaminated region based upon the drilling data looks somewhat like that depicted in Figure 7. The kaliche layer and a high leak rate probably caused the leak to move laterally and upward, rather than uniformly outward from the leak source. The concentration contours were considered as circular-shaped in the horizontal plane for calculation purposes. The shape of the iso-concentration lines in the vertical plane is elliptical. The volumes in the lateral directions are calculated as the volumes of an oblate spheroid. The volumes in the vertical direction are one-half the volumes of a prolate spheroid. The major axis is along the center line from the base point to the point where the leak surfaced. See Figure 8.

The average  $^{137}\text{Cs}$  concentration of the region surrounding the leak source was  $550 \mu\text{Ci } ^{137}\text{Cs/gm}$  of soil or  $4.0 \text{ Ci } ^{137}\text{Cs/gal}$  of solution, assuming the soil has a 35 percent void fraction with a volumetric  $^{137}\text{Cs}$  distribution coefficient of 0.6  $(\text{Ci/ft}^3 \text{ soil})/(\text{ci/ft}^3 \text{ sol'n})$  (3) and an average bulk density of  $1.8 \text{ gm/cc}$ . This value is within 10 percent of the ion exchange feed concentration of  $4.34 \text{ Ci } ^{137}\text{Cs/gal}$  of solution and verifies that this region around the leak source is saturated.

9 2 1 2 5 1 2 9 2

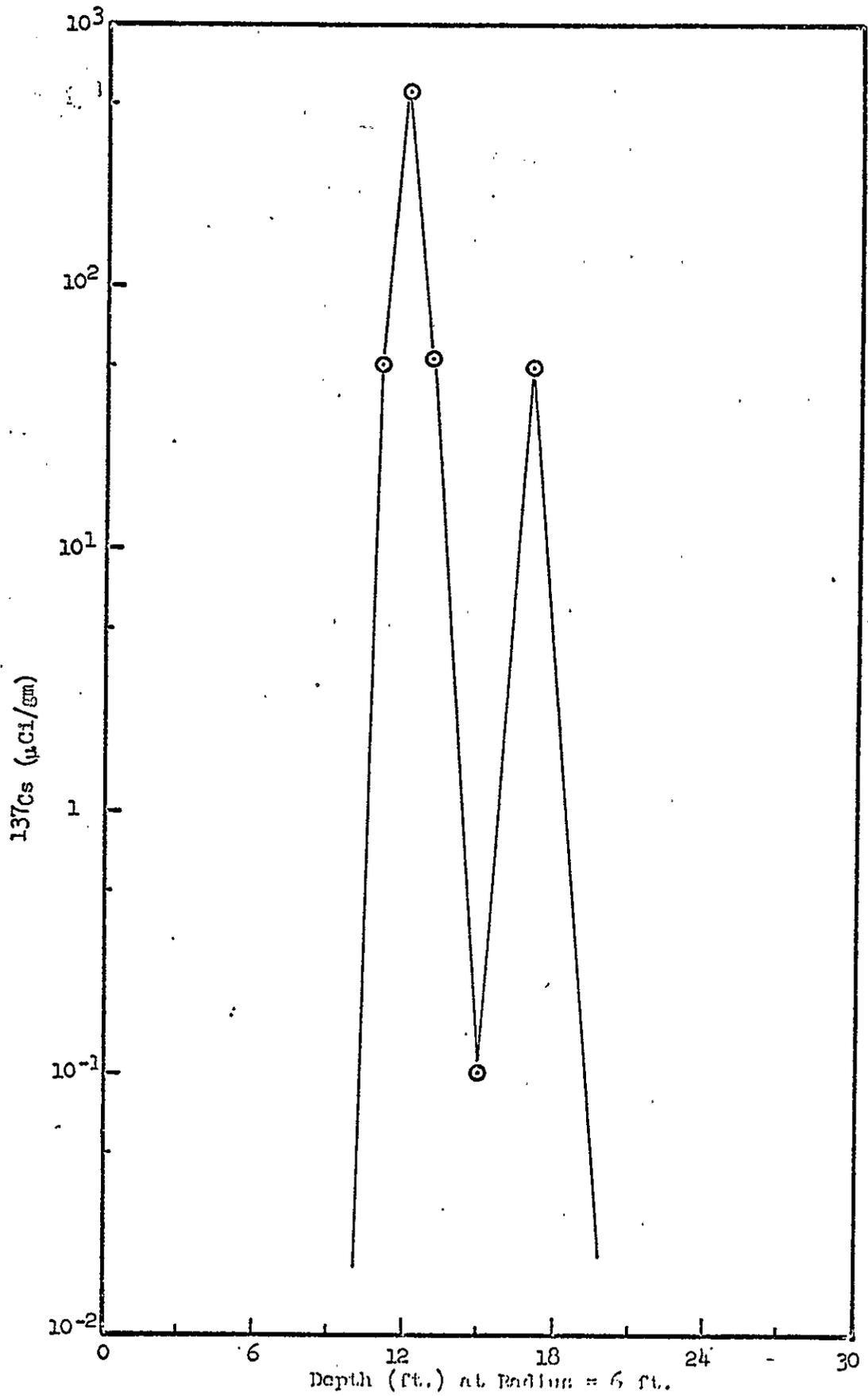
FIGURE 4 - CONCENTRATION PROFILE OF WELL #5

1960



9 2 1 2 5 1 2 9 3

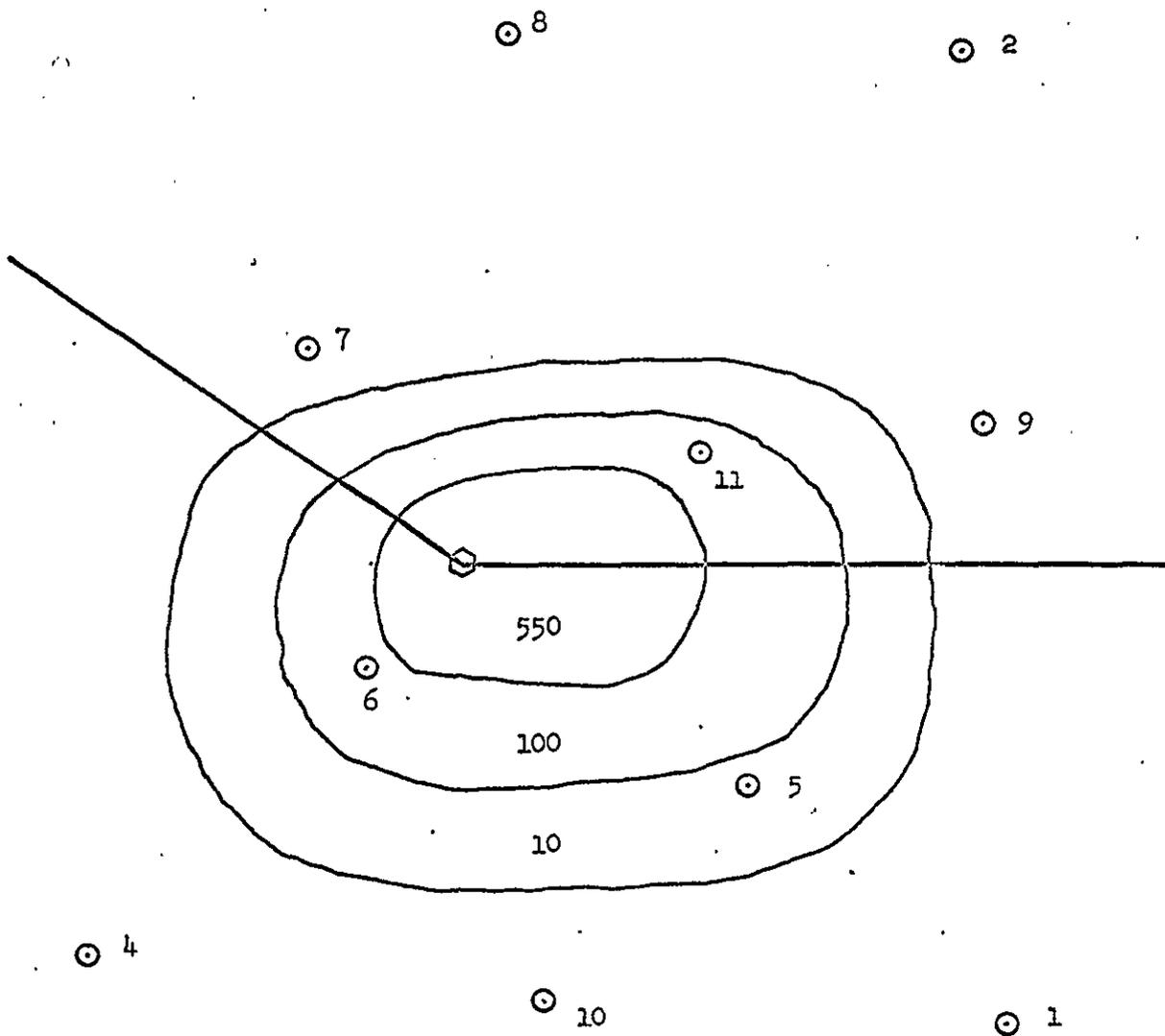
FIGURE 5 - CONCENTRATION PROFILE OF WELL #11



9 2 1 2 5 1 1 2 9 4

FIGURE 6 - ISO-CONCENTRATION CONTOURS

( $\mu\text{Ci }^{137}\text{Cs}/\text{gm soil}$ ) at a Depth of 11 feet  
Relative to Test Wells and Pipe Line



9 2 1 2 5 1 1 2 9 5

FIGURE 7 - ACTUAL LEAK CONFIGURATION

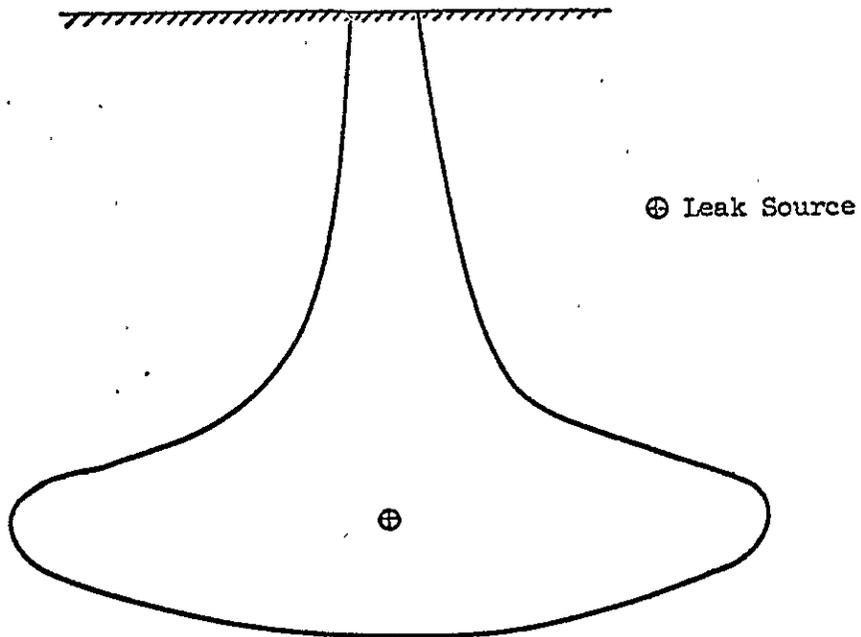
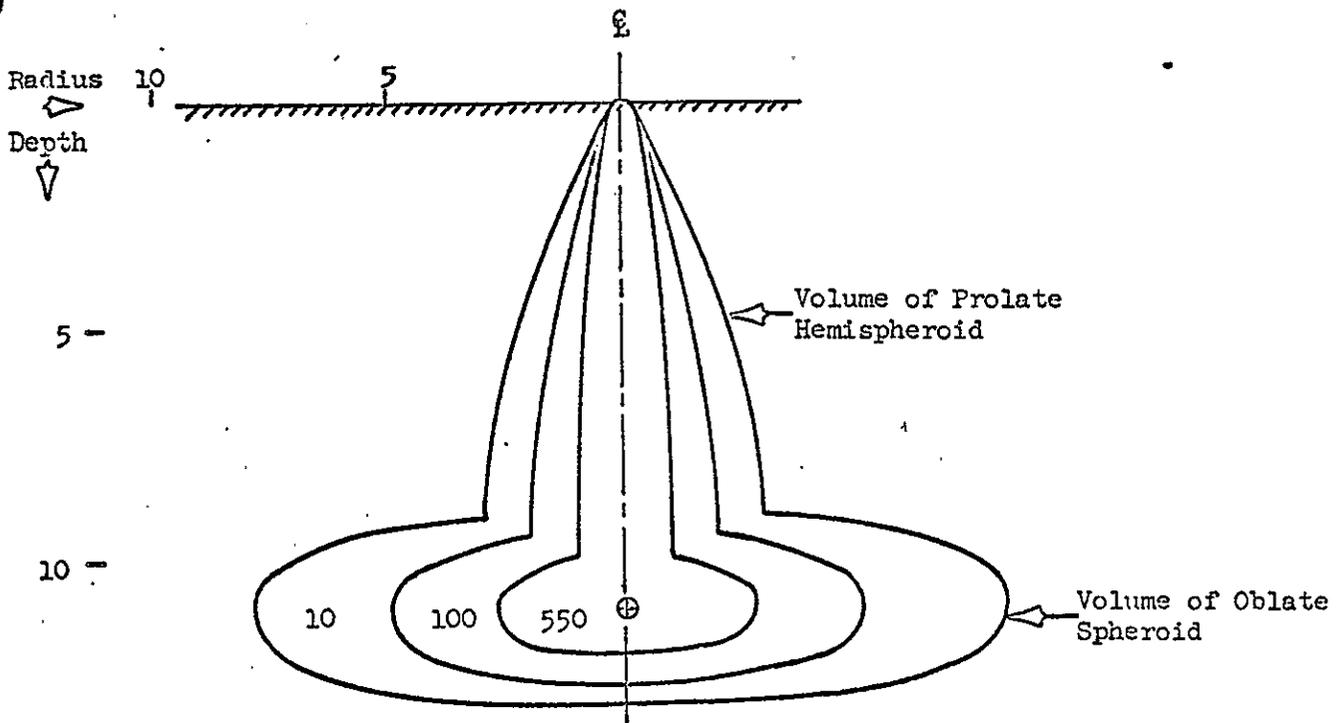


FIGURE 8 - CALCULATIONAL LEAK CONFIGURATION



9 2 1 2 3 1 1 2 9 6

The  $^{137}\text{Cs}$  curie content of each of the iso-concentration regions was calculated from the product of the volume multiplied by the concentration. The total calculated volume of soil contaminated with  $^{137}\text{Cs}$  was 705 cubic feet. The total curies of  $^{137}\text{Cs}$  that leaked, the sum of each region and the quantity that surfaced, divided by the ion exchange feed solution concentration equals the number of gallons of feed lost through the leak. A leak loss of 2600 gallons and 11,300 curies of  $^{137}\text{Cs}$  was calculated. Other radionuclide losses are listed in Table 1, together with the ion exchange feed composition.

TABLE 1  
PSN-IX FEED COMPOSITION AND RADIONUCLIDES  
LEAKED TO THE SOIL

<u>Radionuclide</u>	<u>Feed Composition</u> <u><math>\mu\text{Ci/gal}</math></u>	<u>Activity Leaked</u> <u>to Soil, Ci</u>
$^{137}\text{Cs}$	4.34	11,300
$^{144}\text{Ce}$	0.10	260
$^{106}\text{RuRh}$	0.05	130
$^{95}\text{ZrNb}$	0.10	260
$^{134}\text{Cs}$	0.04	130

Drilling in Well No. 6 was terminated when a sample reading of 110 rad/hr was encountered at a depth of 11 feet. Facilities for handling such a hot sample were not available at that time so the soil was knocked out of the sampler and left in the well. The 110 rad/hr soil undoubtedly contained, in addition to  $^{137}\text{Cs}$ ,  $^{144}\text{Ce}$  and  $^{95}\text{ZrNb}$  from the feed, since the radiation reading of 30 rad/hr was measured from a sample saturated with only  $^{137}\text{Cs}$ . These radionuclides, whose volumetric distribution coefficient,  $K_D$ , is greater than 500, were sorbed or precipitated onto an estimated 40 cubic feet of soil around the leak source.

Analytical results indicate that a broader and deeper migration of  $^{106}\text{Ru}$  than  $^{137}\text{Cs}$  into a spheroidal band between 4 and 8 feet beyond the  $^{137}\text{Cs}$  boundary. The short-lived  $^{106}\text{Ru}$  (one year half-life) presents less of a potential hazard than  $^{137}\text{Cs}$  (30-year half-life).

A complete thermal analysis of the pipeline leak was not made. Only a maximum temperature increase in the saturated region near the leak source was estimated. From a previous study<sup>(5)</sup>, a computer program generated data for estimating the temperature increase in the soil of a leak from a waste tank containing the similar type of waste solution that was used for the ion exchange feed. Based on a calculated volumetric heat generation rate of 0.60 Btu/hr/ft<sup>3</sup> for the feed solution and the previously mentioned soil characteristics, a 30 °F maximum temperature increase in the soil was estimated.

Due to the ion exchange properties of the soil, the depth of the water table level, and the light regional rainfall, it is concluded that the radioactive contamination from the leak will not reach the ground water. The water table level in the vicinity of the leak is located more than 200 feet below the ground level. The average annual rainfall in this region is less than 6 inches and would require a flooding storm of disastrous proportions to force the migration of radioactivity to such depths through the soil. In addition, the ion exchange properties of the Hanford soil will sorb the radioactive contaminants before they could reach the ground water.

REFERENCES

1. H-2-32484, Cesium Transfer Line No. V-122 - 241-CR-05A to 241-C-152
2. H-2-35450, Line V-106 and Replacement Line V-122 - Details
3. G. Jansen, Jr., W. E. Willingham, and W. V. DeMier, Buried Radioactive Waste Storage Tank Temperatures and Soil Temperatures Near Leaks, BNWL-181, March 1966
4. J. R. Raymond and E. G. Shdo, Characterization of Subsurface Contamination in the SX Tank Farm, BNWL-CC-701, June 14, 1966
5. Op. cit., G. Jansen, Jr.

9 2 1 2 5 1 2 9 3

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CU-673

I. NE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Unplanned Release		241-C-Tank Farm Line Leak, SW Corner	UN-216-E-14
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, N.E. Quadrant Near SW corner of 241-C Tank Farm		2/25/71	--
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-42725, W-48745	H-2-44500 Sheet 7	Ground	680 ft
		Water Table	402 ft(1973)
		Site Depth	8 ft
<u>Source and Description of Waste</u>			
Waste from process transfer line.			
<u>Description of Facility</u>			
A leak in the process transfer line No. 812 from AR Vault to 241-C Tank Farm near the SW corner of the 241-C Tank Farm. Contaminated soil volume estimated at 1300 ft <sup>3</sup> . Test wells indicated penetration of waste to a depth of 20 ft.			
<u>Radionuclide Content</u> (calculated from discharge data)			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 12/31/73</u>
	<sup>137</sup> Cs, Ci	~25,000	~21,000
<u>History:</u>			
Process transfer line #812 from AR Vault to 241-C Tank Farm was found leaking near southwest corner of that farm. At that location, the line is eight-feet deep. Contaminated soil zone was estimated at 1,300 cubic feet. Test wells driven into the ground indicated the contamination did not extend below a depth of 20 feet.			
(See Attachment)			

9 2 1 2 5 1 1 2 9 9

NOV 28 1972



UN-216-E-14

2/25/71

Date: November 9, 1972

To: G. L. Borshiem

From: W. P. Metz *W.P. Metz*

Subject: PSS LINE LEAK (LINE No. 812)

Reference:

- (1) Letter, June 2, 1971, J. R. Irish to R. C. Tabasinske, "Line No. 812 Leak Investigation"
- (2) Letter, June 22, 1971, J. R. Irish, G. C. Oberg to P. F. Pritchard, "PSS' Leak-Well Stake Out"
- (3) Letter, August 19, 1971, W. P. Metz, G. L. Borsheim to R. C. Tabasinske, "Line No. 812 Leak Investigation"
- (4) B. W. Anderson, Monthly Report, February 1971.

INTRODUCTION

During routine line monitoring near C-Farm, in March 1971 a radiation zone was detected in the vicinity of line No. 812, the line used to transport PSS from AR Vault to C-Farm. An investigation was initiated to determine the extent of the fission product loss (references 1,2, and 3).

SUMMARY

The investigation concluded that about 25,000 curies of <sup>137</sup>Cs were lost via the leak. Eight wells were drilled in the leak area and the apparent boundaries of the contaminated soil were established. The ground surface in the leak vicinity should be stabilized to prevent contamination spread.

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DISCUSSION

Evaluation of the AR Vault process data indicated that at or around February 25, 1971, 17,385 gallons of PSS (containing about 1.35 Ci/gal of <sup>137</sup>Cs) had been lost (reference 4). Routine line radiation monitoring indicated that a leak had occurred in line No. 812 near C-Farm. To assist in the investigation PNL was contacted to drill eight dry wells in the vicinity of the leak.

Figure I is a sketch of the leak vicinity in the vertical and horizontal view and shows the line, the eight wells, and the estimated extent of the contaminated soil. The contaminated soil zone is estimated to contain about 1300 feet<sup>3</sup>. The contamination did not extend below a depth of 20 feet in any of the test wells.

Line 812 is a 2 inch direct buried line which is about 8 feet below grade. The line has a carbon steel to stainless steel joint near the bend as indicated. Well Nos. 1,2,3,6 and 7 were found to be uncontaminated to a depth of 15 to 20 feet. Well Nos. 4,5, and 8 were found to have soil contaminated up to 334 uCi of <sup>137</sup>Cs per gram. Wells 5 and 8 were drilled to a depth of 16 to 19 feet where uncontaminated soil was found. Drilling in well No. 4 was terminated at a depth of 6 feet due to radiation exposure. Table I lists various soil sample analyses at the depths of sampling for wells 5 and 8, and lists soil exposure rates for well 4.

The line has been abandoned. The wells should be closed. The ground surface should be sterilized to prevent plant growth and stabilized to prevent wind erosion.

WPM:bri

Att:

cc: RB Guenther  
J Dunn  
DJ Larkin  
WP Metz  
LW Roddy  
File 1124-A  
LB

FOR P55 LINE LEAK  
INVESTIGATION

11

- UNCONTAMINATED WELL
- ⊙ CONTAMINATED WELL
- ⊙ SURFACE CONTAMINATION
- ⊙ ESTIMATED CONTAMINATION ZONE

9 2 1 2 5 1 1 3 7 2 0

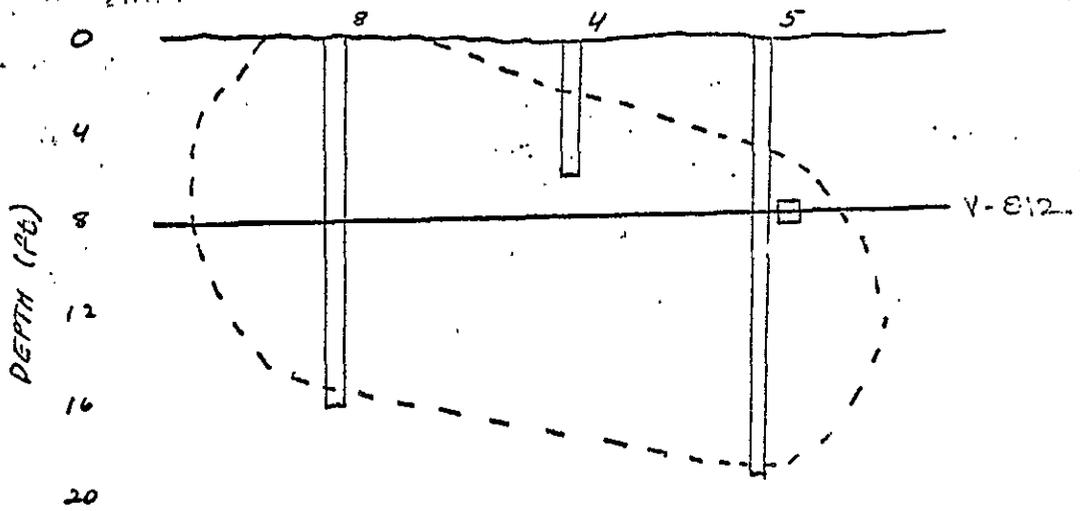
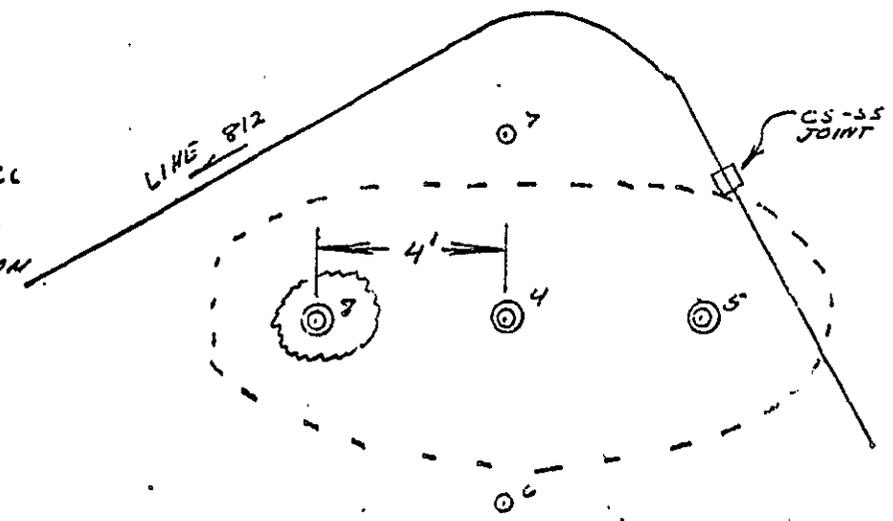


TABLE I  
WELL LOGS FOR CONTAMINATED WELLS

Depth (Ft)	Exposure	Well No.	
		4	5
		uCi <sup>137</sup> Cs/gram	8
			uCi <sup>137</sup> Cs/gram
0			
1	1000 cpm		
2			334.
3	5R		
4			
5		0.065	
6	5R at 2"		0.104
7			
8			50.7
9			
10			
11			
12		3.48	.295
13			
14		0.268	0.064
15			
16		0.272	Clean
17			
18		0.291	
19		Clean	

9 2 1 2 5 1 3 0 3

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NE

<u>Name/Type of Facility</u> B Plant Retention Basin		<u>Past Designation</u>	<u>Number</u> 207-B
<u>Location</u> 200 East, N.E. Quadrant ~2,000 ft Northeast of 221-B Bldg. ~400 ft east of Baltimore Ave. South of the 241-B Tank Farm.		<u>Service Dates</u> 4/45 to present	<u>Status</u> Active
<u>Site Coordinates</u> (Approximate) N-44600, W-52500	<u>Reference Drawings</u> W-73646	<u>Elevations</u> Ground 669 ft Water Table 404 ft Site Depth 6.5 ft	
<u>Source and Description of Waste</u>  Receives process cooling water from processequipment jackets in the 221-B Building. Activity levels are normally low and the water is discharged to the 216-B-3 pond via the 216-B-2 Ditches.			
<u>Description of Facility</u> Divided concrete basin, approximately 1 million gal capacity. Dimensions 123 ft x 246 ft x 6.5 ft deep.  System also includes about 3000 ft of 15 in. to 30 in. diam vitrified pipe used to convey the waste water to and from the basin. <u>Radionuclide Content</u> (calculated from discharge data)  Unknown. Basin is still being used.			
<u>History</u>  The concrete walls of this basin have been contaminated by a number of incident radioactive water releases during the years of operation. In 1963 the residue contamination on the walls was covered with a coat of tar sealant.			

