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DATA SUMMARY PACKAGE FOR THE BETHEL VALLEY AREA DQO WORKSHOP

WASTE AREA GROUPING 1

VOLUME 2

SECTION IV
(EM-60 Transition Facilities and EM-40 D&D Buildings)

FINAL

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WASTE AREA GROUPING 1 DQO Data Package

VOLUME I

I. Introduction

1.1 Overview
- Organization of Data Package
- Major Findings Overall
- Bethel Valley RI/FS Sites
- Site Map

1.2 General WAG 1 Information

II. Tanks, Pipes and Ducts

- Introduction
- Source Information
- Data Summary
- Conceptual Site Model
- Risk Assessment
- References
- Other

III. Impoundments

- Introduction
- Source Information
- Data Summary
- Conceptual Site Model
- Risk Assessment
- References
- Other

VOLUME II

IV. D&D Buildings and Reactors

- Introduction
- Source Information
- Data Summary
- Conceptual Site Model
- Risk Assessment
- References
- Other

VOLUME III

V. Contaminated Media

- Introduction
- Source Information
- Data Summary
- Conceptual Site Model
- Risk Assessment
- References
- Other

VI. Burial Grounds

- Introduction
- Source Information
- Data Summary
- Conceptual Site Model
- Risk Assessment
- References
- Other

VII. Active Facilities (WMRAD)

- Introduction

IV. D&D Buildings, and Reactors (EM-60 transition facilities and EM-40 D&D facilities)

Introduction

A number of the Bethel Valley RI/FS sites are inactive contaminated research facilities and nuclear reactors. Many of these facilities are maintained within the EM-40 D&D program until the program can provide for their disposition. Other inactive facilities have been accepted into the EM-60 facility transition program, and are undergoing deactivation before being transferred to the EM-40 D&D Program for final disposition. An additional group of inactive facilities that still belong to ORNL may eventually be transferred to EM-60. A process will be developed for including these additional facilities in the CERCLA decision at the time the facilities are ready for dismantling.

The information in this section is summarized for the most part in the Site Description Data Sheets (SDDS) prepared in December 1996 (Kuhaida and Parker 1996). Attempts were made to gather additional or more current information by contacting personnel familiar with the numerous facilities. This new information is provided on the Facility Contact Checklists; blank entries on this form indicate no new information was gathered and the reader should refer to the SDDS. Assumptions pertaining to the D&D buildings and reactors, as well as, general information are bulleted below:

- Source Information - Most of the source information for the transition facilities include general information on inventory and surface contamination within the building itself. Very little is known about releases from the buildings to soil, surface water or groundwater. Some of the building drains are dilapidated and may have released into soil and/or groundwater. In some cases, such as for Building 3515, soil outside of the building has become contaminated due to runoff from rainwater coming into the building roof before the roof was repaired in 1987.

- Data Summary - most of the data gathered consists of radiological surveys conducted inside the buildings. Also, some of the buildings still have stored sources, fuel, and/or contaminated wastes.

- Risk Assessment - very few risk assessments have been conducted for the EM-40 or EM-60 facilities.

- Other - includes building maps and drawings.

- A number of the facilities contain inventories of stored radioisotopes, fuel and/ or hazardous chemicals.

- All of the facilities can be expected to contain lead-based paint, PCBs in light fixtures, and asbestos/asbestos containing material (ACM).

IV. D&D Buildings, and Reactors continued

- A removal site evaluation report was completed for each Isotopes Facility Deactivation Project (IFDP) facility.

- The only FFA requirement for the IFDP is to shutdown all LLLW drains which feed tanks, WC-2 and WC-10 by the end of FY 1998.

DATA SUMMARY SHEET FOR WASTE AREA GROUPING ___1____

CERCLA Status:

Waste Unit Description	Unit Type	Status	Size/ Capacity	Ownership	Waste Forms	Inventory					Contaminant Releases				Hydrologic Model		Potential Risk			
																	Human		Ecological	
						RAD	TRU	PCB	Hg	Other*	Surface Water	Groundwater	Soil	Sediment	Hydrologic Class	Transport Pathways	Current	Future	Current	Future
Graphite Reactor Canal Overflow	?	I		EM-40	N/A	N/A	N/A	N/A	N/A	N/A	O	O	O	O	◒	◒	O	O	O	O
Graphite Reactor Building 3001	Lndmark	I	140'x116'x70'	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
Bldg 3005/ Low Intensity Test React.	Reactor		70'x62'x57'	EM-40	S	X											O	O	O	O
Bldg 3001/Storage Canal	DD	R	71'x11.5'x101'	EM-40	N/A	N/A	N/A	N/A	N/A	N/A	O	O	O	O	◒	◒	O	O	O	O
Fan House 3003	DD		53'x88'x18'	EM-40	N/A	X					O	O	O	O	◒	◒	O	O	O	O
Filter House 3002	DD		53'x69.5'x27'	EM-40	N/A	X					O	O	O	O	◒	◒	O	O	O	O
UG Exhaust Duct 3001/3003	DD	A		EM-40	N/A	X					O	O	O	O	◒	◒	O	O	O	O
LITR (3077) Heat Exchange	DD	I		EM-40	L,S	X					N/A	N/A	N/A	N/A	◒	◒	O	O	O	O
3086 Cooling Tower No. 1. ORR	DD	I	20 sq ft	EM-40	S	X									◒	◒	O	O	O	O
3085 ORR Pumphouse	DD	I		EM-40	S	X									◒	◒	O	O	O	O
3103 Cooling Tower No. 3, ORR	DD	I	150'x75'	EM-40	S	X									◒	◒	O	O	O	O

Unit Types:
B = Building
T = Tank
R = Reactor
P = Pipeline
DD = D&D Facility
BW = Buried Waste
I = Impoundment
CS = Contaminated Soil
CG = Contaminated Groundwater
CW = Contaminated Surface Water

Status:
A = Active
T = Transition
I = Inactive
R = Remediated

Ownership:
(See Attachment 1)

Waste Forms:
G = Gas
GW = Groundwater
SW = Surface Water
SD = Sediment
SL = Sludge
SS = Surface Soil
SB = Subsurface Soil
L = Liquid
S = Surfaces
N/A = Not Applicable

*** Other:**
VOA
Metals
Asbestos
Flammables
Lead & Paints

Well Defined: ●
Partially Defined: ◒
Not Defined: O

000011

DATA SUMMARY SHEET FOR WASTE AREA GROUPING ___1____

CERCLA Status:

Waste Unit Description	Unit Type	Status	Size/ Capacity	Ownership	Waste Forms	Inventory					Contaminant Releases				Hydrologic Model		Potential Risk			
																	Human		Ecological	
						RAD	TRU	PCB	Hg	Other*	Surface Water	Groundwater	Soil	Sediment	Hydrologic Class	Transport Pathways	Current	Future	Current	Future
3102 Heat Exchanger, No. 2, ORR and	DD	I		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
Demin. Water Holding Tanks	DD	I		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
ORR Experimental Facilities	DD	I	50'x30'	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3126 - ORR NOG Filter Pit	DD	I	127 sq ft	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3083 Neutron Spectrometer Station N	DD	I	25 sq ft	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
Cell Vent Filters	DD	I		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3107 House, Target, 25 Meter, on Fl	DD	I	8'x8'	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3089 Cooling Tower No. 2, ORR	DD	I		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3109 - POG Filter Pit	DD	I		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
Low Intensity Test Reactor-3005	Reactor	I	70'x62'x57'	EM-40	S	X					N/A	N/A	N/A	N/A	◒	◒	O	O	O	O

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S = Surfaces
N/A = Not Applicable

*** Other:**
VOA
Metals
Asbestos
Flammables
Lead & Paints

Well Defined: ●
Partially Defined: ◒
Not Defined: O

000013

DATA SUMMARY SHEET FOR WASTE AREA GROUPING ___1____

CERCLA Status:

Waste Unit Description	Unit Type	Status	Size/ Capacity	Ownership	Waste Forms	Inventory					Contaminant Releases				Hydrologic Model		Potential Risk			
																	Human		Ecological	
						RAD	TRU	PCB	Hg	Other*	Surface Water	Groundwater	Soil	Sediment	Hydrologic Class	Transport Pathways	Current	Future	Current	Future
Oak Ridge Research Reactor - 3042	Reactor	I		EM-40	S	X					O	◒	O	O	◒	◒	O	O	O	O
Fission Product Pilot Plant - 3515	DD	I	20'x10'x8'	EM-40	S	X					O	O	◒	O	◒	◒	O	O	O	O
Metal Recovery Fac. 3505	DD	I	90'x70'x24'	EM-40	S	X	X				O	O	O	O	◒	◒	O	O	O	O
Site 3506/Waste Evaporator Facility	DD	R	N/A	EM-40	S	N/A					N/A	N/A	N/A	N/A	◒	◒	N/A	N/A	N/A	N/A
Bldg 3505/Transfer Canal/Pit	DD	I	6'x35'x14' 8'x10'x10'	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
Bulk Shielding Reactor	Rmvl SE		77'x51'	EM-60	S	X	X				O	O	O	O	◒	◒	O	O	O	O
Off-Gas Filter House - 3121	?				S						O	O	O	