9 2 1 2 5 1 1 3 0 4

VOLUME I 200 EAST AREA - Southeast Quadrant (SE)

## Waste Disposal Sites and Associated Radiation Zones

## Quadrant Boundaries

- East Boundary - Canton Avenue, known as the "East Fence-line Road".
- South Boundary - 1st Street, known as the "South Fenceline Road".
- West Boundary - Baltimore Avenue from 1st Street to 7th Street.
- North Boundary - 7th Street from Baltimore Avenue to Canton Avenue.

See Area and Quadrant maps at the end of this section.

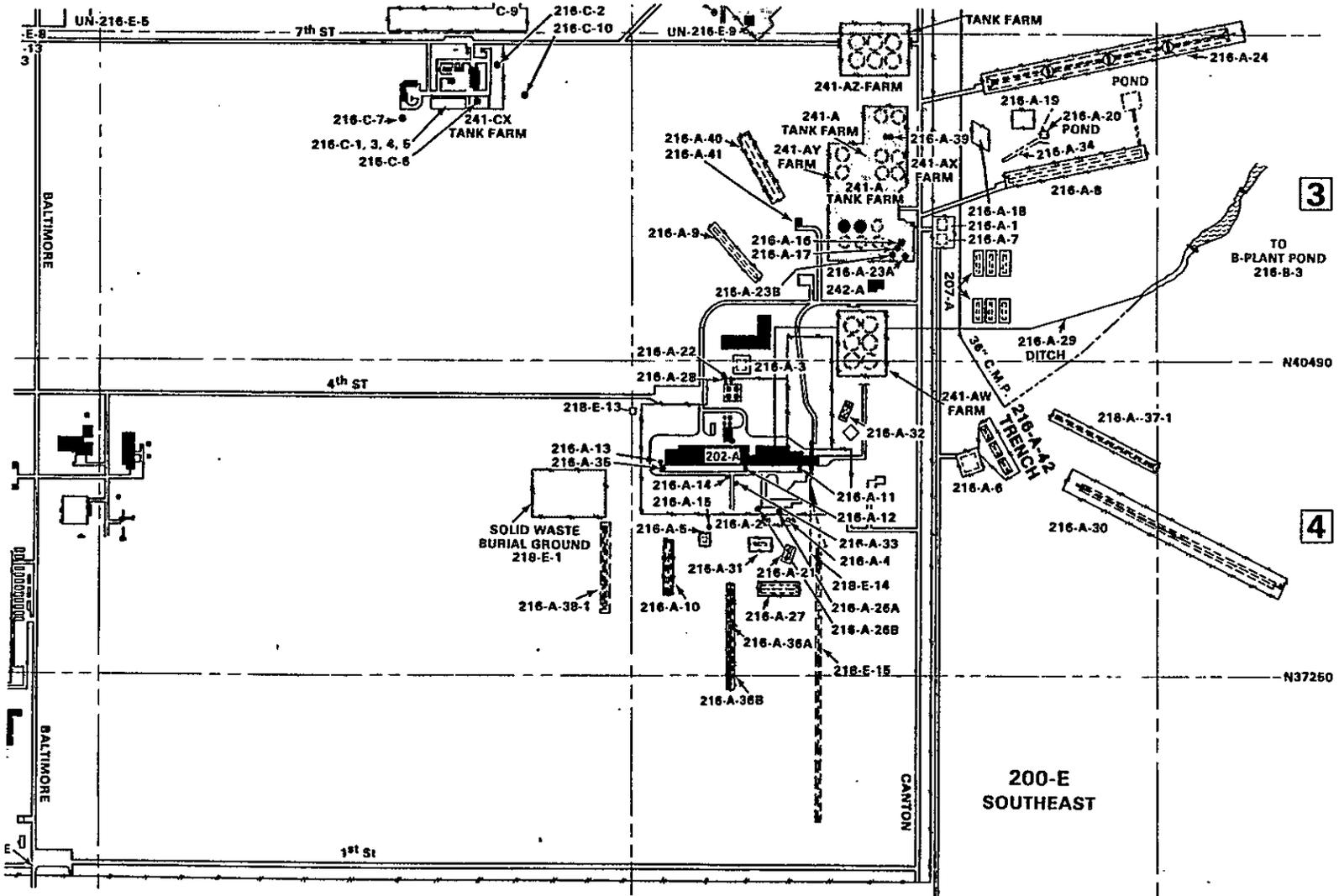
How to read the Index and locate a site:

Example - 216-A-12 French Drain ,I. SE

<u>Site Number</u>	<u>Volume</u>	<u>Quadrant</u>
216-A-12 French Drain	I	SE (Southeast)

9 2 1 2 5 1 1 3 0 5

RHO-CD-673



9 2 1 2 5 1 1 3 0 6

## INDEX - VOLUME I 200 EAST AREA

## Southeast Quadrant

216-A-2 Crib	I. SE	216-A-33 French Drain	I. SE
216-A-3 Crib	I. SE	216-A-35 French Drain	I. SE
216-A-4 Crib	I. SE	216-A-36A Crib	I. SE
216-A-5 Crib	I. SE	216-A-36B Crib	I. SE
216-A-9 Crib	I. SE	216-A-38 Crib	I. SE
216-A-10 Crib	I. SE	216-A-39 Crib	I. SE
216-A-11 Crib	I. SE	216-A-40 Trench	I. SE
216-A-12 French Drain	I. SE	216-A-41 Crib	I. SE
216-A-13 French Drain	I. SE	216-C-1 Crib	I. SE
216-A-14 French Drain	I. SE	216-C-2 Crib	I. SE
216-A-15 French Drain	I. SE	216-C-3 Crib	I. SE
216-A-16 French Drain	I. SE	216-C-4 Crib	I. SE
216-A-17 French Drain	I. SE	216-C-5 Crib	I. SE
216-A-21 French Drain	I. SE	216-C-6 Crib	I. SE
216-A-22 Crib (Fr. Drain)	I. SE	216-C-7 Crib	I. SE
216-A-23A French Drain	I. SE	216-C-10 Crib	I. SE
216-A-23B French Drain	I. SE	218-E-1 Burial Ground	I. SE
216-A-26A French Drain	I. SE	218-E-13 Burial Ground	I. SE
216-A-26B French Drain	I. SE	218-E-14 Purex Tun. Stor.	I. SE
216-A-27 Crib	I. SE	218-E-15 Purex Tun. Stor.	I. SE
216-A-28 Crib	I. SE		
216-A-31 Crib	I. SE		
216-A-32 Crib	I. SE		

9 2 1 2 5 1 1 3 0 7

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		216-A-2 Cavern	216-A-2
<u>Location</u> 200 East, SE Quadrant		<u>Service Dates</u>	<u>Status</u>
200 East Area, 260 ft south of 202A Bldg. 900 ft west of Canton Avenue S.W. of the 291-A-1 stack.		1/56-1/63	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39515, W-48278	H-2-56049 H-2-56050	Ground	712 ft
		Water Table	403 ft (1973)
		Site Depth	28 ft
<u>Source and Description of Waste</u>			
2.3 x 10 <sup>5</sup> liters. Organic waste from 202A (Purex). Low-salt, neutral-basic.			
<u>Description of Facility</u>			
Rock structure, 20 ft x 20 ft bottom surface area. Deactivated when the specific retention capacity was reached by removing a section of effluent pipeline.			
<u>Radionuclide Content</u> (calculated from discharge data)			
<u>Radionuclide</u>	<u>At time of Discharge</u>	<u>As of 6/30/78</u>	
Pu, g	130	1.30 x 10 <sup>2</sup>	
Beta, Ci	590	< 6.49	
<sup>90</sup> Sr, Ci	2	1.24	
<sup>106</sup> Ru, Ci	150	3.67 x 10 <sup>-4</sup>	
<sup>137</sup> Cs, Ci	3	1.92	
<sup>60</sup> Co, Ci	1	7.99 x 10 <sup>-2</sup>	
U, kg	78.1	7.81 x 10 <sup>1</sup>	

9 2 1 2 5 1 1 3 0 8

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-A-3 Cavern	216-A-3
<u>Location</u> 200 East, S.E. Quadrant	<u>Service Dates</u>	<u>Status</u>
Directly South of 275-EA Bldg. and ~1200 ft west of Canton Ave.	1/56 to 11/67	Active
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>
N-40530, W-48540	H-2-55900 H-2-56049 H-2-56050	Ground 704 ft Water Table 404 ft Site Depth 16 ft
<u>Source and Description of Waste</u>		
2.8 x 10 <sup>6</sup> liters. Silica-Gel regeneration waste from 203-A, the UNH storage pit drainage and the liquid waste from the 203-A Pumphouse.		
<u>Description of Facility</u>		
Rock filled crib. Area 20 ft x 20 ft bottom dimensions.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.20	.20
Beta, Ci	882	< 0.263
<sup>90</sup> Sr, Ci	0.10	5.82 x 10 <sup>-2</sup>
<sup>106</sup> Ru, Ci	350	7.14 x 10 <sup>-4</sup>
<sup>137</sup> Cs, Ci	<0.10	< 6.03 x 10 <sup>-2</sup>
<sup>60</sup> Co, Ci	<0.10	< 5.50 x 10 <sup>-3</sup>
U, kg	1.7 x 10 <sup>3</sup>	1.68 x 10 <sup>3</sup>
<u>History:</u>		
Receives UNH storage pit drainage, the liquid waste from the 203-A Pumphouse and 203-A Bldg enclosure sumps, and the heating coil condensate from the P-1 through P-4 UNH tanks. The discharge of silica gel to this crib was discontinued sometime between 1967 and 1970.		

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u> 216-A-4 Cavern	<u>Number</u> 216-A-4
<u>Location</u> 200 East, S.E. Quadrant  260 ft south of 202-A Bldg. 760 ft west of Canton Ave. 150 ft east of 216-A-2.	<u>Service Dates</u> 12/55-12/58	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-39515, W-48158	<u>Reference Drawings</u> H-2-56049 H-2-56050	<u>Elevations</u> Ground 710 ft Water Table 403 ft(1973) Site Depth 25 ft

Source and Description of Waste

6.21 x 10<sup>6</sup> liters. Laboratory cell drainage from the Purex Plant and 291-A-1 stack drainage. Low-salt, neutral-basic.

Description of Facility

Rock structure 20 ft x 20 ft bottom surface area.  
Deactivated when the specific retention capacity was reached by blanking the pipeline inlet to the crib.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	140	1.40 x 10 <sup>2</sup>
Beta, Ci	864	2.96 x 10 <sup>1</sup>
<sup>90</sup> Sr, Ci	10	5.93
<sup>106</sup> Ru, Ci	400	2.05 x 10 <sup>-4</sup>
<sup>137</sup> Cs, Ci	15	9.19
<sup>60</sup> Co, Ci	1	6.07 x 10 <sup>-2</sup>
U, kg	399	3.99 x 10 <sup>2</sup>

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-A-5 Cavern	216-A-5
<u>Location</u> 200 East, S.E. Quadrant	<u>Service Dates</u>	<u>Status</u>
450 ft south of 202-A Bldg. 1400 ft west of Canton Ave.	12/55-11/61	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>
N-39510, W-48750	H-2-55900 H-2-56049 H-2-56050	Ground 710 ft Water Table 404 ft (1973) Site Depth 32 ft

Source and Description of Waste

1.63 x 10<sup>9</sup> liters. Process condensate from 202-A. Acidic.

Description of Facility

One crib, rock structure, 35 ft x 35 ft bottom surface.  
Deactivation: Effluent pipeline to crib was blanked out.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	65	6.50 x 10 <sup>1</sup>
Beta, Ci	3400	< 1.54 x 10 <sup>2</sup>
<sup>90</sup> Sr, Ci	90	5.62 x 10 <sup>1</sup>
<sup>106</sup> Ru, Ci	150	5.05 x 10 <sup>-4</sup>
<sup>137</sup> Cs, Ci	25	1.61 x 10 <sup>1</sup>
<sup>60</sup> Co, Ci	110	8.94
U, kg	263	2.63 x 10 <sup>2</sup>
<sup>233</sup> U, g	none	

Site Characterization Status

Well No E24-1A was drilled to a depth of 320 ft at the south edge of the 216-A-5 crib in 1966 to determine locations and concentrations of subsurface contamination. Analytical data on core samples from this well show rapidly decreasing <sup>137</sup>Cs concentrations from a moderate level of 4.4 x 10<sup>-3</sup> μCi/g at about 35 ft to a low level of 10<sup>-5</sup> μCi/g at about 65 ft. The <sup>137</sup>Cs values were at or below the detection limit of 10<sup>-6</sup> μCi/g throughout most of the soil column. The <sup>90</sup>Sr concentrations were below the detection limit (3.2 x 10<sup>-5</sup> μCi/g).

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> --	<u>Number</u> 216-A-9
<u>Location</u> 200 East, S.E. Quadrant 500 ft west of 241-A Tank Farm 900 ft north of 275-EA Bldg.		<u>Service Dates</u> 3/56-2/58 4/66-10/66 8/69-8/69	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-41000, W-48355 to N-41297, W-48652	<u>Reference Drawings</u> H-2-55577 H-2-55578 H-2-55579	<u>Elevations</u> Ground 694 ft Water Table 404 ft(1973) Site Depth 12 ft	

Source and Description of Waste

9.81 x 10<sup>8</sup> liters. Acid fractionator condensate and condenser cooling water from 202-A (3/56-2/58); N Reactor decontamination waste (1966); acid fractionator condensate (1969). Acidic.

Description of Facility

One crib, rock structure, 420 ft x 20 ft bottom area.  
Deactivation: Effluent pipeline was blanked north of 202-A-3 Bldg. after replacing 100 ft of effluent pipeline which failed.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.5	.50
Beta, Ci	190	<41.8
<sup>90</sup> Sr, Ci	25	14.9
<sup>106</sup> Ru, Ci	50	1.70 x 10 <sup>-4</sup>
<sup>137</sup> Cs, Ci	10	6.17
<sup>60</sup> Co, Ci	0.14	1.57 x 10 <sup>-2</sup>
U, kg	0.23	0.227

Site Characterization Status

Well E24-3 monitors the southeast end of the 216-A-9 Crib. Waste disposed at this site contained only an estimated 54 Ci of radioactivity. No ground contamination was noted on the 1959 scintillation well log. A small amount of contamination from 30 ft to 100 ft below ground surface is indicated on the 1963 log.

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> --	<u>Number</u> 216-A-10
<u>Location</u> 200 East, S.E. Quadrant Approximately 270 ft south of the southwest corner of 202-A.		<u>Service Dates</u> 11/61-	<u>Status</u> Active
<u>Site Coordinates</u> (Approximate) N-39090, W-48952 to N-39370, W-48952	<u>Reference Drawings</u> H-2-55576 H-2-55578 H-2-58131	<u>Elevations</u> Ground 714 ft Water Table 404 ft(1973) Site Depth 45 ft	

Source and Description of Waste

2.9 x 10<sup>9</sup> liters. Process condensate from 202-A. Acidic.

Description of Facility

Crib, rock-filled. 275 ft x 45 ft bottom dimensions.

Radionuclide Content (calculated from discharge data)

<u>Radionuclides</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	3.4 x 10 <sup>2</sup>	343.0
Beta, Ci	8.1 x 10 <sup>5</sup>	< 720.0
<sup>90</sup> Sr, Ci	1.5 x 10 <sup>2</sup>	111.0
<sup>106</sup> Ru, Ci	7.3 x 10 <sup>3</sup>	5.49
<sup>137</sup> Cs, Ci	1.3 x 10 <sup>2</sup>	106.0
<sup>60</sup> Co, Ci	1.8 x 10 <sup>2</sup>	26.7
U, kg	2.0 x 10 <sup>2</sup>	204.0
<sup>233</sup> U, g	2.8 x 10 <sup>2</sup>	277.0

Site Characterization Status

Ground water samples taken from monitoring wells near the 216-A-10 crib prior to 1967 show <sup>90</sup>Sr concentrations slightly above detection limit (1 x 10<sup>-8</sup> μCi/cc). However, only small quantities of <sup>90</sup>Sr (57 curies) had been disposed to this site. The acidic nature of this waste increases the mobility of <sup>90</sup>Sr through the soil column.

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
French Drain		--	216-A-11
<u>Location</u> 200 East, S.E. Quadrant		<u>Service Dates</u>	<u>Status</u>
Southeast corner of 202-A		1/56-	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39780, W-48050	H-2-55090 H-2-55091 H-2-55095	Ground	708 ft
		Water Table	404 ft(1973)
		Site Depth	30 ft
<u>Source and Description of Waste</u>			
Volume unknown, steam trap Pit No. 1 drainage from 202-A. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
French drain, 30 in. diameter			
<u>Radionuclide Content</u> (calculated from discharge data)			
<50 Ci Beta			

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. SE

<u>Name/Type of Facility</u> French Drain		<u>Past Designation</u> --	<u>Number</u> 216-A-12
<u>Location</u> 200 East, SE Quadrant Center of South side of 202-A, approximately 75 ft from the building.		<u>Service Dates</u> 11/55-	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-39780, W-48503	<u>Reference Drawings</u> H-2-53014 H-2-55090 H-2-55092	<u>Elevations</u> Ground 708 ft Water Table 404 ft(1973) Site Depth 33 ft	
<u>Source and Description of Waste</u> Volume unknown, steam trap Pit No. 3 drainage from 202-A. Low-salt, neutral/basic.			
<u>Description of Facility</u> French drain, 30 in. diamter.			
<u>Radionuclide Content (calculated from discharge data)</u> <50 Ci total Beta			

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
French Drain		--	216-A-13
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant West end of 202-A Bldg.		1/56-12/62	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39814, W-49010	SK-22568 H-2-55076	Ground	708 ft
		Water Table	403 ft
		Site Depth	18 ft
<u>Source and Description of Waste</u>			
Volume unknown, Seal water from the air sampler vacuum pumps in the 202-A Bldg. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
French Drain, 2 ft diameter.			
<u>Radionuclide Content (calculated from discharge data)</u>			
Total Beta: <1 Ci			

9 2 1 2 5 1 1 3 1 6

CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
French Drain	--	216-A-14
<u>Location</u>	<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant South side of the center of the 202-A Bldg. approximately 75 ft, and 75 ft west of 216-A-12.	1/57 to present	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>
N-39742, W-48551	H-2-53465 H-2-55090	Ground 708 ft Water Table 403 ft Site Depth 29 ft
<u>Source and Description of Waste</u>		
Volume unknown. Vacuum filter and blower pit drainage from the 202-A Bldg. Low-salt, neutral/basic.		
<u>Description of Facility</u>		
French drain, 20 in. diameter.		
<u>Radionuclide Content (calculated from discharge data)</u>		
Total Beta: <1 Ci		

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> French drain		<u>Past Designation</u> --	<u>Number</u> 216-A-15
<u>Location</u> 200 East, S.E. Quadrant Approximately 325 ft South of the center of 202-A		<u>Service Dates</u> 12/55-	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-39516, W-48656	<u>Reference Drawings</u> H-2-56045-2	<u>Elevations</u> Ground 712 ft Water Table 404 ft(1973) Site Depth 44 ft	
<u>Source and Description of Waste</u>  Volume unknown. Drainage from 216-A-10 process condensate sample pit. Acidic.			
<u>Description of Facility</u>  French drain, 2 ft diameter.			
<u>Radionuclide Content (calculated from discharge data)</u>  <50 Ci total Beta			

9 2 1 2 5 1 1 3 1 8

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
French Drain		216-A-16 Dry Well	216-A-16
<u>Location</u>	200 East, within the confines of the 241-A Tank Farm	<u>Service Dates</u>	<u>Status</u>
		1/56-3/69	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-41191, W-47433	H-2-55943 H-2-56521	Ground	686 ft
		Water Table	404 ft(1973)
		Site Depth	17 ft
<u>Source and Description of Waste</u>			
Volume unknown. Floor drainage and 296-A-11 stack drainage from the 241-A-431 Bldg. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
French drain, 4 ft diameter.			
<u>Radionuclide Content (calculated from discharge data)</u>			
Total Beta: <10 Ci			

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CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u> French Drain		<u>Past Designation</u> 216-A-17 Dry Well	<u>Number</u> 216-A-17
<u>Location</u> 200 East, within the confines of the 241-A Tank Farm.		<u>Service Dates</u> 1/56-3/69	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-41181, W-47453	<u>Reference Drawings</u> H-2-55943 H-2-56521 H-2-56900	<u>Elevations</u> Ground 686 ft Water Table 404 ft(1973) <u>Site Depth</u> 17 ft	
<u>Source and Description of Waste</u> Volume unknown. Floor drainage and 296-A-11 stack drainage from the 241-A-431 Bldg. (overflow). Low-salt; neutral/basic.			
<u>Description of Facility</u> French drain, 4 ft diameter.			
<u>Radionuclide Content (calculated from discharge data)</u> Total Beta: <1 Ci			

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. SE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-A-21 Crib	216-A-21
<u>Location</u> 200 East, S.E. Quadrant 200 East Area, 600 ft south of 202-A Bldg. 750 ft west of Canton Ave.	<u>Service Dates</u> 10/57-6/65	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-39300, W-48160	<u>Reference Drawings</u> H-2-57042 H-2-57032	<u>Elevations</u> Ground 711 ft Water Table 403 ft (1973) Site Depth 19 ft

Source and Description of Waste

7.78 x 10<sup>7</sup> liters. From 10/57 to 6/58, received sump waste from 293-A Bldg. From 12/58 to 6/65, received 293-A sump waste, Purex Laboratory cell drainage and 291-A-1 stack drainage. Typically low-salt, neutral-basic; waste could have been acidic at times.

Description of Facility

Gravel structure, 60 ft x 16 ft bottom surface area. Deactivated when the effluent flow rate exceeded the infiltration capacity, by blanking the effluent line to the crib.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	150	150.0
Beta, Ci	2800	225.0
<sup>90</sup> Sr, Ci	15	10.1
<sup>106</sup> Ru, Ci	200	6.80 x 10 <sup>-3</sup>
<sup>137</sup> Cs, Ci	150	104.0
<sup>60</sup> Co, Ci	10	1.27
U, kg	195	195.0

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CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib (French Drain)		216-A-22 French Drain	216-A-22
<u>Location</u> 200 East, S.E. Quadrant ~400 ft North of the Center of the 202-A Bldg. Near 216-A-28		<u>Service Dates</u> 3/56-12/58	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-40352, W-48560	<u>Reference Drawings</u> H-2-54812 H-2-54818 H-2-57617	<u>Elevations</u> Ground 708 ft Water Table 404 ft Site Depth 16 ft	
<u>Source and Description of Waste</u>  Volume unknown. Sump waste from the 203-A Bldg. and heating coil condensate from the P-1 through P-4 UMH tanks. Low-salt, neutral/basic.			
<u>Description of Facility</u> French drain, rock filled, 6-ft. diameter.			
<u>Radionuclide Content</u> (calculated from discharge data)  Total Beta: <1 Ci			

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CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
French Drain		Same	216-A-23A
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant-within the confines of the 241-A Tank Farm		9/57-3/69	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-41171, W-47463	H-2-55943 H-2-56521 H-2-56999	Ground 686 ft Water Table 404 ft (1973) Site Depth Not Known	
<u>Source and Description of Waste</u>			
Volume unknown. Deentrainer tank condensate and back flush from the 241-A-431 Bldg. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
French drain, 42-in. diameter.			
<u>Radionuclide Content</u> (calculated from discharge data)			
Total Beta: <50 Ci			

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
French Drain		Same	216-A-23B
<u>Location</u>	200 East, S.E. Quadrant-within the confines of the 241-A Tank Farm.	<u>Service Dates</u>	<u>Status</u>
		9/57-3/69	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-41171, W-47473	H-2-55943 H-2-56521 H-2-56999	Ground	686 ft
		Water Table	404 ft (1973)
		<u>Site Depth</u>	NA
<u>Source and Description of Waste</u>			
Volume unknown. Deentrainer tank condensate and the back flush from the 241-A-431 Bldg. (overflow). Low-salt, neutral/basic.			
<u>Description of Facility</u>			
French drain, 42-in. diamter.			
<u>Radionuclide Content (calculated from discharge data)</u>			
Total Beta: <5 Ci			

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CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u> French Drain		<u>Past Designation</u> 216-A-25 Crib 216-A-26 French Drain		<u>Number</u> 216-A-26A
<u>Location</u> 200 East, S.E. Quadrant ~100 ft south of the center of the 291-A Bldg.		<u>Service Dates</u> 3/59-7/65		<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-39550, W-48208		<u>Reference Drawings</u> H-2-3325 H-2-55036		<u>Elevations</u> Ground 708 ft Water Table 403 ft Site Depth NA
<u>Source and Description of Waste</u> Volume unknown. Floor drainage from the 291-A fan house. Low-salt, neutral/basic.				
<u>Description of Facility</u> French drain, 3-ft. diameter.				
<u>Radionuclide Content (calculated from discharge data)</u> Total Beta: <1 Ci				
<u>History:</u> Removed the 216-A-26A French Drain encasement in July, 1965. Reconnected the effluent pipeline to the new 216-A-26B French Drain encasement.				

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>		<u>Number</u>
French Drain		216-A-26 French Drain 216-A-26A French Drain		216-A-26B
<u>Location</u> 200 East, S.E. Quadrant			<u>Service Dates</u>	<u>Status</u>
115 ft south of the center of the 202-A Bldg. 15 ft south of 216-A-26A French Drain.			7/65 to present	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>		
N-39535, W-48208	H-2-55036	Ground	708 ft	
		Water Table	403 ft	
		Site Depth	Not Known	
<u>Source and Description of Waste</u>				
Volume unknown. Floor drainage from the 291-A fan house. Low-salt, neutral/basic.				
<u>Description of Facility</u>				
French drain, 4 ft. diameter.				
<u>Radionuclide Content</u> (calculated from discharge data)				
Total Beta: <1 Ci				

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
Crib		--	216-A-27
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant. ~700 ft. south of 202-A Bldg. ~800 ft west of Canton Ave.		6/65-7/70	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39100, W-48118 to N-39100, W-48318	H-2-57508 H-2-57509	Ground 719 ft Water Table 402 ft Site Depth Not known	
<u>Source and Description of Waste</u>			
2.3 x 10 <sup>7</sup> liters. Sump waste from 293-A Bldg., the laboratory cell drainage from the 202-A Bldg. and the 291-A-1 stack drainage. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
Sand filled crib, 200 x 10 ft bottom dimensions.			
<u>Radionuclide Content (calculated from discharge data)</u>			
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
Pu, g	97	96.5	
Beta, Ci	2.7 x 10 <sup>3</sup>	< 159.0	
<sup>90</sup> Sr, Ci	41	33.1	
<sup>106</sup> Ru, Ci	63	6.48 x 10 <sup>-2</sup>	
<sup>137</sup> Cs, Ci	53	42.9	
<sup>60</sup> Co, Ci	<2.7	< .807	
U, kg	68	168.0	

9 2 1 2 5 1 1 3 2 7

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-A-28 French Drain	216-A-28
<u>Location</u>	<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant 500 ft. North of 202-A, 1250 ft. West of Canton Avenue.	12/58-11/67	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>
N-40362, W-48595	H-2-57617	Ground 690 ft Water Table 405 ft (1967) Site Depth 11 ft

Source and Description of Waste

3 x 10<sup>4</sup> liters. Waste from 203-A enclosure sumps and heating coil condensate from P-1 through P-4 UNH tanks. Low-salt, neutral/basic.

Description of Facility

One crib, rock structure, 10 ft diameter bottom surface. Deactivation: The effluent pipeline to the crib was blocked north of the 203-A UNH Tank enclosure when the effluent flow rate exceeded the infiltration capacity.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	None	None
Beta, Ci	31	< 3.12 x 10 <sup>-2</sup>
<sup>90</sup> Sr, Ci	None	None
<sup>106</sup> Ru, Ci	None	None
<sup>137</sup> Cs, Ci	None	None
<sup>60</sup> Co, Ci	None	None
U, kg	632	632.0

9 2 1 2 5 1 1 3 2 8

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		216-A-32 Crib	216-A-31
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant ~500 ft south of the center of the 202-A Bldg.		7/64-11/66	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39370, W-48290	H-2-57934	Ground	704 ft
		Water Table	404 ft(1973)
		Site Depth	Not known
<u>Source and Description of Waste</u>			
1.0 x 10 <sup>4</sup> liters. Organic waste from the 202-A Bldg. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
Gravel filled crib, 70 ft by 10 ft. Deactivation: "L" cell nozzles to the 241-A-151 Diversion base which routed the effluent to the crib have been blanked.			
<u>Radionuclide Content (calculated from discharge data)</u>			
	<u>Radionuclide</u>	<u>At time of Discharge</u>	<u>As of 6/30/78</u>
	Pu, g	9.0	9.0
	Beta, Ci	2.0 x 10 <sup>5</sup>	< 246.0
	<sup>90</sup> Sr, Ci	2.0	1.42
	<sup>106</sup> Ru, Ci	9.5 x 10 <sup>4</sup>	6.10
	<sup>137</sup> Cs, Ci	150	109.0
	<sup>60</sup> Co, Ci	0.10	1.58 x 10 <sup>-2</sup>
	U, kg	21	20.5

9 2 1 2 3 1 1 3 2 9

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib			216-A-32
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant 200 East Area. Approximately 300 ft. north-east of 202-A and approximately 700 ft west of Canton Avenue.		1/59-	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-40148, W-47811 to N-40212, W-47782	H-2-55900 H-2-55901 H-2-56000 H-2-57110	<u>Ground</u>	697 ft
		<u>Water Table</u>	404 ft(1973)
		<u>Site Depth</u>	12 ft
<u>Source and Description of Waste</u>			
Volume unknown. East crane maintenance facility floor, sink and shower drainage from 202-A.			
<u>Description of Facility</u>			
Crib, gravel-filled, 70 ft x 8 ft.			
<u>Radionuclide Content (calculated from discharge data)</u>			
<1 Ci Beta			

9 2 1 2 3 0 1 1 3 3 0

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> French Drain		<u>Fast Designation</u> 216-A-33 Dry Well	<u>Number</u> 216-A-33
<u>Location</u> 200 East, S.E. Quadrant  ~300 ft south of 202-A, ~1100 ft West of Canton Avenue. Near the S.W. corner of 291-A Bldg.		<u>Service Dates</u>  11/56-7/64	<u>Status</u>  Inactive
<u>Site Coordinates</u> (Approximate) N-39617, W-48310	<u>Reference Drawings</u> H-2-55036	<u>Elevations</u> Ground 716 ft Water Table 402 ft <u>Site Depth</u> Not known	
<u>Source and Description of Waste</u>  Volume unknown. Bearing coolant from the 291-A-1 stack electric exhaust fans.			
<u>Description of Facility</u> • French drain, 6-ft diameter.			
<u>Radionuclide Content</u> (calculated from discharge data)  Total Beta: <1 Ci			

9 2 1 2 5 1 1 3 3 1

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>		<u>Fast Designation</u>	<u>Number</u>
French Drain		216-A-35 Dry Well	216-A-35
<u>Location</u> 200 East, S.E. Quadrant.		<u>Service Dates</u>	<u>Status</u>
200 East Area, West End of 202-A Bldg. Near 216-A-13		12/63-1/66	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39800, W-49003	H-2-55076	Ground	708 ft
		Water Table	403 ft
		Site Depth	NA
<u>Source and Description of Waste</u>			
Volume unknown. Seal cooling water from the air sampler vacuum pumps in the 202-A Bldg. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
French drain, 6-ft diameter.			
<u>Radionuclide Content</u> (calculated from discharge data)			
Total Beta: <1 Ci			

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CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-A-36 Crib	216-A-36A
<u>Location</u>	<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant 750 ft. south of 202-A Bldg. 1150 ft West of Canton Ave.	9/65-3/66	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>
N-39000, W-48525 to N-39105, W-48525	H-2-59805 H-2-59129	Ground 710 ft Water Table 403 ft(1973) Site Depth 25 ft
<u>Source and Description of Waste</u>		
1.07 x 10 <sup>6</sup> liters of ammonia scrubber waste from Purex. Low-salt, neutral/basic.		
<u>Description of Facility</u>		
Gravel structure, 100 ft x 11 ft bottom area. Deactivated because of a large discharge of fission products. Concrete dam installed between 216-A-36A and 216-A-36B. Pipeline to 216-A-36 extended into 216-A-36B.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	80	80.0
Beta, Ci	1.5 x 10 <sup>5</sup>	< 5280.0
<sup>90</sup> Sr, Ci	1.8 x 10 <sup>3</sup>	1320.0
<sup>106</sup> Ru, Ci	3 x 10 <sup>3</sup>	5.45
<sup>137</sup> Cs, Ci	1.5 x 10 <sup>3</sup>	1120.0
<sup>60</sup> Co, Ci	10	1.91
U, kg	145	145.0

9 2 1 2 5 1 1 3 3 3

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		216-A-36 Crib	216-A-36B
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant ~1200 ft south of the 202-A Bldg.		3/66-1972	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-38500, W-48525 to N-39000, W-48525	H-2-59129 H-2-59805	Ground	719 ft
		Water Table	403 ft
		Site Depth	NA
<u>Source and Description of Waste</u>			
9.4 x 10 <sup>7</sup> liters. Ammonia scrubber waste from the 202-A Bldg. Low-salt, neutral/basic.			
<u>Description of Facility</u>			
Gravel-filled crib, 500 ft x 11 ft. bottom dimensions. (See 216A-36A)			
<u>Radionuclide Content (calculated from discharge data)</u>			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
	Pu, g	<180	177.0
	Beta, Ci	4.8 x 10 <sup>4</sup>	< 2050.0
	<sup>90</sup> Sr, Ci	550	455.0
	<sup>106</sup> Ru, Ci	6.5 x 10 <sup>3</sup>	45.6
	<sup>137</sup> Cs, Ci	<560	463.0
	<sup>60</sup> Co, Ci	<51	< 18.4
	<sup>238</sup> U, kg	120	119.0
	<sup>233</sup> U, g		25.6

9 2 1 2 5 1 1 3 3 4

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		216-A-38	216-A-38
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant ~600 ft Southwest of 202-A Bldg., ~1500 ft north of 1st St.		Never used	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-38971, W-49352 to N-39471, W-49352	H-2-62875	Ground	
		Water Table	
		<u>Site Depth</u>	
<u>Source and Description of Waste</u>			
Never used.			
<u>Description of Facility</u>			
Crushed stone-filled, 520 ft x 15 ft bottom dimensions.			
Never used.			
<u>Radionuclide Content (calculated from discharge data)</u>			

9 2 1 2 5 1 1 3 3 5

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-A-40 Crib	216-A-39
<u>Location</u> 200 East, S.E. Quadrant	<u>Service Dates</u>	<u>Status</u>
Directly north of 241-AX Tank Farm along Canton Ave.	6/66	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>
N-41860, W-47489 to N-41860, W-47399 N-41930, W-47489 to N-41930, W-47399	H-2-33295	Ground 675 ft Water Table 404 ft Site Depth Not known
<u>Source and Description of Waste</u>		
20 liters. Floor drainage from the 241-AX-801-B Bldg. Low-salt, neutral/basic.		
<u>Description of Facility</u>		
Crib and two trenches filled with gravel and backfilled. 90 ft x 2 ft bottom dimensions.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Beta; Ci	50	36.4
<sup>137</sup> Cs, Ci	25	19.0
<u>History:</u>		
This site is the result of an unplanned radioactive materials release originating in the 241-AX-801-B Building.		
(See Attachment)		

9 2 1 2 5 1 1 3 3 6

216-A-39 continued

History:

A Process operator, Maintenance instrument man, and a Radiation Monitor were changing out a valve on the 103AX tank recirculator line when highly radioactive waste liquid pressureized in the line and flowed out onto the floor of the instrument building. Dose rates from the spill were greater than 5 R/hr at a distance of 10 feet from the spill.

A trench approximately 3 feet deep was dug from the door of the 801 Building to the brow of the north hill, then over the hill to the flat ground below where it was extended eastward approximately 90 feet. A hole was cut through the back side of the 801 building and a fire hose was inserted to wash the contamination into the trench. The first trench was covered with soil and a second trench, paralleling the first, was dug to receive a second washing. This trench was also covered. Dose rate residue radiation remains in the floor of the building and in the 2 trenches of 216-A-39.

9 2 1 2 5 1 1 3 3 7

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>		<u>Number</u>	
Trench		216-A-39 Ditch 216-A-40 Ditch		216-A-40	
<u>Location</u>			<u>Service Dates</u>		<u>Status</u>
200 East, S.E. Quadrant ~500 ft West of 241-AX Tank Farm, ~500 ft South of 7th Ave.			1/68-present		Inactive
<u>Site Coordinates (Approximate)</u>		<u>Reference Drawings</u>		<u>Elevations</u>	
N-41519, W-48209 to N-41868, W-48404		H-2-61979 H-2-63083 H-2-63084		Ground 683 ft Water Table 404 ft Site Depth Not known	
<u>Source and Description of Waste</u>					
9.5 x 10 <sup>5</sup> liters. Diverted cooling water and steam condensate from the 244AR Vault. This is a rubber bag type diverter trench for the recovery of radioactive cooling water that might become contaminated from equipment failures.					
<u>Description of Facility</u>					
Open trench, 400 ft x 20 ft.					
<u>Radionuclide Content (calculated from discharge data)</u>					
Unknown.					

9 2 1 2 5 1 1 3 3 3

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		--	216-A-41
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant Approximately 600 ft west of 241-AX Tank Farm and approximately 600 ft south of 7th Avenue.		1/68- 1974	Out of service
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-41420, W-48082	H-2-61975 H-2-63084	Ground 683 ft Water Table 405 ft(1973) <u>Site Depth</u> 6 ft	
<u>Source and Description of Waste</u>			
Volume unknown. 296-A-13 Stack Drainage. Potentially slightly acidic.			
<u>Description of Facility</u>			
Crib, gravel-filled, 10 ft x 10 ft bottom surface.			
<u>Radionuclide Content (calculated from discharge data)</u>			
<Ci Beta			
<u>History</u>			
The stack drainage piping from the 296-A-13 stack to the 216-A-41 Crib was removed in 1974. The stack drainage was then rerouted to the Vessel Vent seal pot system of the 244AR Building.			

9 2 1 2 5 1 1 3 3 9

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u> 216-C Crib	<u>Number</u> 216-C-1
<u>Location</u> 200 East, S.E. Quadrant 250 ft South of 2704-C Bldg. 450 ft South of 7th Street (within the Hot Semiworks complex.)	<u>Service Dates</u> 1/43-6/57 1/53	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-42069, W-50235	<u>Reference Drawings</u> H-2-4037 H-2-32523	<u>Elevations</u> Ground 689 ft Water Table 405 ft (1973) Site Depth 13 ft
<u>Source and Description of Waste</u> 2.34 x 10 <sup>7</sup> liters. High-salt waste, cold run waste and process condensate from 201-C (semi-works). High-salt, neutral/basic.		
<u>Description of Facility</u> One crib, 23 ft x 8 ft bottom surface, concrete structure.		
<u>Radionuclide Content</u> (calculated from discharge data)		
	<u>Radionuclide</u>	<u>At Time of Discharge</u>
	Pu, g	8
	Beta, Ci	1.1 x 10 <sup>4</sup>
	<sup>90</sup> Sr, Ci	200
	<sup>106</sup> Ru, Ci	400
	<sup>137</sup> Cs, Ci	<0.10
	<sup>60</sup> Co, Ci	<0.10
	U, kg	300

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The 218-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 done was as follows:

- o Bladed off four inches of the ground surface and deposited spoil in the cavity above 216-C-1 Crib.
- o Covered the ground with a four-inch sand pad.
- o Applied ureabor herbicide at the rate of 500 lbs./acre.
- o Installed 10 mil plastic sheeting over entire surface.  
NOTE: The plastic sheet was doubled over the area around the Tank #71 riser.
- o Installed 12-inch pad of sand over the plastic.
- o The surface stabilized with four inches of pit run gravel.

9 2 1 2 5 1 1 3 4 1

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> Dry well.		<u>Past Designation</u> 291-C Dry Well 216-C-2 Dry Well.		<u>Number</u> 216-C-2	
<u>Location</u> 200 East, S.E. Quadrant Approx. 100 ft southeast of the 291-C Stack. (within the Hot Semi-works complex)			<u>Service Dates</u> 1/53-		<u>Status</u> Active
<u>Site Coordinates</u> N-42300, W-50000		<u>Reference Drawings</u> H-2-4033 H-2-32523		<u>Elevations</u> Ground 681 ft Water Table 402 ft(1973) Site Depth 40 ft	
<u>Source and Description of Waste</u> Volume unknown. 291-C stack drainage and the seal water drainage from the stack ventilation filters. Low-salt, neutral/basic.					
<u>Description of Facility</u> Reverse well, 12-in. diameter..					
<u>Radionuclide Content</u> (calculated from discharge data)  <1 Ci Beta					

9 2 1 2 5 1 1 3 4 2

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u> 201-C Leaching Pit	<u>Number</u> 216-C-3
<u>Location</u> 200 East. S.E. Quadrant 400 ft south of 7th Street, 375 ft S.S.E. of 2704-C Bldg. (within the Hot semi-works complex).	<u>Service Dates</u> 1/53-3/54	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-42055, W-50390	<u>Reference Drawings</u> H-2-4034 H-2-32523	<u>Elevations</u> Ground 689 ft Water Table 405 ft (1973) Site Depth 10 ft
<u>Source and Description of Waste</u> 5 x 10 <sup>6</sup> liters. Acid waste from 201-C, 215-C, 271-C.		
<u>Description of Facility</u> One crib, gravel pit structure, 50 ft x 10 ft bottom surface. Deactivation: Pipeline blanked when the crib reached its specific retention capacity.		
<u>Radionuclide Content</u> (calculated from discharge data)		
	<u>Radionuclide</u>	<u>At Time of Discharge</u>
	Pu, g	1
	Beta, Ci	200
	<sup>90</sup> Sr, Ci	20
	<sup>106</sup> Ru, Ci	10
	<sup>137</sup> Cs, Ci	<0.10
	<sup>60</sup> Co, Ci	<0.10
	U, kg	45
	<sup>233</sup> U, g	none

9 2 1 2 5 1 1 3 4.3

The 218-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 done was as follows:

- o Bladed off four inches of the ground surface and deposited spoil in the cavity above 216-C-1 Crib.
- o Covered the ground with a four-inch sand pad.
- o Applied ureabor herbicide at the rate of 500 lbs./acre.
- o Installed 10 mil plastic sheeting over entire surface.  
NOTE: The plastic sheet was doubled over the area around the Tank #71 riser.
- o Installed 12-inch pad of sand over the plastic.
- o The surface stabilized with four inches of pit run gravel.

9 2 1 2 5 1 1 3 4 4

CONTAMINATED LIQUID DISPOSAL SITES

I. SE

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u>	<u>Number</u> 216-C-4
<u>Location</u> 200 East, S. E. Quadrant 375 ft south of 7th Street, 375 ft S.E. of 2704 Bldg. (within the Hot Semiworks Complex).		<u>Service Dates</u> 7/55-5/65	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-42060, W-50430	<u>Reference Drawings</u> H-2-4010 H-2-4425 H-2-32523	<u>Elevations</u> Ground 689 ft Water Table 405 ft(1973) Site Depth 16 ft	
<u>Source and Description of Waste</u> 1.7 x 10 <sup>5</sup> liters. Contaminated organic waste from 276-C. Low-salt, neutral basic.			
<u>Description of Facility</u> One crib, 20 ft x 10 ft bottom surface, gravel structure. Deactivation: Piping to the crib in 276-C was valved out when the specific retention capacity was reached.			
<u>Radionuclide Content</u> (calculated from discharge data)			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	
	Pu, g	1	
	Beta, Ci	120	
	<sup>90</sup> Sr, Ci	28	
	<sup>106</sup> Ru, Ci	15	
	<sup>137</sup> Cs, Ci	<0.10	
	<sup>60</sup> Co, Ci	<0.10	
	U, kg	3.4	
	<sup>233</sup> U, g	none	

9 2 1 2 5 1 1 3 4 5

The 218-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 done was as follows:

- o Bladed off four inches of the ground surface and deposited spoil in the cavity above 216-C-1 Crib.
- o Covered the ground with a four-inch sand pad.
- o Applied ureabor herbicide at the rate of 500 lbs./acre.
- o Installed 10 mil plastic sheeting over entire surface.  
NOTE: The plastic sheet was doubled over the area around the Tank #71 riser.
- o Installed 12-inch pad of sand over the plastic.
- o The surface stabilized with four inches of pit run gravel.

9 2 1 2 5 1 1 3 4 6

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		216-C-5	216-C-5
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant 450 ft south of 7th Street, 375 ft S.S.W. of the 2704-C Bldg. (within the Hot Semiworks complex).		3/55-6/55	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-42030, W-50360	H-2-4010 H-2-4425 H-2-32523	Ground	689 ft
		Water Table	405 ft(1973)
		Site Depth	16 ft
<u>Source and Description of Waste</u>			
3.79 x 10 <sup>4</sup> liters. High-salt, cold run waste from 201-C (semi-works).			
<u>Description of Facility</u>			
One crib, ground structure, 10 ft x 10 ft bottom surface. Deactivation: Piping to crib valved out when the specific retention capacity was reached.			
<u>Radionuclide Content</u> (calculated from discharge data)			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	
	Pu, g	1	
	Beta, Ci	94	
	<sup>90</sup> Sr, Ci	10	
	<sup>106</sup> Ru, Ci	5	
	<sup>137</sup> Cs, Ci	<0.10	
	<sup>60</sup> Co, Ci	<0.10	
	U, kg	54	

9 2 1 2 5 3 1 1 3 4 7

The 218-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 done was as follows:

- o Bladed off four inches of the ground surface and deposited spoil in the cavity above 216-C-1 Crib.
- o Covered the ground with a four-inch sand pad.
- o Applied ureabor herbicide at the rate of 500 lbs./acre.
- o Installed 10 mil plastic sheeting over entire surface.  
NOTE: The plastic sheet was doubled over the area around the Tank #71 riser.
- o Installed 12-inch pad of sand over the plastic.
- o The surface stabilized with four inches of pit run gravel.

9 2 1 2 5 1 1 3 4 8

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		241-CX Crib	216-C-6
<u>Location</u> 200 East, S.E. Quadrant		<u>Service Dates</u>	<u>Status</u>
450 ft south of 7th Street, 325 ft south of the 291-C Stack (within the Hot Semiworks Complex).		9/55-9/64	Inactive
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-42015, W-50066	H-2-4425 H-2-35523	Ground	689 ft
		Water Table	405 ft(1973)
		Site Depth	16 ft
<u>Source and Description of Waste</u>			
5.3 x 10 <sup>5</sup> liters. Process condensate from 201-C; 241-CX vault floor drainage. Acidic.			
<u>Description of Facility</u>			
One crib, gravel structure, 20 ft x 20 ft bottom surface.			
<u>Radionuclide Content</u> (calculated from discharge data)			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	
	Pu, g	<0.10	
	Beta, Ci	2 x 10 <sup>3</sup>	
	<sup>90</sup> Sr, Ci	65	
	<sup>106</sup> Ru, Ci	25	
	<sup>137</sup> Cs, Ci	<0.10	
	<sup>60</sup> Co, Ci	<0.10	
	U, kg	<0.05	

9 2 1 2 5 1 3 4 9

CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u>		<u>Past Designation</u>		<u>Number</u>	
Crib				216-C-7	
<u>Location</u> 200 East, S.E. Quadrant Approximately 75 ft southwest of the 209-E Bldg. (Critical Mass Facility).			<u>Service Dates</u>		<u>Status</u>
			5/61-		Active
<u>Site Coordinates</u>		<u>Reference Drawings</u>		<u>Elevations</u>	
N-42000, W-50672		H-2-32523 H-2-44336		Ground 681 ft Water Table 402 ft(1973) Site Depth 12 ft	
<u>Source and Description of Waste</u>					
5.1 x 10 <sup>4</sup> liters to 12/31/73. Liquid waste from 209-E.					
<u>Description of Facility</u>					
Crib, gravel, 20 ft x 20 ft bottom surface.					
<u>Radionuclide Content</u> (calculated from discharge data)					
		<u>Radionuclide</u>		<u>At Time of Discharge</u>	
		Pu, g		<1.1	
		Beta, Ci		20	
		<sup>90</sup> Sr, Ci		<0.1	
		<sup>106</sup> Ru, Ci		1.0	
		<sup>137</sup> Cs, Ci		<0.1	
		<sup>60</sup> Co, Ci		<0.1	
		U, kg		<0.1	

9 2 1 2 5 1 3 5 0

CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u>	<u>Number</u> 216-C-10
<u>Location</u> 200 East, S.E. Quadrant 450 ft southeast of 2704-C Bldg. 400 ft south of 7th Street (near the Hot Semiworks Complex).	<u>Service Dates</u> 11/64-10/69	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-42100, W-49870	<u>Reference Drawings</u> H-2-4540 H-2-32523	<u>Elevations</u> Ground 689 ft Water Table 405 ft Site Depth 7 ft
<u>Source and Description of Waste</u> 8.97 x 10 <sup>5</sup> liters. Process condensate and liquid waste from 201-C (semi-works). Acidic.		
<u>Description of Facility</u> One crib, crushed rock structure, 32 ft x 5 ft bottom surface.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	
Pu, g	<0.15	
Beta, Ci	161	
<sup>90</sup> Sr, Ci	63	
<sup>106</sup> Ru, Ci	1.5	
<sup>137</sup> Cs, Ci	<0.15	
<sup>60</sup> Co, Ci	<0.15	
U, kg	<0.05	

9 2 1 2 5 1 1 3 5 1

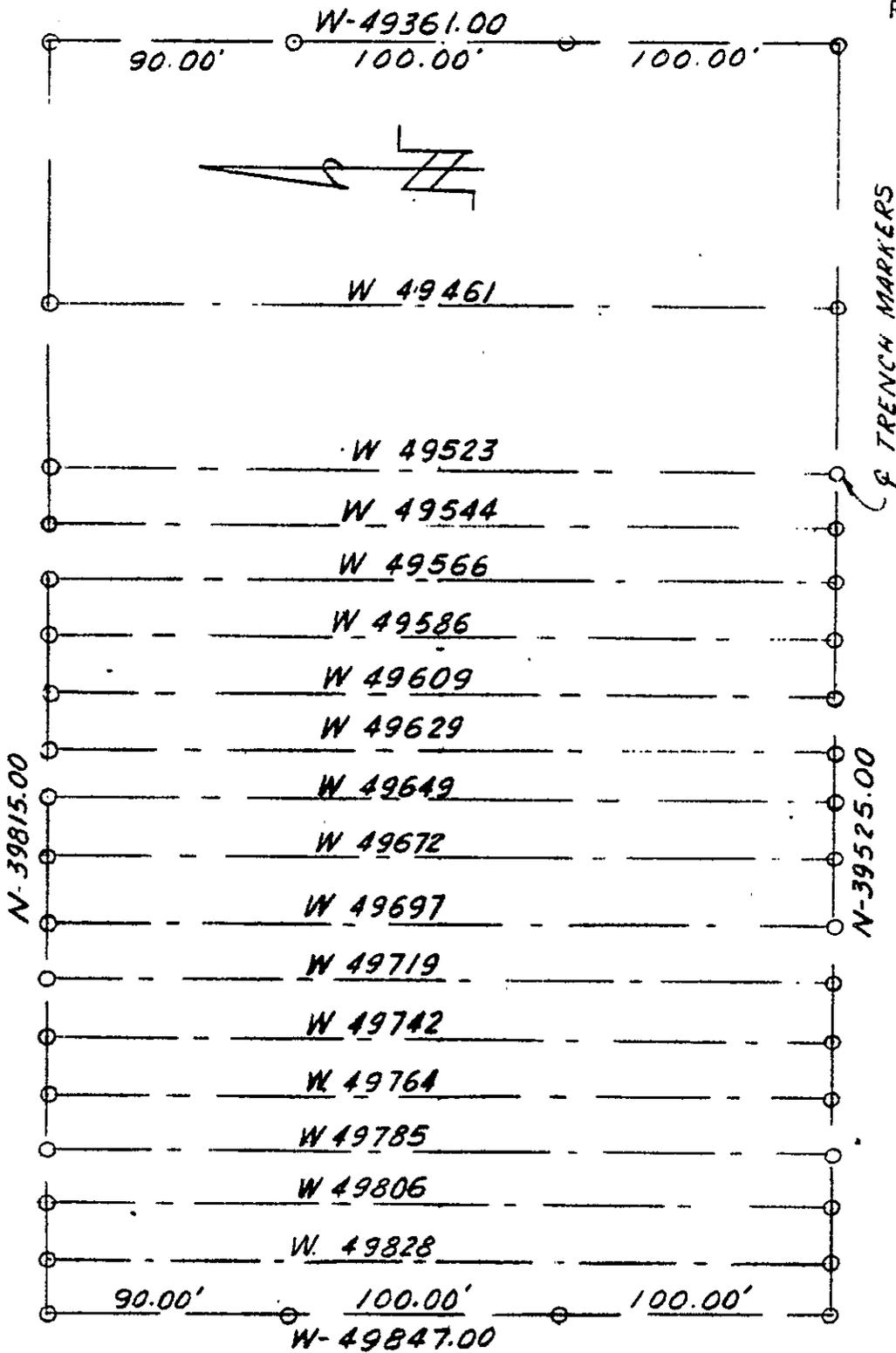
CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u>		<u>Post Designation</u>	<u>Number</u>
Burial Ground		200 East/Dry Waste No. 01	218-E-1
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.E. Quadrant About 350 ft west of the Purex Plant		1945-1/53	Inactive
<u>Site Coordinates</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-39813, W-49361 N-39528, W-49845	H-2-124 H-2-31269	Ground	716 ft
		Water Table	404 ft(1973)
		Site Depth	~9 ft
<u>Source and Description of Waste</u>			
Miscellaneous dry waste (approximately $1.1 \times 10^5$ ft <sup>3</sup> ).			
<u>Description of Facility</u>			
Twenty-one trenches running north-south approximately 200 ft long. Surface area - $1.11 \times 10^5$ ft <sup>2</sup> .			
<u>Radionuclide Content</u> (calculated from discharge data)			
	<u>Radionuclide</u>	<u>At time of Burial</u>	
	U, g	$4.0 \times 10^5$	
	Pu, g	$9.0 \times 10^2$	
	Total Beta, Ci	$1.0 \times 10^2$	
	<sup>90</sup> Sr, Ci	2.0	
	<sup>106</sup> Ru, Ci	4.3	
	<sup>106</sup> Cs, Ci	2.1	
<u>History:</u> Exerpt from Radiation Monitoring Monthly Report, March 27, 1974.			
"All sunken dry waste trenches in the 218-E-1 burial ground have been filled to ground level with cinders from the 200 East power plant cinder mound. This makes a comparatively sterile seed bed, a deterrent against radioactive plant growth. The surface of the cinders has been covered with coarse gravel against wind erosion and a dry moat has been bladed around the zone perimeter inside the post line to discourage vehicle travel over the surface of the burial ground."			

9 2 1 2 5 1 3 5 2



U. S. ATOMIC ENERGY COMMISSION  
RICHLAND OPERATIONS OFFICE

 AUTOMATION INDUSTRIES, INC.  
VITRO ENGINEERING DIVISION

SOLID WASTE  
STORAGE  
218-E-1  
SURVEYED 12-3-73

NO.	DATE	DESCRIPTION	BY	CH	AP	SCALE	1"=60'	APPD.	
						DRAWN	<i>mc</i>	CLASSIFICATION	NONE
REVISIONS						CHKD.		CLASS. BY	

SKETCH  
NO.

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

RHO-CD-673

I. SE

<u>Name/Type of Facility</u> Unplanned Burial Sight		<u>Past Designation</u>	<u>Number</u> 218-E-13 (UN-218-E-1)
<u>Location</u> 200 East, S.E. Quadrant Approximately 350 ft west of the Purex exclusion area Patrol gatehouse on 4th Street.		<u>Service Dates</u> 8/66	<u>Status</u> Inactive
<u>Site Coordinates</u> N-40180, W-49175	<u>Reference Drawings</u> H-2-44500 Sheet 7	<u>Elevations</u>	
<u>Source and Description of Waste</u>			
<u>Description of Facility</u> Broken pieces of contaminated concrete from the pipe trench encasement were left in the excavation hole and buried following repairs to piping at that location.			
<u>Radionuclide Content</u> (calculated from discharge data)  < 1 Ci fission products			

9 2 1 2 5 1 1 3 5 4

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

RHO-CD-673  
I. SE

<u>Name/Type of Facility</u> Purex Tunnel No. 1		<u>Past Designation</u> Facility Type Tunnel		<u>Number</u> 218-E-14	
<u>Location</u> 200 East, S.E. Quadrant About 500 ft south of Purex.			<u>Service Dates</u> 6/60-5/64		<u>Status</u> Inactive
<u>Site Coordinates</u> N-39555, W-48020 N-39196, W-48020		<u>Reference Drawings</u> H-2-55586 H-2-55587		<u>Elevations</u> Ground ~719 ft Water Table ~402 ft(1973) Site Depth ~ 19 ft	
<u>Source and Description of Waste</u> Large equipment, (approximately 2 x 10 <sup>4</sup> ft <sup>3</sup> ).					
<u>Description of Facility</u> Tunnel running north and south, 360 ft long. Surface area: 2.16 x 10 <sup>4</sup> ft <sup>2</sup>					
<u>Radionuclide Content</u> (calculated from discharge data)					
		<u>Radionuclide</u>	<u>At Time of Burial</u>		
		Total Beta, Ci	8.8 x 10 <sup>4</sup>		
		<sup>90</sup> Sr, Ci	1.8 x 10 <sup>3</sup>		
		<sup>106</sup> Ru, Ci	3.8 x 10 <sup>3</sup>		
		<sup>137</sup> Cs, Ci	1.9 x 10 <sup>3</sup>		
<u>Tunnel 1</u>					
<u>Car Position</u>	<u>Date</u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Decayed MFP (Ci)</u>	<u>Pu (Gms)</u>	
1&2	6/60	6,190	2,400	--	
3	7/29/60	1,900	40,000	--	
4	12/23/60	2,465	3,000	--	
5	1/5/61	2,336	1,000	--	
6	4/21/61	2,336	700	--	
7	2/1/62	2,336	40,000	--	
8	5/23/64	2,400	700	--	

9 2 1 2 5 1 3 5 5

## CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. SE

<u>Name/Type of Facility</u> Purex Tunnel No. 2		<u>Past Designation</u> Facility Type Tunnel	<u>Number</u> 218-E-15	
<u>Location</u> 200 East, S.E. Quadrant About 2200 ft south of Purex to end of tunnel.		<u>Service Dates</u> 12/67	<u>Status</u> Active	
<u>Site Coordinates</u> N-39366, W-47960 N-37670, W-47960		<u>Reference Drawings</u> H-2-58191 H-2-58192	<u>Elevations</u> Ground 719 ft Water Table 402 ft(1973) Site Depth ~8 ft	
<u>Source and Description of Waste</u> Large equipment, (approximately $1.9 \times 10^4$ ft <sup>3</sup> ).				
<u>Description of Facility</u> (1) Tunnel running north-south, approximately 1600 ft long. Surface Area: $1.02 \times 10^5$ ft <sup>2</sup> .				
<u>Radionuclide Content</u> (calculated from discharge data)				
	<u>Radionuclide</u>	<u>At Time of Burial</u>		
	Pu, g	500		
	Total Beta, Ci	$2.0 \times 10^4$		
	<sup>90</sup> Sr, Ci	40		
	<sup>106</sup> Ru, Ci	87		
	<sup>137</sup> Cs, Ci	43		
	Misc. Radionuclides	$1.0 \times 10^4$		
<u>Tunnel 2</u>				
<u>Car Position</u>	<u>Date</u>	<u>Volume (ft<sup>3</sup>)</u>	<u>Decayed MFP (Ci)</u>	<u>Pu (Gms)</u>
1	12/12/67	2,400	700	--
2	3/26/69	2,400	500	--
3	3/19/70	2,400	700	--
4	12/30/70	2,400	--	--
5	2/26/71	2,400	20	<500
6	12/21/71	2,400	10	--
7	12/22/71	2,400	50	--
8	8/29/72	800	17,500	--
9	9/30/72	1,594	50	--

9 2 1 2 5 1 3 5 6

VOLUME I 200 EAST AREA - Southwest Quadrant (SW)

## Waste Disposal Sites and Associated Radiation Zones.

## Quadrant Boundaries

- East Boundary - Baltimore Avenue from 1st Street to 7th Street.
- South Boundary - 1st Street, known as the "South Fenceline Road".
- West Boundary - Akron Avenue, known as the "West Fenceline Road".
- North Boundary - 7th Street from Akron Avenue to Baltimore Avenue.

See Area and Quadrant maps at the end of this section.

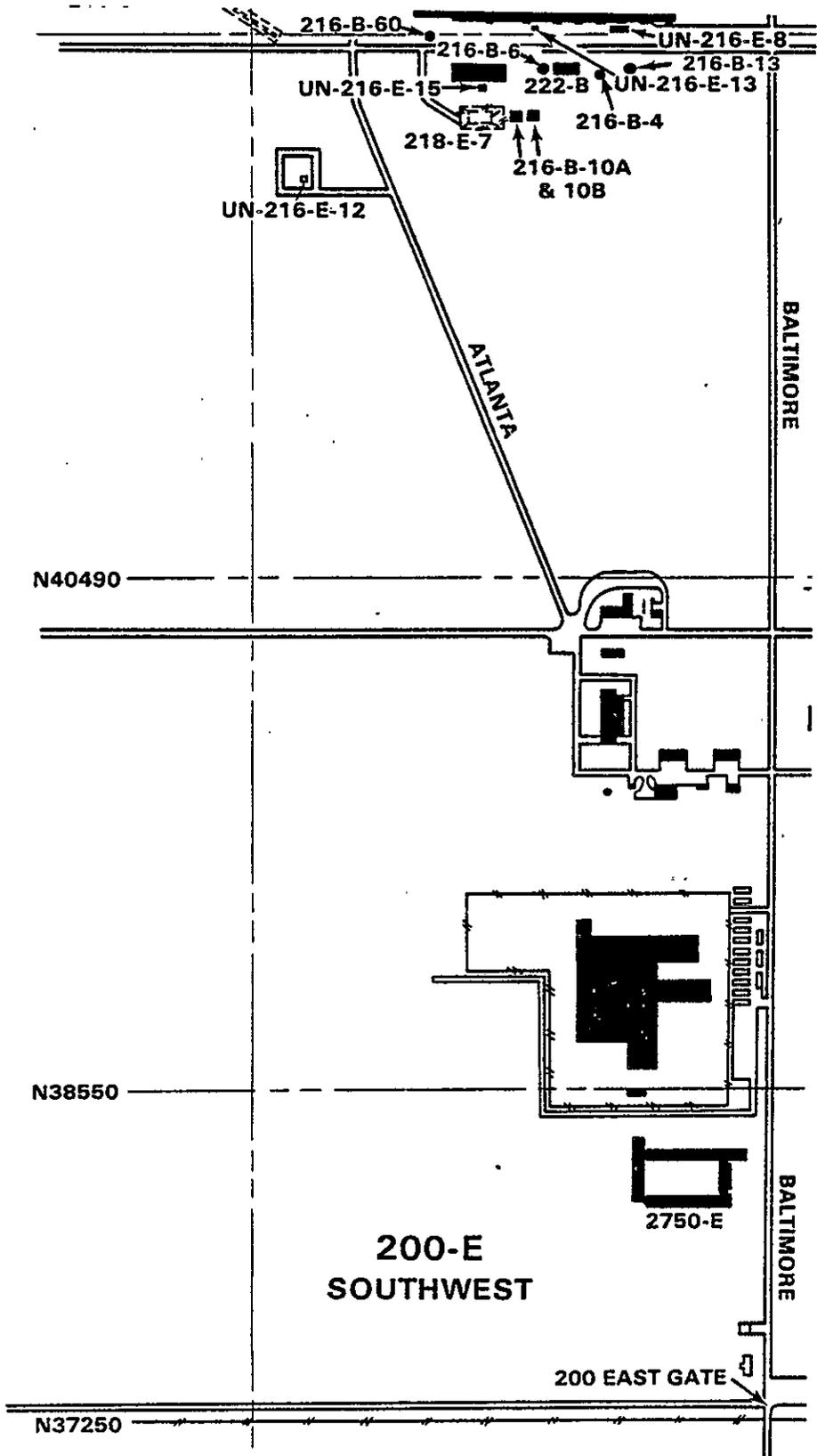
How to read the Index and locate a site:

Example - 218-E-7 Burial Ground (Vault)

<u>Site Number</u>	<u>Volume</u>	<u>Quadrant</u>
218-E-7 Burial Ground (Vault)	I.	SW (Southwest)

9212511357

9 2 1 2 5 1 1 3 5 8



INDEX - VOLUME I 200 EAST AREA

Southwest Quadrant

216-B-4 Reverse Well	I. SW
216-B-6 Reverse Well	I. SW
216-B-10A Crib	I. SW
216-B-10B Crib	I. SW
216-B-13 French Drain	I. SW
218-E-7 Burial Vault	I. SW
UN-216-E-12 Unplanned Release	I. SW
UN-216-E-15 Unplanned Release	I. SW

9 2 1 2 5 1 1 3 5 9

CONTAMINATED LIQUID DISPOSAL SITES

<u>Name/Type of Facility</u> Reverse Well		<u>Past Designation</u> 216-B-4 French Drain 216-B-4 Dry Well	<u>Number</u> 216-B-4
<u>Location</u> 200 East, S.W. Quadrant  Approximately 800 ft east by southeast of the 221-B Building. West and near the 292-B Building.		<u>Service Dates</u> 4/45-12/49	<u>Status</u> Inactive
<u>Site Coordinates</u> N-42363, W-53603	<u>Reference Drawings</u> H-2-1100 H-2-1722	<u>Elevations</u> Ground 702 ft Water Table 404 ft(12/31/73) Site Depth 110 ft	
<u>Source and Description of Waste</u>  Received floor drainage from the 292-B Building.			
<u>Description of Facility</u>  8-inch diameter reverse well. Waste volume unknown.			
<u>Radionuclide Content</u> (calculated from discharge data)  < 1 Ci total Beta			

9 2 1 2 5 1 3 6 0

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SW

<u>Name/Type of Facility</u>		<u>Past Designation</u>		<u>Number</u>
Reverse Well		222-B-110 Reverse Well 216-B-6 Dry Well		216-B-6
<u>Location</u>		<u>Service Dates</u>		<u>Status</u>
200 East, S.W. Quadrant  Within a few feet of the northwest corner of the 222-B Building		4/45-12/49		Inactive
<u>Site Coordinates (Approximate)</u>		<u>Reference Drawings</u>		<u>Elevations</u>
N-42403, W-53882		H-2-1649 H-2-2431		Ground 701 ft Water Table 405 ft(1973) Site Depth 302 ft
<u>Source and Description of Waste</u>				
Radioactive wastewater from the regulated area of the 222-B Laboratory. Waste volume unknown.				
<u>Description of Facility</u>				
Reverse well, 6-inch diameter. Use of this well was terminated when it was determined that the well had reached it's radionuclide capacity. Effluent pipeline inlet to well was blanked.				
<u>Radionuclide Content (calculated from discharge data)</u>				
<10 Ci total Beta				

9 2 1 2 5 1 3 6 1

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SW

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> 222-B-1 Crib 216-B-10 Crib		<u>Number</u> 216-B-10A	
<u>Location</u> 200 East, S.W. Quadrant Approximately 200 feet south of the 224-B and 222-B Buildings.			<u>Service Dates</u> 12/49-12/58		<u>Status</u> Inactive
<u>Site Coordinates</u> N-42195, W-53868		<u>Reference Drawings</u> H-2-1649 H-2-1722		<u>Elevations</u> Ground 700 ft Water Table 402 ft Site Depth 20 ft	
<u>Source and Description of Waste</u> 1 x 10 <sup>8</sup> liters. Acidic wastes. Decontamination sink and sample slurper waste from the 222-B Laboratory, and floor drainage from the 292-B Building. The 216-B-10A and the 216-B-10B cascade in series from A to B (East to West).					
<u>Description of Facility</u> Wooden structure, 14 ft x 14 ft bottom surface area, 20 ft below grade. Deactivation: Effluent pipeline to the crib was blanked at the decontamination sink in 222-B.					
<u>Radionuclide Content</u> (calculated from discharge data)					
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>		
	Pu, g	9.8	9.8		
	Beta, Ci	50	6.12		
	<sup>90</sup> Sr, Ci	5	2.55		
	<sup>106</sup> Ru, Ci	10	6.94	x 10 <sup>-8</sup>	
	<sup>137</sup> Cs, Ci	1	0.531		
	<sup>60</sup> Co, Ci	0.1	2.68	x 10 <sup>-3</sup>	
	U, kg	9.1	9.07		
<u>Other Potential Hazards</u> Wooden structure may collapse. Prompt remedial action would be required to prevent spread of contamination and correct other hazards.					

9 2 1 2 5 1 3 6 2

CONTAMINATED LIQUID DISPOSAL SITES

I. SW

RHO-CD-673

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Crib		222-B-2 Crib 216-B-10 Crib	216-B-10B
<u>Location</u>		<u>Service Dates</u>	<u>Status</u>
200 East, S.W. Quadrant  Approximately 200 ft. south of the 224-B and 222-B Buildings.		12/49-10/73	Inactive
<u>Site Coordinates (Approximate)</u>	<u>Reference Drawings</u>	<u>Elevations</u>	
N-42195, W-53943	H-2-1649 H-2-1722	Ground	710 ft
		Water Table	404 ft
		Site Depth	20 ft
<u>Source and Description of Waste</u>			
2.8 x 10 <sup>4</sup> liters. Receives decontamination sink and shower waste from the 221-B Building. The 216-B-10A and 216-B-10B cribs cascade in series from A to B (East to West).			
<u>Description of Facility</u>			
Wood crib, 14 ft x 14 ft bottom dimensions.			
<u>Radionuclide Content</u> (calculated from discharge data)			
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
Pu, g	<4.7 x 10 <sup>-5</sup>	<4.74 x 10 <sup>-5</sup>	
Beta, Ci	1.8 x 10 <sup>-3</sup>	<7.33 x 10 <sup>-4</sup>	
<sup>90</sup> Sr, Ci	<3.3 x 10 <sup>-4</sup>	<2.67 x 10 <sup>-4</sup>	
<sup>106</sup> Ru, Ci	<1.7 x 10 <sup>-6</sup>	<1.35 x 10 <sup>-8</sup>	
<sup>137</sup> Cs, Ci	<1.1 x 10 <sup>-4</sup>	<9.26 x 10 <sup>-5</sup>	
<sup>60</sup> Co, Ci	<7.8 x 10 <sup>-7</sup>	<3.52 x 10 <sup>-7</sup>	
U, kg	<7.5 x 10 <sup>-4</sup>	<7.42 x 10 <sup>-4</sup>	
<u>Other Potential Hazards</u>			
Wooden structure may collapse. Prompt remedial action would be required to prevent spread of contamination and correct other hazards.			

9 2 1 2 5 1 1 3 6 3

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. SW

<u>Name/Type of Facility</u> French Drain		<u>Past Designation</u> 291-B Crib 216-B-B Crib	<u>Number</u> 216-B-13
<u>Location</u> 200 East, S.W. Quadrant Approximately 300 ft south of 221-B		<u>Service Dates</u> 8/47-	<u>Status</u> Active
<u>Site Coordinates</u> N-42366, W-53554	<u>Reference Drawings</u> H-2-2926	<u>Elevations</u> Ground 700 ft Water Table 402 ft Site Depth 18 ft	
<u>Source and Description of Waste</u> 291-B Stack drainage (vol. not known). Low-salt, neutral-basic.			
<u>Description of Facility</u> Four ft diameter, plywood cover, filled with crushed limestone, 18 ft below grade.			
<u>Radionuclide Content</u> <1 Ci Beta Potential Pu >0.04 g/m <sup>2</sup>			

9 2 1 2 5 1 1 3 6 4

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

RHO-CD-673  
I. SW

<u>Name/Type of Facility</u> Burial Ground (Vaults)	<u>Last Designation</u> 200 East/222-B Vaults	<u>Number</u> 218-E-7
<u>Location</u> 200 East, S.W. Quadrant Approximately 100 ft south of 222-B Building.	<u>Service Dates</u> 1915-1952	<u>Status</u> Inactive
<u>Site Coordinates (Approx.)</u> N-42280, W-53760 N-42250, W-53820	<u>Reference Drawings</u> H-2-757, H-2-1938	<u>Elevations</u> Ground ~685 ft Water Table ~404 ft(1973) Site Depth ~ 28 ft

Source and Description of Waste

Laboratory and sample waste from 222-B. (Approx. 6000 ft<sup>3</sup>)

Description of Facility

Underground storage compartment, surface area: 2.00 x 10<sup>3</sup> ft<sup>2</sup>.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	1.0 x 10 <sup>3</sup>	1.0 x 10 <sup>3</sup>
Pu, g	1.0	1.0
Total Beta, Ci	6.0 x 10 <sup>2</sup>	24.6
<sup>90</sup> Sr, Ci	12	5.89
<sup>106</sup> Ru, Ci	26	1.16 x 10 <sup>-7</sup>
<sup>137</sup> Cs, Ci	13	6.58

History:

The original 12-foot deep by 10-foot square underground wooden vault, made of 2" x 12" planking, was replaced by a 8'-0" concrete culvert pipe encasement (25'-2" deep). The top of the encasement was covered with a precast concrete cover. The top of the concrete cover is 3'2" below ground level. The wooden vault was open at the bottom. The concrete encasement has a 12" thick concrete floor.

9 2 1 2 5 1 3 6 5

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SW

<u>Name/Type of Facility</u>		<u>Past Designation</u>	<u>Number</u>
Unplanned Release		241-ER-151 Catch Tank Leak	UN-216-E-12
<u>Location</u> 200 East, S.W. Quadrant		<u>Service Dates</u>	<u>Status</u>
Approximately 800 ft SW of 221-B.		3/53	--
<u>Site Coordinates</u> (Approximate)	<u>Reference Drawings</u>	<u>Elevations</u>	
N-41937, W-54702	H-2-44500	Ground	697 ft
		Water Table	404 ft (1973)
		<u>Site Depth</u>	
<u>Source and Description of Waste</u>			
About 1700 gal of contaminated acid was lost to ground.			
<u>Description of Facility</u>			
A leak in 241-ER-151 Catch Tank. No ground surface contamination detected.			
<u>Radionuclide Content</u> (at time of discharge)			
Approximate 10 Ci mixed fission product.			
<u>History:</u>			
About 1,700 gallons of contaminated acid was lost to ground through a leaking catch tank. No ground surface contamination was detected.			

9 2 1 2 5 1 1 3 6 6

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. SW

<u>Name/Type of Facility</u> Unplanned Release		<u>Fast Designation</u> 224-B, South Side Pu Ground Contamination	<u>Number</u> UN-216-E-15
<u>Location</u> 200 East, S.W. Quadrant South Side 224-B		<u>Service Dates</u> 1945 through 1953	<u>Status</u> --
<u>Site Coordinates</u> (Approximate) N-42325, W-53980	<u>Reference Drawings</u> H-2-44500	<u>Elevations</u> Ground 690 ft Water Table 404 ft Site Depth NA	
<u>Source and Description of Waste</u>  Not available.			
<u>Description of Facility</u>  Plutonium ground contamination on south side of 224-B Building.			
<u>Radionuclide Content</u>  Not Available.			
<u>History:</u>  It is assumed that a similar condition exists behind 224-B Building to that found behind the 224-T Building in 1972. (See UN-216-W-12)			

9 2 1 2 5 1 1 3 6 7

VOLUME I 200 EAST AREA - Northwest Quadrant (NW)

## Waste Disposal Sites and Associated Radiation Zones

## Quadrant Boundaries

- East Boundary - Baltimore Avenue from 7th Street to 12th Street.
- South Boundary - 7th Street from Baltimore Avenue to Akron Avenue.
- West Boundary - Akron Avenue, known as the "West Fenceline Road".
- North Boundary - 12th Street, known as the "North Fenceline Road".

See Area and Quadrant maps at the end of this section.

How to read the Index and locate a site:

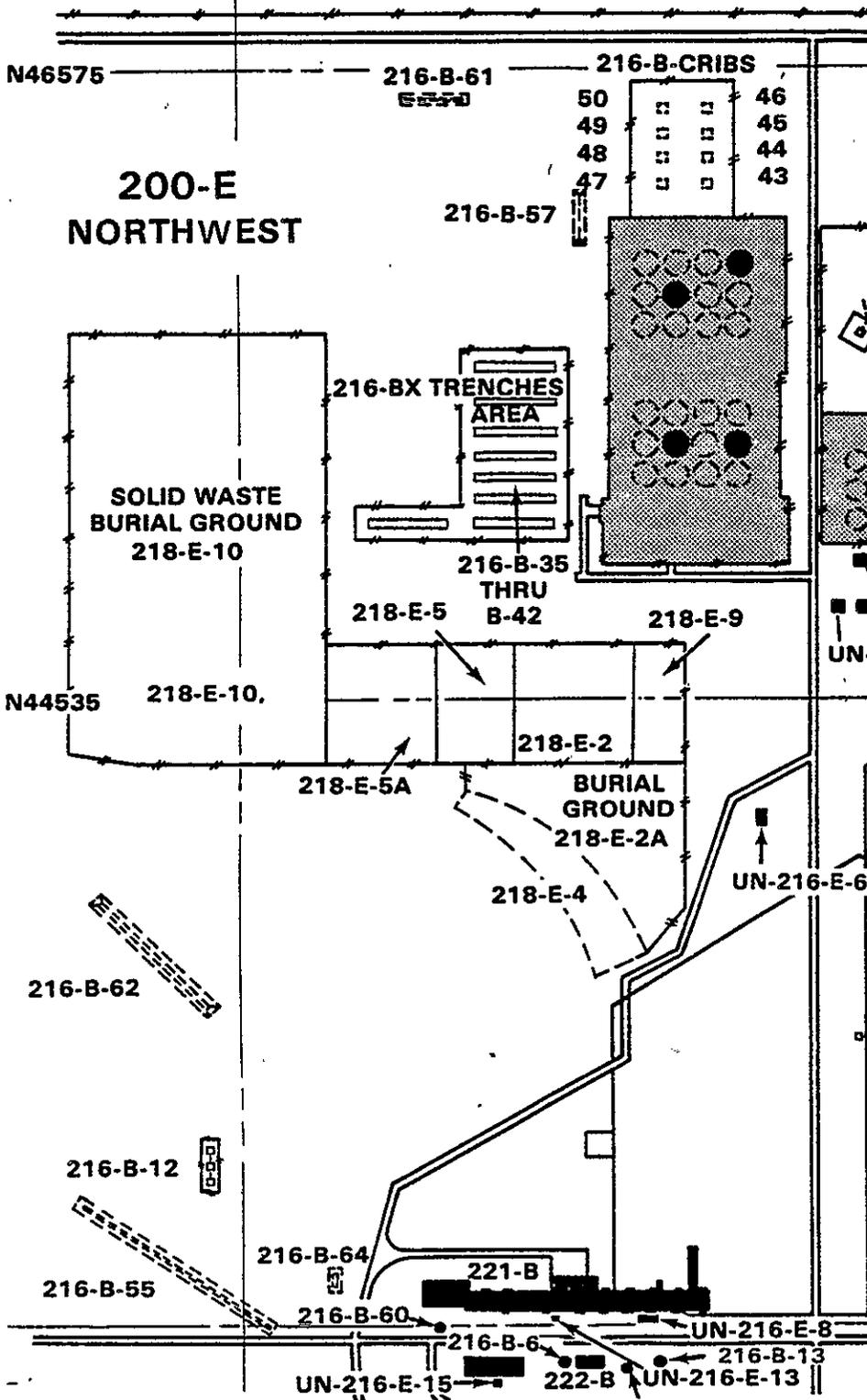
Example - 218-E-5A Burial Ground

<u>Site Number</u>	<u>Volume</u>	<u>Quadrant</u>
218-E-5A Burial Ground	I.	NW (Northwest)

9 2 1 2 3 1 3 5 8

A

W54895



9 2 1 2 5 1 1 3 6 9

INDEX - VOLUME I 200 EAST AREA  
Northwest Quadrant

216-B-12 Crib	I. NW	218-E-2 Burial Ground	I. NW
216-B-35 Trench (covered)	I. NW	218-E-2A Burial Ground	I. NW
216-B-36 Trench (covered)	I. NW	218-E-4 Burial Ground	I. NW
216-B-37 Trench (covered)	I. NW	218-E-5 Burial Ground	I. NW
216-B-38 Trench (covered)	I. NW	218-E-5A Burial Ground	I. NW
216-B-39 Trench (covered)	I. NW	218-E-9 Storage Site	I. NW
216-B-40 Trench (covered)	I. NW	218-E-10 Burial Ground	I. NW
216-B-41 Trench (covered)	I. NW	UN-216-E-2 Unplanned Release	I. NW
216-B-42 Trench (covered)	I. NW	UN-216-E-6 Unplanned Release	I. NW
216-B-43 Crib	I. NW	UN-216-E-8 Unplanned Release	I. NW
216-B-44 Crib	I. NW	UN-216-E-13 Unplanned Release	I. NW
216-B-45 Crib	I. NW		
216-B-46 Crib	I. NW		
216-B-47 Crib	I. NW		
216-B-48 Crib	I. NW		
216-B-49 Crib	I. NW		
216-B-50 Crib	I. NW		
216-B-55 Crib	I. NW		
216-B-57 Crib	I. NW		
216-B-60 Crib	I. NW		
216-B-61 Crib	I. NW		
216-B-62 Crib	I. NW		

9 2 1 2 5 1 1 3 7 0

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> 216-ER-1,2, and 3 Cribs 216-ER Crib	<u>Number</u> 216-B-12
<u>Location</u> 200 East, N.W. Quadrant 1000 ft Northwest of 221-B		<u>Service Dates</u> 11/52-12/57 11/67-11/73	<u>Status</u> Deactivated
<u>Site Coordinates</u> (Approximate) N-42972, W-55000 to N-43133, W-55000	<u>Reference Drawings</u> H-2-43027 H-2-43029 H-2-43039 H-2-43046 SK-2-19674	<u>Elevations</u> Ground 697 ft Water Table 404 ft(1973) Site Depth 30 ft	
<u>Source and Description of Waste</u> 5.2 x 10 <sup>8</sup> liters. Process condensate from Evaporators in 221-U and 224-U Bldgs. 11/52 to 12/57. Construction waste, 5/67 to 11/67. 221-B Process condensate, 11/67 to 11/73, (neutralized with limestone). Low-salt, neutral/basic.			
<u>Description of Facility</u> Wooden structure. Bottom surface area 160 ft x 50 ft. Three cribs 16 ft square in gravel bed. Crib collapsed (see RL Occurrence Report 73-82). Following discovery of crib collapse, immediate action was taken to deactivate crib and backfill area to grade.			
<u>Radionuclide Content</u> (calculated from discharge data)			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
	Pu, g	370	374.0
	Beta, Ci	1.1 x 10 <sup>4</sup>	<2080.0
	<sup>90</sup> Sr, Ci	<150	< 107.0
	<sup>106</sup> Ru, Ci	310	0.276
	<sup>137</sup> Cs, Ci	1.2 x 10 <sup>3</sup>	949.0
	<sup>60</sup> Co, Ci	<1.7	< 0.623
	U, kg	2.1 x 10 <sup>4</sup>	20,900.0

(See next page)

9 2 1 2 5 1 1 3 7 1

DATE AUG 23 1974

TO: (MANAGER RADIATION MONITORING SUBSECTION TECHNICAL SERVICES SEC. _____)	FROM: (NAME OF ORIGINATING SECTION) _____
<b>B. C. SAUERESSIG</b>	<b>L. E. BRECKE</b>
<b>REFERENCES</b>	
(1) RADIOACTIVE WASTE DISPOSAL GUIDES - PART I, "GROUND DISPOSAL - TERMINATING SITES," ATOMIC ENERGY COMMISSION MANUAL - RL APPENDIX 0510-1, JULY 1, 1967.  (2) ARH-1000, "HANFORD ARCHITECTURAL AND CIVIL STANDARDS, AC-3-40 (JUNE 20, 1967) AC-3-2 (OCTOBER 19, 1969), AND AC-3-40 (MAY 25, 1969).	3. ARH-220, "RADIATION PROTECTION STANDARDS AND CONTROLS, STANDARD NO. 1," PERSONNEL PROTECTION OPERATION, SEPTEMBER 15, 1969.  4. ATLANTIC RICHFIELD HANFORD COMPANY OPERATING INSTRUCTION 1.0.3.2, "OUTDOOR RADIATION ZONES"

**I SUMMARY**

CONDITIONS FOR DEACTIVATION OF THE 216 - B - 12 Crib  
 HAVE BEEN SATISFIED AND FUTURE RESPONSIBILITY TRANSFERRED TO TECHNICAL SERVICES

APPROVED: _____ <small>MANAGER TECHNICAL SERVICES SECTION</small>	APPROVED: _____ <small>MANAGER ORIGINATING SECTION</small>
DATE _____	DATE <u>10/21/74</u>

**II RADIATION ZONE RECORD**

**1. ORIGIN OF MATERIALS INTRODUCED TO THE SITE**

U Plant Condensate  
 3 Plant Condensate

**2. HISTORY:**

DATE OF INITIAL USE: Nov. 1952      DATE OF FINAL USE: Nov. 1973

Also called the 216 - ER #1, #2, and #3 Crib.  
 Received the process condensate from the waste evaporators in the 221 - U and 224 - U Bldgs. from November 1952 to December 1957.  
 Received the process condensate and construction waste from the 221-B Bldg. from May 1967 to November 1973.

**3. ESTIMATE OF RADIONUCLIDE AND CURIE INVENTORY:**

RADIONUCLIDE:    A <u>Du</u> <u>ii</u>	B <u>Beta</u>	C <u>90Sr</u> <u>137Cs</u>
CURIES:            A <u>374 gms</u> <u>2000Kgs</u>	B <u>11200</u> <u>Decayed 2480</u>	C <u>153</u> <u>1200</u>

**4. RADIATION SURVEY OF THE ZONE**

CONDITIONS: (A) ALL ZONE SURFACES TO BE LESS THAN 1 MRAD/HR      (B) NO MEASURABLE SURFACE CONTAMINATION

Decayed < 120

< 100 C/A

9212511372

DATE: \_\_\_\_\_

SURVEY RESULTS		DATE OF SURVEY	REMARKS
A. RADIATION	< 6 MRAD/HR	7/8/74	
B. CONTAMINATION	< 100 BETA-GAMMA	7/8/74	
	< 100 dm ALPHA	7/8/74	
C. MOST RECENT GROUND WATER SAMPLE RESULTS	See remarks section.		
5. DRAWINGS (SHOWING PLOT PLAN, MARKERS, MONITORING WELLS, SIGNS, BARRIERS, COORDINATES, ELEVATION, AND DETAILS OF STEPS TAKEN TO PRECLUDE FUTURE USE):			
DRAWINGS H-2 34524, 34525, 43029 FCN's submitted to revise drawings. ATTACHED			

## III. DEACTIVATION WORK

	DATE		DATE
1. VENT RISERS SEALED OFF BELOW GRADE	4/10/74	3. GROUND STABILIZATION (PREVENTION OF EROSION AND TUMBLEWEED GROWTH)	5/8/74
2. INLET AND TRANSFER LINES DEACTIVATED.	3/14/74	4. OTHER WORK PERFORMED:	
HOW DEACTIVATED:			
A cap was cemented on fiberglass fill line and a concrete plug was poured around the line end.			

## IV. ZONE IDENTIFICATION

	DATE		DATE
1. PERMANENT MARKERS INSTALLED	7/2/74	3. RADIATION ZONE SIGNS INSTALLED SO AS TO BE VISIBLE FROM ALL AVENUES OF APPROACH TO THE ZONE.	5/15/74
2. FENCE OR CHAIN BARRIER INSTALLED IF ZONE IS SUBJECT TO CAVE - IN.	5/15/74		

## V. REMARKS

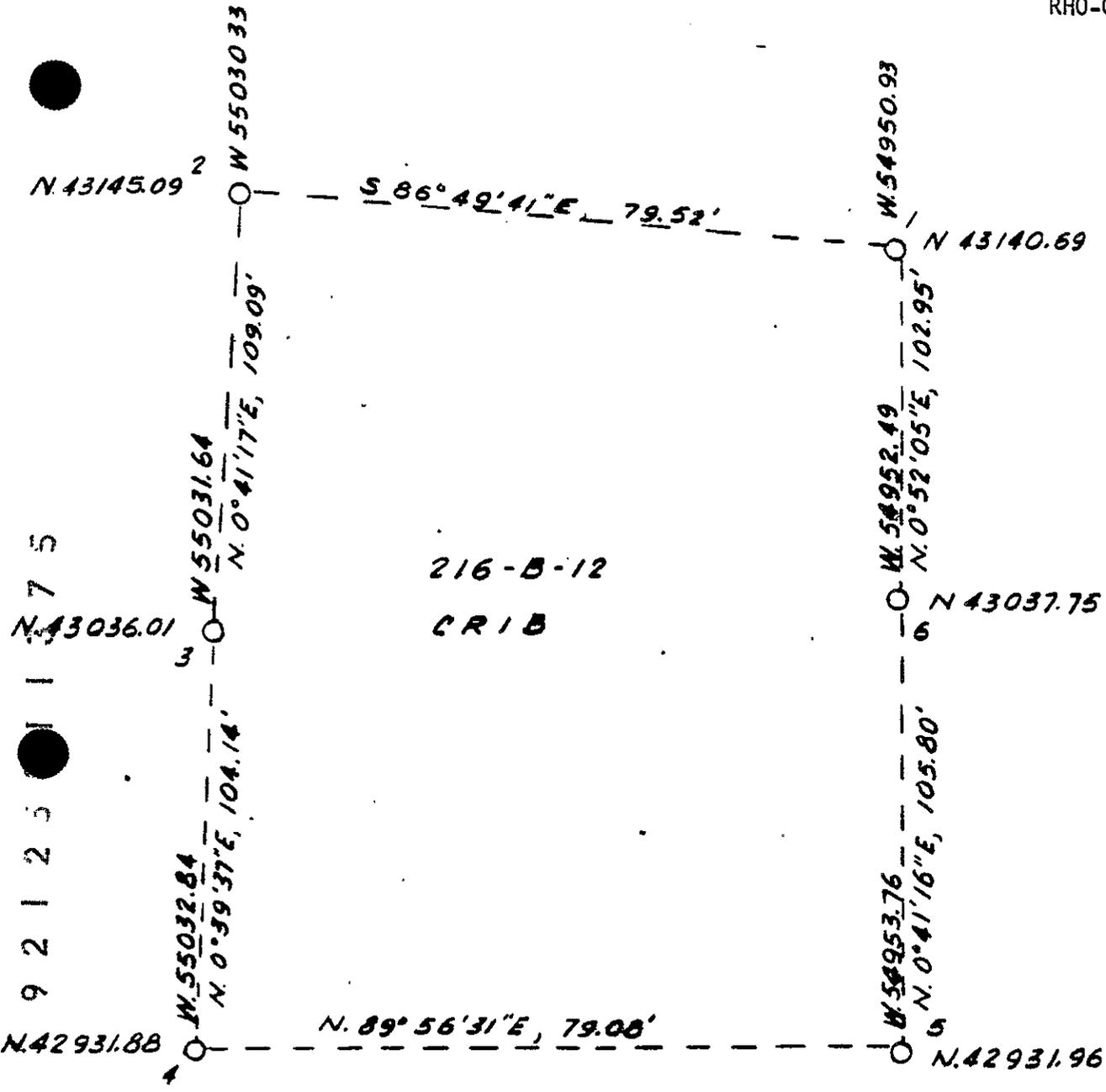
Ground Water Sample for April 1974  
 Total Beta 270 pico curies/liter  
 Total Strontium <24 pico curies/liter  
 Cesium 30±30 pico curies/liter

DISTRIBUTION: 1. MANAGER - ORIGINATING SECTION  
 2. MANAGER - TECHNICAL SERVICES  
 3. MANAGER - PERSONNEL PROTECTION

4. MANAGER - PROCESS DESIGN ENGINEERING  
 5. MANAGER - RADIATION MONITORING  
 EXTRAS

9 2 | 2 3 3 | 3 7 4

D	XYZ	TIME	FUNCTIONS															RADIATION OCCURRENCE	INJURY					
			12-8	8-4	3-12	BURIAL	COMPLIANCE PROGRAM	IN CONT.	FOLLOW UP	INSP.	LAB.	MAINT.	PERSONNEL SURVEYS	PROCESS WORK	RAIL	MOVEMENT	RELEASE			SAMPLING	ON SITE	SHIPMENT OFF SITE	SHIPMENT	VEHICLES
C			RADIATION SURVEY															PUREX						
B			SURVEY NUMBER B7407004															S						
A			RESPIRATORY PROTECTION WORN N R A C F A															T						
DAYS			LOCATION 216B 12 crib. INSTRUMENT(S) USED gm -															PLANTS 242-S						
31			JOB DESCRIPTION Survey of crib -															Z						
30			ITEM OF LOCATION AND REMARKS * DOSE RATE WD WC DIST. NEUTRON DIST. c/m d/m															TANK FARMS						
29			area of crib. <100.															GENERAL						
28																		CONS.						
27			3 vent. pipes. <100.															LAB.						
26																		MAINT.						
25			Bel rizar paper cut.															PROCESSING						
24			ff. covered with dirt -															RADIATION MONITORING						
23																		RFLC + MATION						
22																		SP SER DECON						
21																		UO <sup>3</sup>						
20																		ENCAP.						
19																		OTHER						
18																		1974						
17																		1975-						
16			Al Surgenister															1976						
15																		1977						



216-B-12  
CRIB

9 2 1 2 5 1 1 7 5

REV. NO.	REV. BY DATE	DRAWING STATUS	APPD. BY DATE	FOR	MICRO P.M'D
DFTG APPD	DATE	APPD	DATE		
CHECKED		APPD			
<i>Compton</i>	7/17/74	ENGR			
BLDS NO.	216-B-12		INDEX NO.		
SCALE	CLASSIFIED BY	CLASSIFICATION			
NONE		NONE			
DATE					

DWG NO.	REV NO.	DRAWING TITLE OR INDEX NO.
		REFERENCE DRAWINGS
U. S. ATOMIC ENERGY COMMISSION RICHLAND OPERATIONS OFFICE		
HANFORD ENGINEERING SERVICES A DIVISION OF VITRO CORPORATION OF AMERICA		
AS-BUILT MARKER POSTS 216-B-12 CRIB		
DWG NO.	SHEET NO.	SHEETS



Atlantic Richfield Hanford Company

### FACILITIES CHANGE NOTICE

(REF. OPERATING INSTRUCTION 4.9.1.3)

# NO 03571

INITIATED BY <i>F. Taylor</i>	ORGANIZATION <i>FPI</i>	PHONE NO. <i>2856</i>	PLANT NO (REFERENCE ONLY) <i>216-12</i>
----------------------------------	----------------------------	--------------------------	--

DRAWING(S) AFFECTED	REV. NO	TITLE, PART, NAME OR DESCRIPTION
<i>H-2-34525</i>	<i>3</i>	<i>CLOSE FILL LINE FOR 216-12</i>
<i>H-2-34524</i>	<i>3</i>	<i>CRIB</i>

DESCRIPTION OF CHANGE (BE AS COMPLETE AS POSSIBLE IN DESCRIBING CHANGE) PLANT LOCATION (CELL HOOD, ROOM, AREA, ETC.)  
 BLDG. NO. *271-B*

*CUT OFF FILL LINE &  
 CAP WITH CEMENT FOR  
 216-12 CRIB - FILL LINE*

9212581376

SAFETY APPROVALS (AS REQUIRED) - INDICATE					REVIEW & APPROVAL (AS REQUIRED)	
NUCLEAR	RADIOLOGICAL	PROCESS	MECHANICAL	FIRE SAFETY	ENGINEERING	PERSONNEL PROTECT.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

AUTHORIZED BY <i>E. Hester</i>	DATE <i>1-22-74</i>	WORK COMPLETED <i>CRIB</i>	SIGNATURE AND DATE <i>E. Hester 4-26-74</i>	CHECK FOR COMPLETENESS: SIGNATURE AND DATE <i>E. Taylor 4-26-74</i>
-----------------------------------	------------------------	-------------------------------	--	--

FOR DRAFTING OPERATION	DRAFTSMAN	DATE COMPLETED	REMARKS
------------------------	-----------	----------------	---------

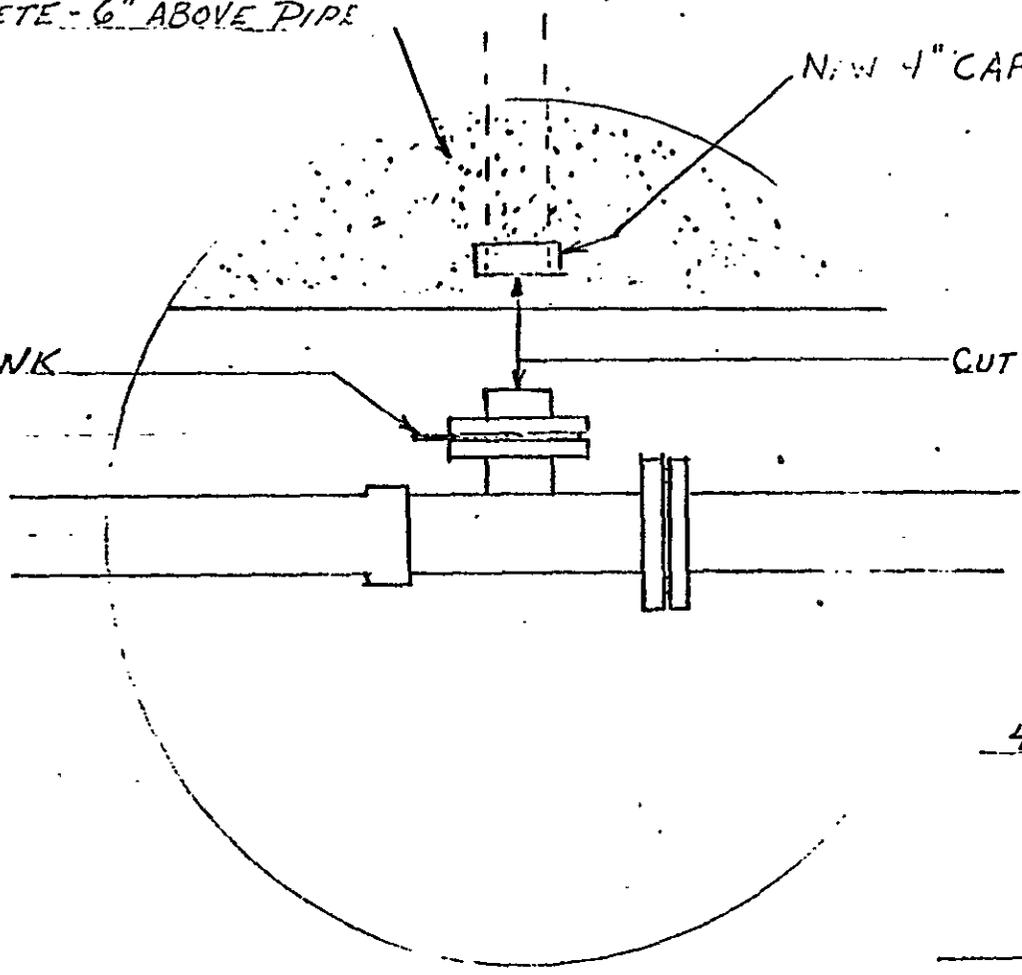
9 2 1 2 5 8 1 3 7 7

POUR CONCRETE - 6" ABOVE PIPE

NEW 4" CAP (FR)

EXISTING BLANK

CUT OUT 8" SECTION



48" MANHOLE

Z →

PLUG FOR B12 CRIB

W.D.L. - 1/21/74

RHO-CD-673

Harold

3-10-18

All of the actions <sup>described</sup> in the attached letter were completed. I don't know for certain the dates because the job took two years and its been quite some time. If you need more information let me know. I have a folder of surveys, purchase requisitions work orders, plots by Vitro surveyors, etc. etc.

Dick Puentou

9 2 1 2 5 8 1 3 7 3

Date: January 22, 1974  
To: A. J. Low  
From: R. E. Preston *R. E. Preston*  
Subject: 216-B-12 CRIB DEACTIVATION AND TRANSFER OF RESPONSIBILITY

- References:
1. Atomic Energy Commission Manual - RL Appendix 0510-1, July 13, 1967, "Radioactive Waste Disposal Guides - Part 1," "Ground Disposal - Terminating Sites"
  2. HWS-1000, "Hanford Architectural and Civil Standards," AC-3-20 (June 20, 1960), AC-5-2 (October 19, 1959), and AC-5-40 (August 25, 1960)
  3. ARH-220 (unclassified), September 15, 1969, "Radiation Protection Standards and Controls Standard 1," Personnel Protection Operation
  4. Atlantic Richfield Hanford Company Operating Instruction 1.6.5.2, "Outdoor Radiation Zones"

The pertinent AEC Manual Chapters, Atlantic Richfield Hanford Company OPG's and Radiation Protection Standards have been reviewed on the layaway of retired radioactive disposal sites. In this letter the steps are shown for the layaway of B-12 crib, the list should be used for an order of performance schedule. Step 2 is the only exception, it must be performed before Step 4, but may be completed before Step 1.

1. The risers (vent and gauge wells) should be cut off below the surface and the risers welded shut or flanges welded on and blanks bolted in place. This work can be performed as soon as the liquid level as measured in the gauge well is at or below the 26-foot level as experienced in operation.

The test wells (3) are to be left as at present.

9 2 1 2 3 1 3 7 9

A. J. Low  
Page 2  
January 22, 1974

The location of these risers and wells is shown on H-2-43029. The gauge well and vent risers are the outside risers in groups of three on each of the three crib sections. The test wells are the center riser in each group.

2. The inlet line has already been blanked off. This was done on November 21, 1973. An FCN has been prepared to show this on drawings H-2-34524 and H-2-34525.

The line to B-12 crib should be cut and the line capped with a plastic cap cemented on the pipe and concrete poured around the end of the pipe. This may be done as soon as material is available.

3. The ground stabilization program should probably be put off until April or May to allow for further settling to avoid repetition of the ground stabilization effort.

The ground stabilization effort should cover an area 60 feet wide, centered on the line running through the test wells. The area should extend 30 feet beyond the outer test wells. This area will be 60 feet wide and 181 feet long, or 10,860 square feet.

The area should be leveled and smoothed, all vegetation removed and any sharp items removed. Two to three inches of sand should be spread over the area. After this, 10 mil plastic sheet should be laid out and weighted down with soil. A solid soil sterilant such as boric acid-type like Ureabor should be sprinkled evenly on top of the plastic. Ureabor can be ordered through Farmer's Exchange in Kennewick. They do not carry it in stock. The area over the plastic should be covered with 18 inches of sand free from any large rocks. Once the sand is laid and leveled, the area should be covered with two-inch minus gravel to a depth of four to six inches.

4. When the soil stabilization is complete, the crib should be marked off with six monuments built according to Hanford Standard AC-5-40. The monuments should be placed at coordinates: N42964XW55030, N42964XW54970, N43056XW54970, N4305XW55030, N43144XW55030, and N43144XW54970.

9 2 1 2 5 1 3 3 0

A. J. Low  
Page 3  
January 22, 1974

The brass medallions for these posts can be obtained through the Peterson Pattern Works.

Once the posts are in place, Harold Maxfield will stamp the required numbers on the posts.

5. At this time, a radiation survey should be made of the area. The survey information should be recorded on BD-6700-091.1 (7-71).
6. The normal radiation chain fence with radiation signs on posts should be repaired to good condition if it has been damaged during any of the above work.
7. The information required on BD-6700-091.1 (7-71), "Outdoor Radiation Zone Deactivation and Transfer of Responsibility," should be filled out and routed to mailing list on form.
8. At this time, Technical Services will accept custodianship of the crib.

REP:b1

cc: JD Anderson  
RB Bixler  
DG Harlow  
GL Hanson  
AJ Low  
LM Knights  
RP Knight  
JH Mathis  
WD Schildknecht  
A Smith  
RM Smithers  
File

9 2 1 2 3 1 3 3 1

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Trench (covered)	<u>Past Designation</u> 241-BX-1 Grave 216-BX-1 Trench 216-B-35 Trench	<u>Number</u> 216-B-35
<u>Location</u> 200 East, N. W. Quadrant  250 ft west of 241-BX Tank Farm, 2650 ft north of B-Plant	<u>Service Dates</u> 2/54-3/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45273, W-53850 to N-45273, W-54102	<u>Reference Drawings</u> H-2-2431 SK-2-2408	<u>Elevations</u> Ground 740 ft Water Table 404 ft.(1973) Site Depth 10 ft

Source and Description of Waste

1.06 x 10<sup>6</sup> liters. First cycle supernatant waste from 221-B. High-salt, neutral/basic.

Description of Facility

Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed trench backfilled.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	1.2	1.2
Beta, Ci	1800	<732.0
<sup>90</sup> Sr, Ci	240	130.0
<sup>106</sup> Ru, Ci	230	1.48 x 10 <sup>-5</sup>
<sup>137</sup> Cs, Ci	430	246.0
<sup>60</sup> Co, Ci	0.030	1.27 x 10 <sup>-3</sup>
U, kg	17	16.7

Potential Hazards

Radioactive weed growth;  
Burrowing animals

9 2 1 2 3 1 1 3 3 2

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Trench (covered)	<u>Past Designation</u> 241-BX-2 Grave 216-BX-2 Trench 216-B-36 Trench	<u>Number</u> 216-B-36
<u>Location</u> 200 East, N. W. Quadrant 250 ft west of 241-BX Tank Farm, 2750 ft north of B-Plant	<u>Service Dates</u> 3/54-4/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45323, W-53850 to N-45323, W-54102	<u>Reference Drawings</u> H-2-2431 SK-2-2408	<u>Elevations</u> Ground 740 ft Water Table 404 ft(1973) Site Depth 10 ft
<u>Source and Description of Waste</u> 1.94 x 10 <sup>6</sup> liters. First cycle supernatant waste from 221-B. High-salt, neutral/basic.		
<u>Description of Facility</u> Trench, 250 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed trench backfilled.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.80	0.80
Beta, Ci	3500	<1390.0
<sup>90</sup> Sr, Ci	490	269.0
<sup>106</sup> Ru, Ci	470	3.05 x 10 <sup>-5</sup>
<sup>137</sup> Cs, Ci	770	445.0
<sup>60</sup> Co, Ci	0.070	2.96 x 10 <sup>-3</sup>
U, kg	16	16.0
<u>Potential Hazards</u> Radioactive weed growth; Burrowing animals		

9 2 1 2 3 3 1 3 3 3

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Trench (covered)		<u>Past Designation</u> 241-BX-3 Grave 216-BX-3 Trench 216-B-37 Trench		<u>Number</u> 216-B-37
<u>Location</u> 200 East, N. W. Quadrant  250 ft west of 241-BX Tank Farm, 2850 ft north of B-Plant			<u>Service Dates</u> 8/54-8/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45413, W-53850 to N-45413, W-54102		<u>Reference Drawings</u> H-2-2431 SK-2-2408		<u>Elevations</u> Ground 663 ft Water Table 404 ft(1973) Site Depth 10 ft
<u>Source and Description of Waste</u>  4.32 x 10 <sup>6</sup> liters. First cycle bottoms waste from the waste evaporator in 242-B. High-salt, neutral/basic.				
<u>Description of Facility</u> Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed trench backfilled.				
<u>Radionuclide Content</u> (calculated from discharge data)				
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
	Pu, g	2.0	2.0	
	Beta, Ci	7000	<3440.0	
	<sup>90</sup> Sr, Ci	16	8.87	
	<sup>106</sup> Ru, Ci	500	3.23 x 10 <sup>-5</sup>	
	<sup>137</sup> Cs, Ci	3100	1780.0	
	<sup>60</sup> Co, Ci	1.0	4.22 x 10 <sup>-2</sup>	
	U, kg	3.6	3.63	
<u>Potential Hazards</u>  Radioactive weed growth; Burrowing animals				

9 2 1 2 5 3 1 3 3 4

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Trench (covered)	<u>Past Designation</u> 241-BX-4 Grave 216-BX-4 Trench 216-B-38 Trench	<u>Number</u> 216-B-38
<u>Location</u> 200 East, N. W. Quadrant 250 ft west of 241-BX Tank Farm, 2950 ft north of B-Plant	<u>Service Dates</u> 7/54-8/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45503, W-53850 to N-45503, W-54102	<u>Reference Drawings</u> H-2-2431 SK-2-2408	<u>Elevations</u> Ground 660 ft Water Table 404 ft(1973) <u>Site Depth</u> 10 ft
<u>Source and Description of Waste</u> 1.43 x 10 <sup>6</sup> liters. First cycle supernatant waste from 221-B. High-salt, neutral/basic.		
<u>Description of Facility</u> Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed and trench backfilled.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	1.2	1.20
Beta, Ci	5800	<2610.0
<sup>90</sup> Sr, Ci	1900	1030.0
<sup>106</sup> Ru, Ci	560	3.62 x 10 <sup>-5</sup>
<sup>137</sup> Cs, Ci	510	292.0
<sup>60</sup> Co, Ci	<0.06	< 2.53 x 10 <sup>-3</sup>
U, kg	42	42.4
<u>Potential Hazards</u> Radioactive weed growth; Burrowing animals		

9 2 1 2 5 9 1 3 0 5

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Trench (covered)		<u>Past Designation</u> 241-BX-5 Grave 216-BX-5 Trench 216-B-39 Trench		<u>Number</u> 216-B-39
<u>Location</u> 200 East, N. W. Quadrant 250 ft west of 241-BX Tank Farm, 3050 ft north of B-Plant. East of 218-E-10 Indust. Burial Grounds.			<u>Service Dates</u> 12/53-11/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45593, W-53850 to N-45593, W-54102		<u>Reference Drawings</u> H-2-2431 SK-2-2408		<u>Elevations</u> Ground 650 ft Water Table 404 ft(1973) Site Depth 10 ft
<u>Source and Description of Waste</u> 1.47 x 10 <sup>6</sup> liters. First cycle supernatant waste from 221-B. High-salt, neutral/basic.				
<u>Description of Facility</u> Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed and trench backfilled.				
<u>Radionuclide Content</u> (calculated from discharge data)				
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
	Pu, g	1.5	1.51	
	Beta, Ci	1100	<514.0	
	<sup>90</sup> Sr, Ci	23	12.5	
	<sup>106</sup> Ru, Ci	65	2.69 x 10 <sup>-6</sup>	
	<sup>137</sup> Cs, Ci	450	255.0	
	<sup>60</sup> Co, Ci	<0.010	< 3.92 x 10 <sup>-2</sup>	
	U, kg	5.8	5.80	
<u>Potential Hazards</u> Radioactive weed growth; Burrowing animals				

9 2 1 2 3 8 1 3 3 6

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Trench (covered)	<u>Past Designation</u> 241-BX-6 Grave 216-BX-6 Trench 216-B-40 Trench	<u>Number</u> 216-B-40
<u>Location</u> 200 East, N. W. Quadrant 250 ft west of 241-BY Tank Farm, 3150 ft north of B-Plant. East of 218-E-10 Indust. Burial Grounds.	<u>Service Dates</u> 4/54-7/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45683, W-53850 to N-45683, W-54102	<u>Reference Drawings</u> H-2-2431 SK-2-2408	<u>Elevations</u> Ground 650 ft Water Table 404 ft(1973) Site Depth 10 ft
<u>Source and Description of Waste</u> 1.64 x 10 <sup>6</sup> liters. First cycle supernatant waste from 221-B. High-salt, neutral/basic.		
<u>Description of Facility</u> Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed and trench backfilled.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	1.0	1.0
Beta, Ci	1800	<700.0
<sup>90</sup> Sr, Ci	280	155.0
<sup>106</sup> Ru, Ci	240	1.58 x 10 <sup>-5</sup>
<sup>137</sup> Cs, Ci	350	203.0
<sup>60</sup> Co, Ci	<0.020	< 8.45 x 10 <sup>-4</sup>
U, kg	35.	35.0
<u>Potential Hazards</u> Radioactive weed growth; Burrowing animals		

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CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Trench (covered)	<u>Past Designation</u> 241-BX-7 Grave 216-BX-7 Trench 216-B-41 Trench	<u>Number</u> 216-B-41
<u>Location</u> 200 East, N. W. Quadrant 250 ft west of 241-BY Tank Farm, 3250 ft north of B-Plant. 218-B-10 Industrial Burial Grounds East of	<u>Service Dates</u> 11/54-11/54	<u>Status</u> Inactive
<u>Site Coordinates</u> N-45573, W-53850 to N-45573, W-54102	<u>Reference Drawings</u> H-2-2431 SK-2-2408	<u>Elevations</u> Ground 650 ft Water Table 404 ft(1973) Site Depth 10 ft
<u>Source and Description of Waste</u> 1.44 x 10 <sup>6</sup> liters. First cycle supernatant waste from 221-B. High-salt, neutral/basic.		
<u>Description of Facility</u> Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed and trench backfilled.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.30	0.30
Beta, Ci	2100	<1040.0
<sup>90</sup> Sr, Ci	47	26.1
<sup>106</sup> Ru, Ci	130	8.47 x 10 <sup>-6</sup>
<sup>137</sup> Cs, Ci	890	512.0
<sup>60</sup> Co, Ci	<0.010	< 4.22 x 10 <sup>-4</sup>
U, kg	7.5	7.5
<u>Potential Hazards</u> Radioactive weed growth; Burrowing animals		

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u>  Trench (covered)		<u>Past Designation</u> 241-BX-8 Grave 216-BX-8 Trench 216-B-42 Trench		<u>Number</u>  216-B-42
<u>Location</u> 200 East, N.W. Quadrant  750 ft west of 241-BX Tank Farm, 2650 ft north of B-Plant, East of 218-E-10 Industrial Burial Grounds.			<u>Service Dates</u>  1/55-2/55	<u>Status</u>  Inactive
<u>Site Coordinates</u>  N-45273, W-54152 N-45273, W-54404		<u>Reference Drawings</u>  H-2-2431 SK-2-2408		<u>Elevations</u> Ground 671 ft Water Table 404 ft(1973) <u>Site Depth</u> 10 ft
<u>Source and Description of Waste</u>  1.50 x 10 <sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.				
<u>Description of Facility</u>  Trench, 252 ft x 10 ft bottom surface. Deactivation: Overground pipeline removed and trench backfilled.				
<u>Radionuclide Content</u> (calculated from discharge data)				
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
	Pu, g	10	10.0	
	Beta, Ci	5800	<1360.0	
	<sup>90</sup> Sr, Ci	1100	625.0	
	<sup>106</sup> Ru, Ci	1500	1.93 x 10 <sup>-4</sup>	
	<sup>137</sup> Cs, Ci	96	56.5	
	<sup>60</sup> Co, Ci	10	0.482	
	U, kg	680	680.0	
<u>Potential Hazards</u>  Radioactive weed growth; Burrowing animals				

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> 216-BY-1 Cavern 216-BY-1 Crib	<u>Number</u> 216-B-43
<u>Location</u> 200 East, N. W. Quadrant 200 ft north of 241-BY Tank Farm, 450 ft south of 12th St.		<u>Service Dates</u> 11/54-11/54	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-46332, W-53355	<u>Reference Drawings</u> H-2-2603 H-2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) <u>Site Depth</u> 14 ft	
<u>Source and Description of Waste</u>  2.1 x 10 <sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.			
<u>Description of Facility</u> Crib, 30 ft x 30 ft bottom dimensions, concrete slab roof. Deactivation: Pipeline to the crib was blanked when the crib reached its specific retention capacity.			
<u>Radionuclide Content</u> (calculated from discharge data)			
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
Pu, g	0.5	0.50	
Beta, Ci	3500	<1880.0	
<sup>90</sup> Sr, Ci	1400	776.0	
<sup>106</sup> Ru, Ci	50	3.23 x 10 <sup>-6</sup>	
<sup>137</sup> Cs, Ci	300	173.0	
<sup>60</sup> Co, Ci	1.0	4.22 x 10 <sup>-2</sup>	
U, kg	14	13.6	
<u>Site Characterization Status</u>  The 216-B-43 Crib is the first in a series of seven cribs north of the 241-BY Tank Farm that received U-Plant high-salt, scavenged waste. These cribs were in service from December 1954 to December 1955 and received a total of 3.4 x 10 <sup>7</sup> liters of waste containing 4.1 x 10 <sup>5</sup> gross beta curies.			

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216-B-43 continuedSite Char. Status

Four wells were drilled in the vicinity of the BY cribs in 1966 to determine the distribution of radionuclides below these cribs. Well E33-2A drilled at the edge of the 216-B-45 Crib showed the highest  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  concentrations. Cesium-137 was first detected at 17 ft (approximate crib bottom) at a concentration of  $18.4 \mu\text{Ci/g}$ . The  $^{137}\text{Cs}$  concentration increases to a maximum of  $28.7 \mu\text{Ci/g}$  at 20 ft beneath ground surface then rapidly decreases with depth. Several additional concentration peaks occur at lower depths in the soil column but only on the order of 0.001 to 0.0001 of the peak concentration. Strontium-90 concentrations follow the same general pattern with a maximum of  $22 \mu\text{Ci/g}$  at 25 ft. Samples below 75 ft contained less than  $2 \times 10^{-3} \mu\text{Ci/g}$ . Data from the other wells showed the same general trend but concentrations were less. It was evident that the quantity of long-lived activity subject to leaching by a moderate rise in the water table is relatively small.

History

The 216-B-43 through 50 cribs are located in a common radiation zone under the hill directly north of the 241-BY Tank Farm. On September 15, 1955 approximately 11,000 gallons of scavenged supernatant radioactive waste overflowed a flush tank and ran over the ground surface near the 216-B-43 Crib. Most of the waste involved was scraped from the ground and pushed into a shallow hole just south and east of the B-43 Crib. It was then covered with 2 feet of clean soil.

Routine radiation surveys in the early 1970's found radioactive Russian thistle to be growing over the old spill site and other ground surfaces within the radiation zone. Remedial action, which reduced the size of the radiation zone by 50 percent, was started in 1975 and completed in November, 1977. It consisted of the following work:

- o All crib vent risers were cut and blanked off approximately 18" below ground surface.
- o The radioactive buried spill site was removed and all ground surfaces decontaminated by removing radioactive surface soils.
- o The ground surface was smoothed off and covered with a 6" sand pad.
- o Two test strips of ground surface, 10 ft x 100 ft, over the cribs were treated with a tracer element, lithium chloride, to help in determining the effectiveness of the plastic root barrier against future root penetrations.
- o A herbicide, urea borate in dry form, was spread over the radiation zone ground surface at the rate of 500 pounds per acre.

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216-B-43 continued

History

- o The surface above and near the cribs was covered with a sheet of 10 mil plastic.
- o The plastic was covered with 6" of sand for a padding against puncture by rocks or other sharp objects, then covered by 12" of top soil.
- o Monitoring well casings were all extended so as to protrude from 12 to 18 inches above ground level.
- o The ground surface was fertilized with 60 pounds of 16-20-0 fertilizer per acre and seeded over the plastic area with 20 lbs. per acre of cheatgrass, and over the remainder of the ground surface of the radiation zone with cheatgrass and Siberian wheatgrass.

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u> 216-BY-2 Cavern 216-BY-1 Crib	<u>Number</u> 216-B-44
<u>Location</u> 200 East, N. W. Quadrant  300 ft north of 241-BY Tank Farm, 350 ft south of 12th St.	<u>Service Dates</u> 11/54-3/55	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-46417, W-53355	<u>Reference Drawings</u> H-2-2603 H -2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) Site Depth 14 ft

Source and Description of Waste

5.6 x 10<sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.

Description of Facility

One crib, gravel filled, 30 ft x 30 ft bottom surface area, constructed of a concrete slab supported by vertical sections of concrete pipe. Deactivation: The pipeline to the crib was valved out when the specific retention capacity was reached.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	15	15.0
Beta, Ci	2.2 x 10 <sup>4</sup>	< 4020.0
<sup>90</sup> Sr, Ci	2900	1620.0
<sup>106</sup> Ru, Ci	5500	6.53 x 10 <sup>-4</sup>
<sup>137</sup> Cs, Ci	700	409.0
<sup>60</sup> Co, Ci	5.0	0.228
U, kg	5.3	2.27

Site Characterization Status and History

Refer to 216-B-43

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> 216-BY-3 Cavern 216-BY-3 Crib	<u>Number</u> 216-B-45
<u>Location</u> 200 East, N. W. Quadrant 400 ft north of 241-BY Tank Farm, 250 ft south of 12th St.		<u>Service Dates</u> 4/55-6/55	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-46502, W-53355	<u>Reference Drawings</u> H-2-2603 H.-2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) Site Depth 14 ft	
<u>Source and Description of Waste</u> 4.9 x 10 <sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.			
<u>Description of Facility</u> One crib, gravel filled, 30 ft x 30 ft bottom surface area, constructed of a concrete slab supported by vertical sections of concrete pipe. Deactivation: The pipeline to the crib was valved out when the specific retention capacity was reached.			
<u>Radionuclide Content</u> (calculated from discharge data)			
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
Pu, g	10	10.0	
Beta, Ci	5.3 x 10 <sup>4</sup>	< 4880.0	
<sup>90</sup> Sr, Ci	2800	1590.0	
<sup>106</sup> Ru, Ci	1.7 x 10 <sup>4</sup>	2.19 x 10 <sup>-3</sup>	
<sup>137</sup> Cs, Ci	1500	884.0	
<sup>60</sup> Co, Ci	5.0	0.241	
U, kg	6.8	6.8	
<u>Site Characterization Status and History</u> Refer to 216-B-43			

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CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u> 216-BY-4 Cavern 216-BY-4 Crib	<u>Number</u> 216-B-46
<u>Location</u> 200 East, N. W. Quadrant 500 ft north of 241-BY Tank Farm, 150 ft south of 12th St.	<u>Service Dates</u> 9/55-12/55	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-46587, W-53355	<u>Reference Drawings</u> H-2-2603 H-2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) Site Depth 14 ft
<u>Source and Description of Waste</u> 6.7 x 10 <sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.		
<u>Description of Facility</u> One crib, gravel filled, 30 ft x 30 ft bottom surface area, constructed of a concrete slab supported by vertical sections of concrete pipe. Deactivation: The pipeline to the crib was valved out when the specific retention capacity was reached.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	20	20.0
Beta, Ci	1.2 x 10 <sup>5</sup>	<1960.0
<sup>90</sup> Sr, Ci	1500	852.0
<sup>106</sup> Ru, Ci	2.8 x 10 <sup>4</sup>	3.61 x 10 <sup>-3</sup>
<sup>137</sup> Cs, Ci	200	118.0
<sup>60</sup> Co, Ci	5	0.241
U, kg	190	191.0
<u>Site Characterization Status and History</u> Refer to 216-B-43		

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> 216-BY-5 Cavern 216-BY-5 Crib	<u>Number</u> 216-B-47
<u>Location</u> 200 East, N. W. Quadrant  200 ft north of 241-BY Tank Farm, 450 ft south of 12th St.		<u>Service Dates</u> 9/55-9/55	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-46332, W-53499	<u>Reference Drawings</u> H-2-2603 H-2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) Site Depth 14 ft	
<u>Source and Description of Waste</u>  3.7 x 10 <sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.			
<u>Description of Facility</u> One crib, gravel filled, 30 ft x 30 ft bottom surface area, constructed of a concrete slab supported by vertical sections of concrete pipe. Deactivation: The pipeline to the crib was valved out when the specific retention capacity was reached.			
<u>Radionuclide Content (calculated from discharge data)</u>			
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
	Pu, g	5.0	5.0
	Beta, Ci	4.5 x 10 <sup>4</sup>	<877.0
	<sup>90</sup> Sr, Ci	620	352.0
	<sup>106</sup> Ru, Ci	1.9 x 10 <sup>4</sup>	2.45 x 10 <sup>-3</sup>
	<sup>137</sup> Cs, Ci	150	88.4
	<sup>60</sup> Co, Ci	1.0	4.82 x 10 <sup>-2</sup>
	U, kg	6.8	6.8
<u>Site Characterization Status and History.</u>  Refer to 216-B-43			

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CONTAMINATED LIQUID DISPOSAL SITES

- I. NW

<u>Name/Type of Facility</u> Crib	<u>Fast Designation</u> 216-BY-6 Cavern 216-BY-6 Crib	<u>Number</u> 216-B-48
<u>Location</u> 200 East, N. W. Quadrant 300 ft north of 241-BY Tank Farm, 350 ft south of 12th St.	<u>Service Dates</u> 11/55-7/57	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-46417, W-53499	<u>Reference Drawings</u> H-2-2603 H-2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) Site Depth 14 ft

Source and Description of Waste

4.7 x 10<sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.

Description of Facility

One crib, gravel filled, 30 ft x 30 ft bottom surface area, constructed of a concrete slab supported by vertical sections of concrete pipe. Deactivation: The pipeline to the crib was valved out when the specific retention capacity was reached.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	5.0	5.0
Beta, Ci	6.1 x 10 <sup>4</sup>	<2010.0
<sup>90</sup> Sr, Ci	1300	739.0
<sup>106</sup> Ru, Ci	6800	8.76 x 10 <sup>-4</sup>
<sup>137</sup> Cs, Ci	450	265.0
<sup>60</sup> Co, Ci	1.0	4.82 x 10 <sup>-2</sup>
U, kg	2.3	2.27

Site Characterization Status and History

Refer to 216-B-43

9 2 1 2 5 1 3 9 7

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Crib		<u>Past Designation</u> 216-BY-7 Cavern 216-BY-7 Crib		<u>Number</u> 216-B-49
<u>Location</u> 200 East, N. W. Quadrant  400 ft north of 241-BY Tank Farm, 250 ft south of 12th St.			<u>Service Dates</u> 11/55-12/57	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-46502, W-53499		<u>Reference Drawings</u> H-2-2603 H-2-2605	<u>Elevations</u> Ground 623 ft Water Table 406 ft(1973) Site Depth 14 ft	
<u>Source and Description of Waste</u>  6.7 x 10 <sup>6</sup> liters. Scavenged waste from uranium recovery (TBP solvent extraction) process in 221-U. High-salt, neutral/basic.				
<u>Description of Facility</u> One crib, gravel filled, 30 ft x 30 ft bottom surface area, constructed of a concrete slab supported by vertical sections of concrete pipe. Deactivation: The pipeline to the crib was valved out when the specific retention capacity was reached.				
<u>Radionuclide Content</u> (calculated from discharge data)				
	<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>	
	Pu, g	15	15.0	
	Beta, Ci	1.1 x 10 <sup>5</sup>	<3560.0	
	<sup>90</sup> Sr, Ci	2700	1530.0	
	<sup>106</sup> Ru, Ci	2.4 x 10 <sup>4</sup>	3.09 x 10 <sup>-3</sup>	
	<sup>137</sup> Cs, Ci	410	242.0	
	<sup>60</sup> Co, Ci	5.0	0.241	
	U, kg	320	318.0	
<u>Site Characterization Status and History</u>  Refer to 216-B-43				

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CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u> 216-BY-8 Cavern 216-BY-8 Crib	<u>Number</u> 216-B-50
<u>Location</u> 200 East, N. W. Quadrant ~700 ft north of 241-BY Tank Farm ~500 ft west of Baltimore Ave.	<u>Service Dates</u> 1/65-1/74	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-46502, W-53499	<u>Reference Drawings</u> H-2-2603 H-2-2605	<u>Elevations</u> Ground 622 ft Water Table 404 ft Site Depth 14 ft
<u>Source and Description of Waste</u> 5.9 x 10 <sup>7</sup> liters. Waste storage tank condensate from the ITS #1 unit in the 241-BY Tank Farm.		
<u>Description of Facility</u> Crib, concrete slab over pipe, 30 ft x 30 ft bottom dimension.		
<u>Radionuclide Content (calculated from discharge data)</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	<2.4 x 10 <sup>-1</sup>	< 0.239
Beta, Ci	241	< 140.0
<sup>90</sup> Sr, Ci	<6	< 4.58
<sup>106</sup> Ru, Ci	11	5.05 x 10 <sup>-3</sup>
<sup>137</sup> Cs, Ci	88	67.8
<sup>60</sup> Co, Ci	<3.3 x 10 <sup>-1</sup>	< 7.61 x 10 <sup>-2</sup>
U, kg	<2.9 x 10 <sup>-1</sup>	< 0.285
<u>Site Characterization Status and History</u> Refer to 216-B-43 for History		

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CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Crib	<u>Past Designation</u>	<u>Number</u> 216-B-55
<u>Location</u> 200 East, N.W. Quadrant Approximately 800 ft west of 221-B	<u>Service Dates</u> 9/67-	<u>Status</u> Active
<u>Site Coordinates</u> N-42497, W-54810 to N-42920, W-55431	<u>Reference Drawings</u> H-2-60330 SK-2-19674	<u>Elevations</u> Ground 700 ft Water Table 400 ft(1973) Site Depth 6-8 ft
<u>Source and Description of Waste</u> 6.0 x 10 <sup>8</sup> liters as of 12/31/73. Steam condensate from 221-B. Low-salt, neutral/basic.		
<u>Description of Facility</u> Crib, gravel-filled, 750 ft x 10 ft bottom dimension.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	<0.43	< 0.552
Beta, Ci	1.4 x 10 <sup>2</sup>	<54.5
<sup>90</sup> Sr, Ci	<7.2 x 10 <sup>0</sup>	< 9.53
<sup>106</sup> Ru, Ci	<1.4 x 10 <sup>0</sup>	< 0.19
<sup>137</sup> Cs, Ci	2.0 x 10 <sup>1</sup>	17.7
<sup>60</sup> Co, Ci	<3.2 x 10 <sup>-1</sup>	< 0.262
U, kg	<3.9 x 10 <sup>0</sup>	< 6.71

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CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u>	<u>Fast Designation</u>	<u>Number</u>
Crib	216-B-57	216-B-57
<u>Location</u> 200 East, N.W. Quadrant Near the northwest corner of 241-BY Tank Farm	<u>Service Dates</u> 2/68-6/73	<u>Status</u> Inactive
<u>Site Coordinates</u> N-46160, W-53775 N-46360, W-53775	<u>Reference Drawings</u> H-2-62406	<u>Elevations</u> Ground 625 ft Water Table 394 ft Site Depth 10 ft(minimum)
<u>Source and Description of Waste</u>		
8.4 x 10 <sup>7</sup> liters (as of 12/31/73). Waste storage tank condensate from the ITS #2 Unit in the 241-BY Tank Farm.		
<u>Description of Facility</u>		
Crib, gravel-filled, 200 ft x 15 ft bottom dimension.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	< 1.9 x 10 <sup>-1</sup>	< 0.187
Beta, Ci	8.4 x 10 <sup>2</sup>	< 580.0
<sup>90</sup> Sr, Ci	3.2 x 10 <sup>0</sup>	2.47
<sup>106</sup> Ru, Ci	8.7 x 10 <sup>0</sup>	2.23 x 10 <sup>-2</sup>
<sup>137</sup> Cs, Ci	3.7 x 10 <sup>2</sup>	299.0
<sup>60</sup> Co, Ci	1.4 x 10 <sup>-1</sup>	< 3.94
U, kg	8.9 x 10 <sup>-1</sup>	< 0.89

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CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Crib	<u>Fast Designation</u> 216-B-60 Crib	<u>Number</u> 216-B-60
<u>Location</u> 200 East, N. W. Quadrant  The crib is under the floor of the north-east corner of the 225-B Building.	<u>Service Dates</u> 11/67-11/67	<u>Status</u> Inactive
<u>Site Coordinates (Approximate)</u> N-42573, W-54178 to N-42583, W-54178	<u>Reference Drawings</u> H-2-34303	<u>Elevations</u> Ground 690 ft Water Table 405 ft(1973) Site Depth 40 ft
<u>Source and Description of Waste</u>  1.89 x 10 <sup>4</sup> liters. Cell cleanout solid and liquid waste from the 24-inch sewer in 221-B. Low-salt, neutral/basic.		
<u>Description of Facility</u>  Two cribs, 8-ft diameter caissons, 16-ft long, bottom at depth of 40 ft. Deactivation: Tops of the caissons were grouted with concrete to seal in the waste; the 24-in. sewer was plugged at the west end of 221-B. The site is now (5/75) covered by the 225-B Encapsulation Facility.		
<u>Radionuclide Content (calculated from discharge data).</u>		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	0.080	0.08
Beta, Ci	1600	<19.9
<sup>137</sup> Cs, Ci	8.0	6.21
U, kg	720	717.0

9212511402

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u>  Crib	<u>Past Designation</u>  216-B-61 Crib	<u>Number</u>  216-B-61
<u>Location</u> 200 East, N. W. Quadrant ~500 ft northwest of 241-BY Tank Farm ~200 ft south of 12th Street	<u>Service Dates</u>  Never used	<u>Status</u>  Inactive
<u>Site Coordinates</u> (Approximate)  N-46650, W-54175 to N-46650, W-54350	<u>Reference Drawings</u>  H-2-34522 H-2-34523	<u>Elevations</u>  Ground            663 ft Water Table     404 ft <u>Site Depth</u>
<u>Source and Description of Waste</u>  Future use: To receive waste storage tank condensate from ITS #1 Unit in the 241-BY Tank Farm.		
<u>Description of Facility</u>  Gravel-filled, 1750 ft <sup>2</sup> bottom surface area.		

9 2 1 2 5 1 4 0 3

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u>	<u>Past Designation</u>	<u>Number</u>
Crib	216-B-62	216-B-62
<u>Location</u> 200 East, N.W. Quadrant Approximately 1500 ft northwest of 221-B	<u>Service Dates</u> 11/73-	<u>Status</u> Active
<u>Site Coordinates</u> N-43580, W-54995 to N-43934, W-55349	<u>Reference Drawings</u> H-2-34524 H-2-34525	<u>Elevations</u> Ground 697 ft Water Table 404 ft (1973) Site Depth ~10 ft
<u>Source and Description of Waste</u> 1.9 x 10 <sup>6</sup> liters as of 12/31/73. B Plant process condensate.		
<u>Description of Facility</u> Crib, gravel-filled. 500 ft x 10 ft bottom dimension.		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 6/30/78</u>
Pu, g	8.4 x 10 <sup>-4</sup>	0.379
Beta, Ci	1.9	<140.0
<sup>90</sup> Sr, Ci	0.31	19.1
<sup>106</sup> Ru, Ci	<1.8 x 10 <sup>-2</sup>	< 0.629
<sup>137</sup> Cs, Ci	0.33	33.9
<sup>60</sup> Co, Ci	<8.3 x 10 <sup>-4</sup>	<449.0
U, kg	<1.9 x 10 <sup>-2</sup>	< 2.75

9 2 1 2 5 1 4 0 4

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Burial Ground	<u>Past Designation</u> 300 East/ Industrial Waste No. 02	<u>Number</u> 218-E-2
<u>Location</u> 200 East, N.W. Quadrant About 2,000 ft north of B-Plant.	<u>Service Dates</u> 1945-1953	<u>Status</u> Inactive
<u>Site Coordinates</u> N-44827, W-53426 N-44395, W-53426 N-44395, W-53950 N-44827, W-53950	<u>Reference Drawings</u> H-2-2479 H-2-55534	<u>Elevations</u> Ground 669 ft Water Table 404 ft(1973) Site Depth 15 ft
<u>Source and Description of Waste</u> Failed equipment and industrial waste (approximately $3.2 \times 10^5$ ft <sup>3</sup> ).		
<u>Description of Facility</u> 2.3 acres. Ref: Ltr. - Rockwell 1/09/80 #65421-80-005 Backfilled trenches. Surface area $2.98 \times 10^5$ ft <sup>2</sup> .		
<u>Radionuclide Content</u> (calculated from discharge data)		
<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$3.0 \times 10^5$	$3.0 \times 10^5$
Pu, g	$8.0 \times 10^2$	$8.0 \times 10^2$
Total		
Beta, Ci	$2.5 \times 10^4$	$1.06 \times 10^3$
<sup>90</sup> Sr, Ci	$5.0 \times 10^2$	253.0
<sup>106</sup> Ru, Ci	$1.1 \times 10^3$	$1.12 \times 10^{-5}$
<sup>137</sup> Cs, Ci	$5.3 \times 10^2$	283.0
<u>NOTE:</u>		
A total of seven burial trenches are shown on print # H-2-2479.		
An inspection of the burial grounds 2/21/78 disclosed some caving over all trenches, and ground surface contamination on a number of tumbleweeds near the north end of 218-E-9.		
Sunken ground surfaces over the centerlines of the various trenches plus the vegetation growth patterns show the true location of the burial trenches in burial grounds E-2, E-5, E-9 to be different than those drawn on Print H-2-55534.		
See Attachments		

9212581405

Burial Ground : 218-E-2

Extensive research work was done during the year 1979 to determine the locations of all burial trenches within the bounds of the 218-E-5, 218-E-5A, 218-E-2 and 218-E-9 Burial Grounds radiation zone. The work included viewing aerial photographs and construction prints, analyzing plant growth patterns, and the load testing of the ground surface.

Four previously unrecorded sites were identified: (See attached map, Figure A.2, Burial Grounds 218-E-2, E-2A, E-5, E-5A, and E-9)

#1 Site Referred to as the 202-A, L-Cell Burial Package. It consisted of four very large burial boxes. The burial location is shown as a 100 foot by 120 foot rectangular area within the 218-E-5A Burial Ground. The D-2 Column from Purex K Cell was also buried here.

#2 Site Multiple trenches running north and south in Burial Ground 218-E-5. It has been stabilized as a single trench.

#4 Site A long trench (423') running east and west along the north side of 218-E-2 Burial Ground.

#5 Site A long trench (423') parallel and adjacent to Site #4 above.

9 2 1 2 5 1 1 4 0 6

Burial Ground: 218-E-2

Fiscal year ground surface stabilization work within the 218-E-2 Burial Ground was done over trenches #3, 4, 5, 6, 7, 8, 9, 10, 11, and 12. (See map attachment.) Trenches 5, 6, 7, 10, and 12 were so close together they were treated as a single work area. Trenches 9 and 11 were also treated as a single work area.

The work consisted of load testing the ground surface for subterranean voids by driving over the ground with a 40-ton vehicle, removing vegetation and radioactive contamination from the ground surface, placing 1 foot of fill dirt over the burial trenches and seeding the prepared surfaces with cheatgrass.

Details of Cheatgrass Seeding

- o Broadcast seed at rate of 20-25 lbs/acre.
- o Cover seed with a drag.
- o Cover with wheat straw mulch at the rate of two tons mulch/acre (approximately 60 bales of straw).
- o Apply amonium sulphate 21-0-0 fertilizer at the rate of 100 to 200 lbs. per acre.
- o Water with water-truck at the rate of 6500 to 7500 gals/acre. Repeat watering after one week.

The ground surfaces between the seeded trenches were stabilized against weather erosion with a three- to six-inch covering of bank run gravel. The gravel covering will be treated with ureabor herbicide at a rate of 500 lbs/acre.

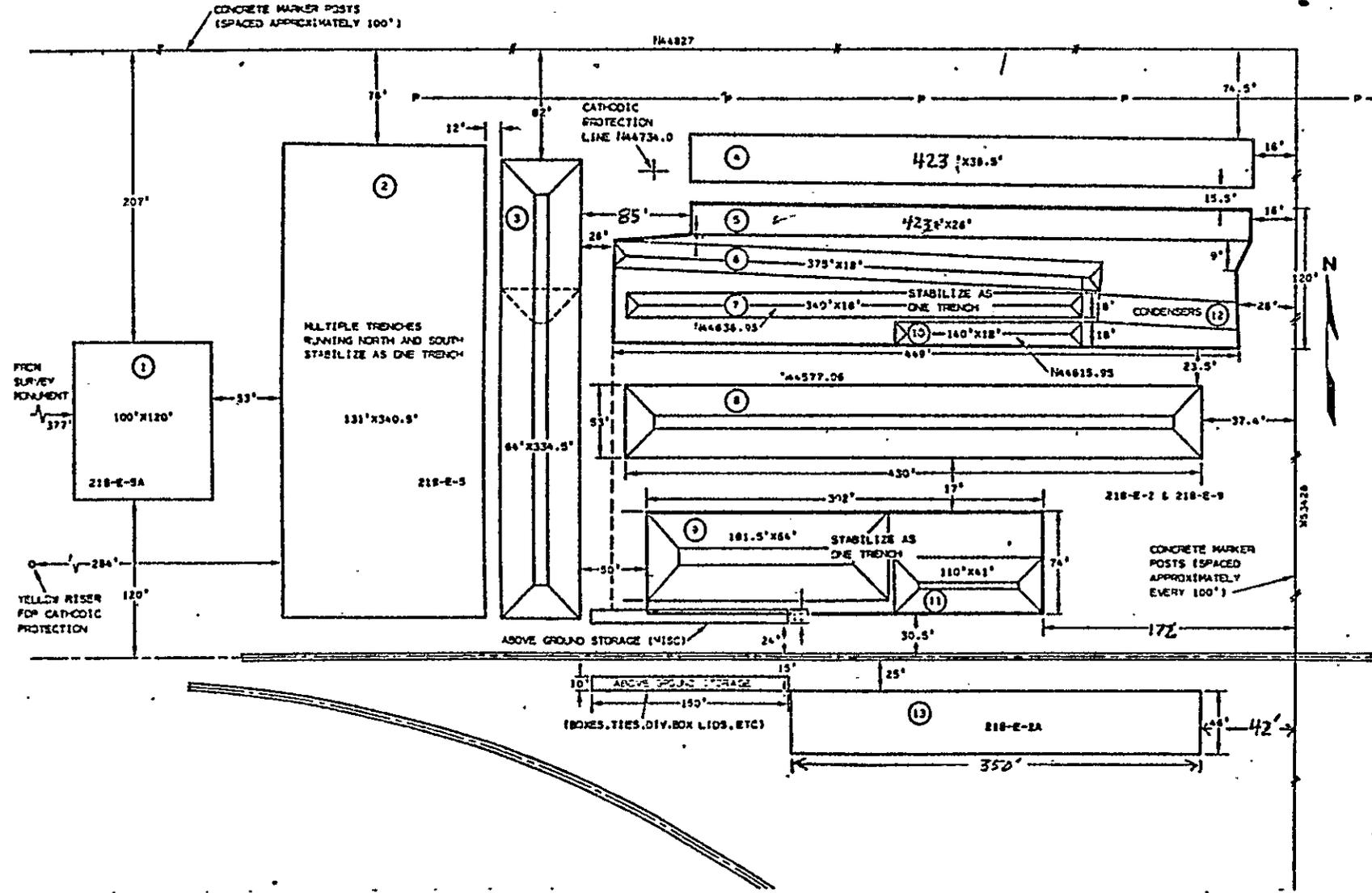
A total of 9,000 yds<sup>3</sup> of dirt was used in the 218-E-5, 5A, 2, and 9 Burial Ground complex for fill material and seed bedding. Three thousand yards of gravel were spread between the trenches.

9 2 1 2 5 8 1 4 0 7

TABLE 4 218-E-2, 2A, 5, 5A & 9 STATUS

TRENCH NO.	SOIL DEPTH (NO BIOBARRIERS)	REVEGETATION SPECIES
1	1'	To Be Completed FY '80
2	1'	To Be Completed BY '80
3	1'	Cheatgrass
4	1'	Cheatgrass
5, 6, 7, 10, 12	1'	Cheatgrass
8	1'	Cheatgrass
9, 11	1'	Cheatgrass
13	3"-6"	To Be Completed FY '80

9 2 1 2 5 1 1 4 0 8



Reference: H-2-2479

FIGURE A.2: BURIAL GROUNDS 218-E-2, 2A, 5, 5A, AND 9

A-4400 072 1 (M 3 7M)

CONTAMINATED LIQUID DISPOSAL SITES

I. NW

<u>Name/Type of Facility</u> Storage Site	<u>Past Designation</u> Regulated Equipment Storage Site No. 02A	<u>Number</u> 218-E-2A
<u>Location</u> 200 East, N. W. Quadrant About 14,00 ft north of B-Plant.	<u>Service Dates</u> Unknown	<u>Status</u> Inactive
<u>Site Coordinates</u> N-43827, W-53426 N-44395, W-53426 N-44395, W-54225	<u>Reference Drawings</u> H-2-34761	<u>Elevations</u> Ground 681 ft Water Table 405 ft(1973) Site Depth NA
<u>Source and Description of Waste</u> Regulated equipment.		
<u>Description of Facility</u> Aboveground storage.		
<u>Radionuclide Content</u> (calculated from discharge data) NA		
<u>NOTE:</u> Print H-2-2479 shows the outline of a trench 46 feet wide along the north boundary of 218E-2A (a later designation) Burial Ground or above ground storage site.  Print H-2-55534 also shows this trench at coordinates N-44332, W-53812, N-44332, W-53468; but the trench is improperly drawn on the print. The centerline N-44332 is shown south of a post at N-44327. However, it still falls within the area later designated as the 216-E-2A Burial Ground.  There are no records or burial inventories available at this writing to indicate the 216-E-2A site was ever used as a burial ground. It more properly should be designated as a regulated equipment above ground storage site. The 218-E-2A designation should be dropped.  2/21/78 - An inspection of the burial trench in 218-E-2A, south of the railroad track, disclosed a number of sink holes along the center line of the trench, indicating the trench had been dug and used for dry waste burials.		
(See Attachment)		

9 2 1 2 5 9 1 4 1 0

Burial Ground: 218-E-2A

During the summer of 1979, a number of loads of dirt were hauled in and dumped over the burial trench in 218-E-2A Burial Ground. This fill material brought the surface of the trench to ground level. Future plans for fiscal year 1980 include stabilization of the ground surface of this trench.

9212581411

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. NW

<u>Name/Type of Facility</u> Burial Ground	<u>Past Designation</u> 200 East/Minor Construction No. 4	<u>Number</u> 218-E-4
<u>Location</u> 200 East, N.W. Quadrant About 1,300 ft north of B-Plant.	<u>Service Dates</u> 2/55-1956	<u>Status</u> Inactive
<u>Site Coordinates</u> N-43757, W-53575 N-43666, W-53700 N-44175, W-54170 N-44300, W-54150	<u>Reference Drawings</u> H-2-31269 H-2-34761	<u>Elevations</u> Ground ~681 ft Water Table ~404 ft (1973) Site Depth NA

Source and Description of Waste

Repair and construction waste (approximately  $5.6 \times 10^4$  ft<sup>3</sup>).

Description of Facility

Backfilled trenches, surface area:  $1.56 \times 10^5$  ft<sup>2</sup>.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$1.0 \times 10^3$	$1.0 \times 10^3$
Pu, g	10	10.
Total Beta, Ci	10	4.67
<sup>90</sup> Sr, Ci	0.20	0.112
<sup>106</sup> Ru, Ci	0.43	$4.66 \times 10^{-8}$
<sup>137</sup> Cs, Ci	0.21	0.124

NOTE:

The number of trenches is not known.

9212581412

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Burial Ground	<u>Last Designation</u> 200 East/Industrial Waste No. 05	<u>Number</u> 218-E-5
<u>Location</u> 200 East, N.W. Quadrant About 1,850 ft north of B Plant.	<u>Service Dates</u> 1954, 1955, 1956	<u>Status</u> Inactive
<u>Site Coordinates</u> N-44827, W-53950 N-44400, W-53950 N-44400, W-54177 N-44827, W-54177	<u>Reference Drawings</u> H-2-31269 H-2-55534 H-2-34761 H-2-2479	<u>Elevations</u> Ground 671 ft Water Table 404 ft(1973) Site Depth 15 ft

Source and Description of Waste

Failed equipment and industrial waste (approximately  $1.1 \times 10^5$  ft<sup>3</sup>).

Description of Facility 2.3 acres. Ref: Ltr. - Rockwell 1/09/80 #65421-80-005

Backfilled trenches, surface area:  $1.02 \times 10^5$  ft<sup>2</sup>.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$1.0 \times 10^5$	$1.2 \times 10^5$
Pu, g	$6.2 \times 10^2$	620.
Total Beta, Ci	$7.5 \times 10^3$	352.0
<sup>90</sup> Sr, Ci	$1.5 \times 10^2$	84.7
<sup>106</sup> Ru, Ci	$3.2 \times 10^2$	$4.65 \times 10^{-5}$
<sup>137</sup> Cs, Ci	$1.6 \times 10^2$	93.8

NOTE:

Print H-2-2479 shows the location of one burial trench having been dug in the 218-E-5 Burial Ground.

The locations of the trenches in this burial ground, as indicated by sink holes and weed growth patterns along the length of the trenches, is different than locations shown on Print H-2-55534.

9 2 1 2 5 1 1 4 1 3

Burial Ground : 218-E-5

Extensive research work was done during the year 1979 to determine the locations of all burial trenches within the bounds of the 218-E-5, 218-E-5A, 218-E-2 and 218-E-9 Burial Grounds radiation zone. The work included viewing aerial photographs and construction prints, analyzing plant growth patterns, and the load testing of the ground surface.

Four previously unrecorded sites were identified: (See attached map, Figure A.2, Burial Grounds 218-E-2, E-2A, E-5, E-5A, and E-9)

#1 Site Referred to as the 202-A, L-Cell Burial Package. It consisted of four very large burial boxes. The burial location is shown as a 100 foot by 120 foot rectangular area within the 218-E-5A Burial Ground. The D-2 Column from Purex K Cell was also buried here.

#2 Site Multiple trenches running north and south in Burial Ground 218-E-5. It has been stabilized as a single trench.

#4 Site A long trench (423') running east and west along the north side of 218-E-2 Burial Ground.

#5 Site A long trench (423') parallel and adjacent to Site #4 above.

9 2 1 2 5 1 1 4 1 4

Burial Ground: 218-E-5

Fiscal year 1979 ground surface stabilization work within the 218-E-5 Burial Ground was confined to a rectangular area 131 feet by 340.5 feet containing multiple burial trenches running north and south.

The work consisted of load testing the ground surface for subterranean voids by driving over the ground with a 40-ton vehicle, marking the site location with steel posts, removing vegetation and radioactive contamination from the ground surface, and establishing a one foot deep soil seed bed over the entire area. Drought resistant grasses will be seeded in FY1980.

(See Table 4 Attachment)

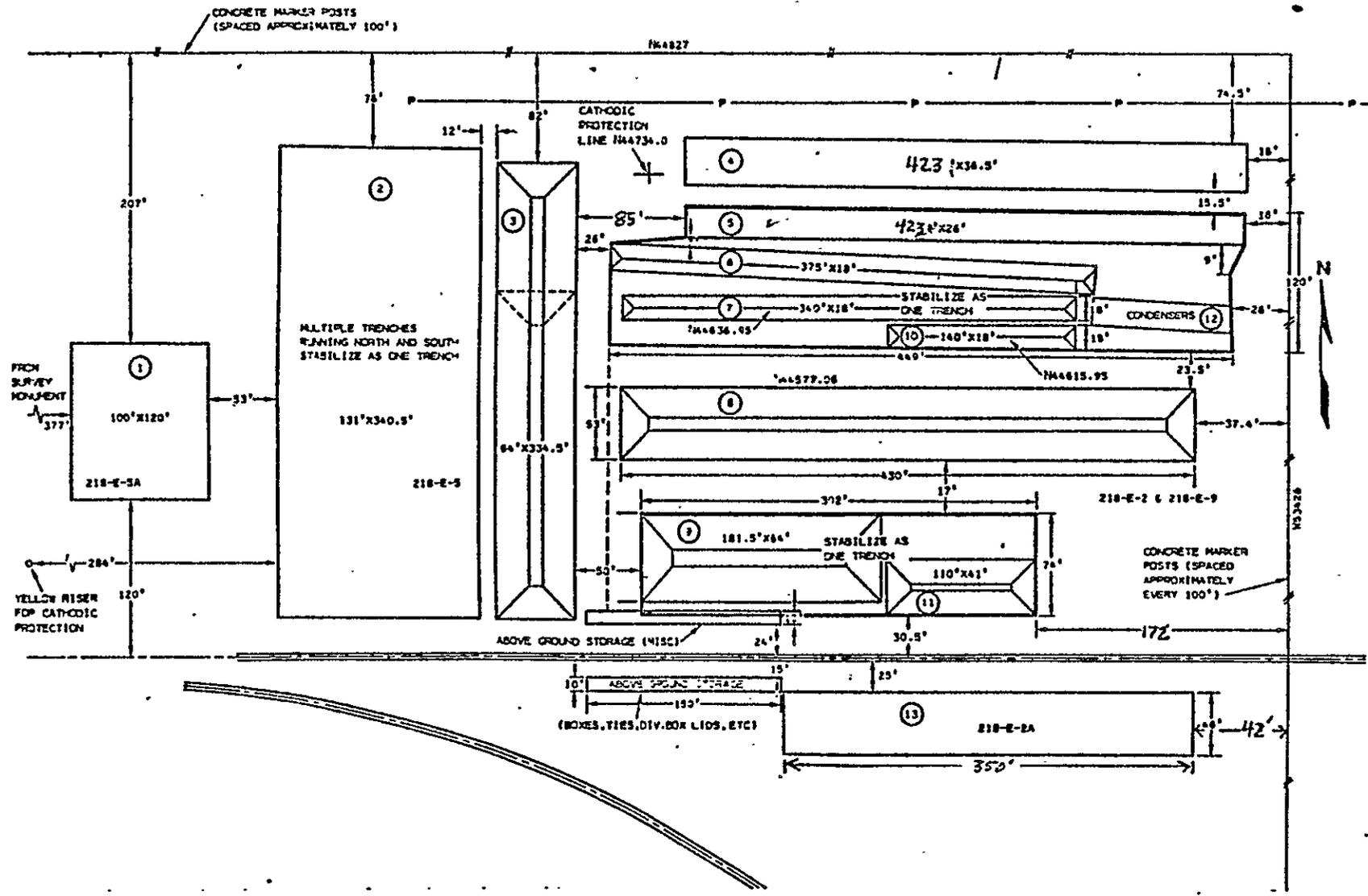
9 2 1 2 5 3 1 4 1 5

TABLE 4 218-E-2, 2A, (5) 5A & 9 STATUS

TRENCH NO.	SOIL DEPTH (NO BIOBARRIERS)	REVEGETATION SPECIES
1	1'	To Be Completed FY '80
2	1'	To Be Completed BY '80
3	1'	Cheatgrass
4	1'	Cheatgrass
5, 6, 7, 10, 12	1'	Cheatgrass
8	1'	Cheatgrass
9, 11	1'	Cheatgrass
13	3"-6"	To Be Completed FY '80

9212521416

9 2 1 2 5 1 4 1 7



Reference: H-2-2479

FIGURE A.2: BURIAL GROUNDS 218-E-2, 2A, 5, 5A, AND 9

A-4400 012 1 (M) 78'

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. NW

<u>Name/Type of Facility</u> Burial Ground	<u>Last Designation</u> 200 East/Industrial Waste No. 05A	<u>Number</u> 218-E-5A
<u>Location</u> 200 East, N.W. Quadrant  About 1,850 ft north of B Plant adjacent to and west of 218-E-5.	<u>Service Dates</u> 1956-1957-1958- 1959	<u>Status</u> Inactive
<u>Site Coordinates</u> N-44827, W-54177 N-44400, W-54177 N-44400, W-54609 N-44827, W-54609	<u>Reference Drawings</u> H-2-55534 H-2-34761	<u>Elevations</u> Ground ~671 ft Water Table ~404 ft(1973) Site Depth ~15-25 ft

Source and Description of Waste

Failed equipment and industrial waste (approximately  $2.2 \times 10^5$  ft).

Description of Facility 3.4 acres. Ref: Ltr. Rockwell 1/09/80 #65421-80-005

Backfilled trenches, surface area:  $2.27 \times 10^5$  x ft<sup>2</sup>.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$1.2 \times 10^5$	$1.2 \times 10^5$
Pu, g	$1.4 \times 10^3$	$1.4 \times 10^3$
Total Beta, Ci	$1.7 \times 10^4$	827.
<sup>90</sup> Sr, Ci	$3.3 \times 10^2$	199.0
<sup>106</sup> Ru, Ci	$7.1 \times 10^2$	$6.59 \times 10^{-4}$
<sup>137</sup> Cs, Ci	$3.5 \times 10^2$	219.0

NOTE:

Unable to locate any print showing location of burial trenches  
in this burial ground.

9 2 1 2 5 8 1 4 1 8

Burial Ground : 218-E-5A

Extensive research work was done during the year 1979 to determine the locations of all burial trenches within the bounds of the 218-E-5, 218-E-5A, 218-E-2 and 218-E-9 Burial Grounds radiation zone. The work included viewing aerial photographs and construction prints, analyzing plant growth patterns, and the load testing of the ground surface.

Four previously unrecorded sites were identified: (See attached map, Figure A.2, Burial Grounds 218-E-2, E-2A, E-5, E-5A, and E-9)

#1 Site Referred to as the 202-A, L-Cell Burial Package. It consisted of four very large burial boxes. The burial location is shown as a 100 foot by 120 foot rectangular area within the 218-E-5A Burial Ground. The D-2 Column from Purex K Cell was also buried here.

#2 Site Multiple trenches running north and south in Burial Ground 218-E-5. It has been stabilized as a single trench.

#4 Site A long trench (423') running east and west along the north side of 218-E-2 Burial Ground.

#5 Site A long trench (423') parallel and adjacent to Site #4 above.

9 2 1 2 5 7 1 4 1 9

Burial Ground: 218-E-5A continued

Fiscal year 1979 stabilization work within the 218-E-5A Burial Ground was confined to a 100 foot by 120 foot rectangular area above the burial sites of the Purex L-Cell burial package and the "2-D" column from Purex K Cell.

The work consisted of load testing the ground surface for subterranean voids by driving over the ground with a 40-ton vehicle, marking the site location with steel posts, removing vegetation and radioactive contamination from the ground surface, and establishing a one foot deep soil seed bed over the entire area. Drought resistant grasses will be seeded in FY1980.

See Table 4 Attachment

9 2 1 2 5 1 1 4 2 0

TABLE 4 218-E-2, 2A, 5, 5A & 9 STATUS

TRENCH NO.	SOIL DEPTH (NO BIOBARRIERS)	REVEGETATION SPECIES
1	1'	To Be Completed FY '80
2	1'	To Be Completed BY '80
3	1'	Cheatgrass
4	1'	Cheatgrass
5, 6, 7, 10, 12	1'	Cheatgrass
8	1'	Cheatgrass
9, 11	1'	Cheatgrass
13	3"-6"	To Be Completed FY '80

9 2 1 2 5 8 1 4 2 1

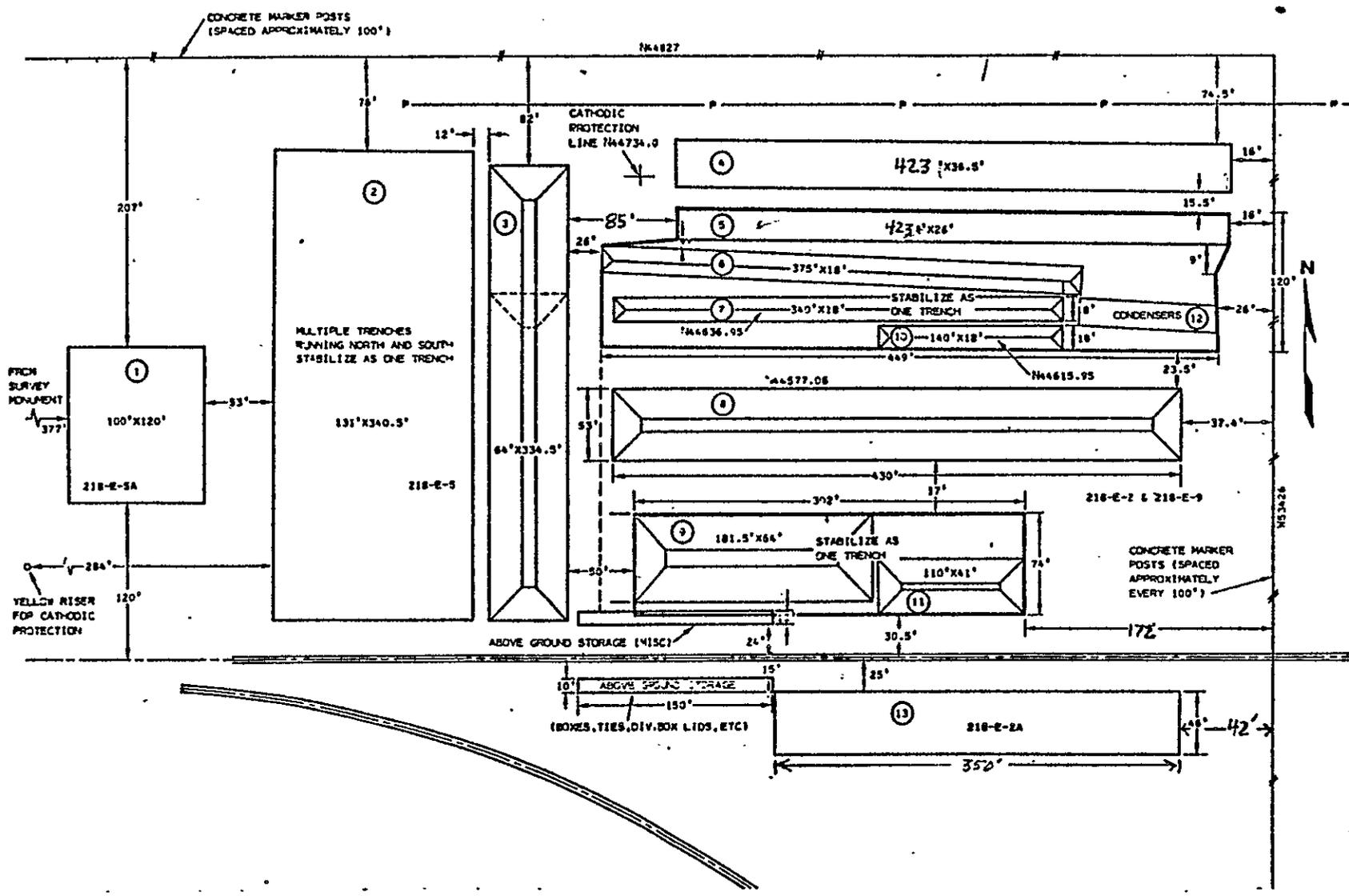
FROM PUREX EQPT DISPOSAL RECORDS

	11/21/56/	-	1 BOX -	IND #5	South End	11/20/56	5"
*	3/19/56		1 generator -	West trend	#5	Burial Ground	(5)
*	6/12/56		1 Box -	" "	#5	" "	(5)
	6/11/57		1 Box -	South end	#5	" "	" 3.5"
	3/21/58		L Cell packages		5A	} ~ 10,000 ft <sup>3</sup>	
	3/24/58		2D columns (Kool)		5A		

\* THIS PROVES THAT THE 5A BURIAL GROUND WAS USED IN 1956 VICE FIRST USE IN 1958 AS SHOWN BY R.F. ROBERTS DATA.

*A. L. Hanson*

1422 | 92 | 25



Reference: H-2-2479

FIGURE A.2: BURIAL GROUNDS 218-E-2, 2A, 5, 5A, AND 9

A-0400-072 1 (M) 2 78'

CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. NW

<u>Name/Type of Facility</u> Storage Site	<u>Past Designation</u> 200 East/Regulated Equipment Storage Site No. 09	<u>Number</u> 218-E-9
<u>Location</u> 200 East, N.W. Quadrant  About 2000 ft north of B Plant. East of 218-E-2 Burial Grounds.	<u>Service Dates</u>  1958	<u>Status</u>  INACTIVE
<u>Site Coordinates</u> N-44395, W-53426 N-44827, W-53426 N-44827, W-53516 N-44395, W-53516	<u>Reference Drawings</u>  H-2-31269	<u>Elevations</u> Ground ~669 ft Water Table ~404 ft(1973) Site Depth NA
<u>Source and Description of Waste</u> Regulated equipment storage.		
<u>Description of Facility</u> (See 218-E-2 for acreage) Above ground storage.		
<u>Radionuclide Content</u> (calculated from discharge data)  NA		
<u>NOTE:</u>  Burial Ground 218-E-9 appears never to have been a burial ground; but to have been used exclusively as an "Above Ground Storage Site".  The 218-E-9 listed coordinates of N-44395, W-53426; N-44827, W-53426; N-44827, W-53516; and N-44395, W-53516 fall within the boundaries of the east 90 feet of the 218-E-2 Burial Ground.  It is recommended that the designation 218-E-9 be deleted from the burial ground records.		
<u>NOTE:</u> Extensive work was done in FY1979 to upgrade 218-E-2 and 218-E-9 Burial Grounds. See 218-E-2 writeup for details.		

9212511424



CONTAMINATED SOLIDS STORAGE AND BURIAL SITES

I. NW

<u>Name/Type of Facility</u> Burial ground.	<u>Past Designation</u> 200 East/Industrial Waste No. 10	<u>Number</u> 218-E-10
<u>Location</u> 200 East, N.W. Quadrant About 2000 ft north and west of B Plant. Directly west of 218-E-5A.	<u>Service Dates</u> February 1960	<u>Status</u> Active
<u>Site Coordinates</u> N-44395, W-55444 N-44464, W-55440	<u>Reference Drawings</u> H-2-31269 H-2-55534	<u>Elevations</u> Ground 671 ft Water Table 404 ft(1973) Site Depth 15-25 ft

Source and Description of WasteFailed equipment and industrial waste (approximately  $5.4 \times 10^6$  ft<sup>3</sup>).Description of Facility

8 trenches running north and south, approx. 400 ft long, surface area:  $7.83 \times 10^5$  ft<sup>2</sup>. Trench #1 is 24' deep, 15 ft wide in the bottom, and 63 ft wide at ground level. All other trenches are 15 ft deep, 16 ft wide in the bottom, and 61 ft wide at ground level.

Radionuclide Content (calculated from discharge data)

<u>Radionuclide</u>	<u>At Time of Burial</u>	<u>As of 9/30/78</u>
U, g	$8.0 \times 10^5$	$8.0 \times 10^5$
Pu, g	$4.9 \times 10^3$	$4.9 \times 10^3$
Total Beta, Ci	$2.4 \times 10^5$	$4.31 \times 10^5$
<sup>90</sup> Sr, Ci	$4.8 \times 10^3$	$1.02 \times 10^5$
<sup>106</sup> Ru, Ci	$1.0 \times 10^4$	544.0
<sup>137</sup> Cs, Ci	$5.1 \times 10^3$	$1.13 \times 10^5$
Misc. Radionuclides	$1.12 \times 10^3$	

9212511426

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Unplanned Release		<u>Fast Designation</u> 241-B-152	<u>Number</u> UN-216-E-2
<u>Location</u> 200 East, N.W. Quadrant 241-B-152 Diversion Box Southwest corner of 241-B Tank Farm		<u>Service Dates</u> Spring 1954	<u>Status</u> Inactive
<u>Site Coordinates</u> (Approximate) N-45000, W-53000	<u>Reference Drawings</u> H-2-4450 Sheet 7	<u>Elevations</u> Ground 625 ft Water Table 392 ft (1973) Site Depth Several trenches	
<u>Source and Description of Waste</u>			
<u>Description of Facility.</u> An area of approximately 50 ft <sup>2</sup> next to the 241-B-152 Diversion Box was contaminated during work on the diversion box. A portion of the contaminated soil was removed and the remainder covered with several inches of clean soil.			
<u>Radionuclide Content</u> (at time of discharge)  Approximately 1 Ci Mixed Fission Products.			

9 2 1 2 5 8 1 4 2 7

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. NW

<u>Name/Type of Facility</u> Unplanned Release		<u>East Designation</u> 241-BX-155 Diversion Box ground contamination	<u>Number</u> UN-216-E-6
<u>Location</u> 200 East, N.W. Quadrant 241-BX-155 Diversion Box approximately 900 feet south of the 241-BX Tank Farm.		<u>Service Dates</u> October 1955	<u>Status</u>
<u>Site Coordinates (Approximate)</u> N=44200, W-53200	<u>Reference Drawings</u> H-2-44500 Sheet 7	<u>Elevations</u> Ground 625 ft Water Table 329 ft(1973) Site Depth Near surface	
<u>Source and Description of Waste</u> Mixed fission product salt waste from B-Plant.			
<u>Description of Facility</u> Ground contamination near 241-BX-155 Diversion box resulting from pressure testing of lines and jumpers in the 155-BX Diversion Box. Approximately 200 ft <sup>2</sup> of surface area was covered with clean soil.			
<u>Radionuclide Content (at time of discharge)</u> Approximately 10 Ci Fission Product.			
<u>History:</u> A spill that occurred during pressure testing of lines and jumpers in the 155-BX Diversion Box caused ground contamination to a maximum dose rate of 22.6 rads/hr at surface. Effected area is approximately 200-foot square. It has been covered with clean soil.			

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CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673  
I. NW

<u>Name/Type of Facility</u> Unplanned Release		<u>Fast Designation</u> 221-B, R-3 line break	<u>Number</u> UN-216-E-8
<u>Location</u> 200 East, N.W. Quadrant  South of 221-B, between the building and 7th Street.		<u>Service Dates</u>  1946	<u>Status</u>  --
<u>Site Coordinates (Approximate)</u>  N-42575, W-53450	<u>Reference Drawings</u>  H-2-44500 Sheet 7	<u>Elevations</u> Ground 686 ft Water Table 404 ft(1973) <u>Site Depth</u> NA	
<u>Source and Description of Waste</u>  Metal waste from 221-B.			
<u>Description of Facility</u> An area approximately 100 ft x 500 ft long due to waste from a leak in the R-3 line. During subsequent construction activity the major portion of the contaminated soil was removed to the 200-E Dry Waste Burial Ground.			
<u>Radionuclide Content (at time of discharge)</u>  <5Ci mixed fission products remain.			

9 2 1 2 5 8 1 4 2 9

CONTAMINATED LIQUID DISPOSAL SITES

RHO-CD-673

I. NW

<u>Name/Type of Facility</u> Unplanned Release		<u>Past Designation</u> 221-B, R-13 Line Break Near Utility Pit	<u>Number</u> UN-216-E-13
<u>Location</u> 200 East, N.W. Quadrant 221-B, R-13 Utility Pit		<u>Service Dates</u> 7/20/72	<u>Status</u> --
<u>Site Coordinates (Approximate)</u> N-42500, W-53850	<u>Reference Drawings</u> H-2-4450 Sheet 7	<u>Elevations</u> Ground 700 ft Water Table 402 ft(1973) Site Depth NA	

Source and Description of Waste

221-B Process Waste.

Description of Facility

Leak in pipeline from Tank 18-1, 221-B Bldg. to 154-BX Diversion Box near the R-13 Utility Pit. Radiation measurements in the pit were 15 rad/hr at 2 in.

Radionuclide Content (at time of discharge)

<u>Radionuclide</u>	<u>At Time of Discharge</u>	<u>As of 12/31/73</u>
<sup>137</sup> Cs, Ci	~15	~14

History:

Excavation of an unencased line (from tank 18-1, 221-B Building to 154-BX Diversion Box) near the utility pit at R-13 disclosed a process waste leak. Radiation measurements taken at bottom of the pit read 15 rads/hr within two inches of the source.

(See Attachment)

9 2 1 2 5 1 4 3 0

PROCESSING DIVISION  
RADIATION OCCURRENCE

M. D. Alford

RADIATION OCCURRENCE FACTS

DATE	7/20/72	TIME	0830
LOCATION			
221-B, R-13 Pit			

RADIATION OCCURRENCE TYPE: 3-B

Loss of control of contamination from a radiation zone.

CAUSE CODE: 1-B

Failure of equipment (line or flange leak).

COMPLETE DESCRIPTION AND CAUSE

During a routine survey, high radiation was discovered in the R-13 pit adjacent to the 221-B Canyon Building. Radiation levels of 15 rads/hr existed in the northeast corner of the pit near the bottom (approximately six feet down). It is suspected the contamination had seeped into the pit from the east side where several unencased lines leave the building. The line most likely to have caused the contamination is the 18-1 waste line that goes to the 154 BX diversion box just south of the 221-B Building.

9 2 1 2 5 1 4 3 1

CCI

GE Backman (2)  
 BJ McMurray (2)  
 GC Oberg  
 FA Perkins  
 RE Smith

ACTION TAKEN

The area was zoned off and excavation started to try and locate the leak.

INVESTIGATED BY

O. L. Mahan/F. A. Perkins

DATE OF INVESTIGATION

7/20/72

EXPOSED EMPLOYEES

None

## RADIATION OCCURRENCE

TO: M. D. Alford		RADIATION OCCURRENCE FACTS	
		DATE 7/20/72	TIME 0830
		LOCATION 221-B, R-13 Pit	
RADIATION OCCURRENCE TYPE: <u>3-B</u>		CAUSE CODE: <u>1-B</u>	
Loss of control of contamination from a radiation zone.		Failure of equipment (line or flange leak).	
COMPLETE DESCRIPTION AND CAUSE			
<p>9 2 1 2 5 1 4 3 2</p> <p>During a routine survey, high radiation was discovered in the R-13 pit adjacent to the 221-B Canyon Building. Radiation levels of 15 rads/hr existed in the northeast corner of the pit near the bottom (approximately six feet down). It is suspected the contamination had seeped into the pit from the east side where several unencased lines leave the building. The line most likely to have caused the contamination is the 18-1 waste line that goes to the 154 BX diversion box just south of the 221-B Building.</p>			
CCI:		ACTION TAKEN	
GE Backman (2) BJ McMurray (2) GC Oberg FA Perkins RE Smith		The area was zoned off and excavation started to try and locate the leak.	
INVESTIGATED BY		DATE OF INVESTIGATION	
O. L. Mahan/F. A. Perkins		7/20/72	
EXPOSED EMPLOYEES			
None			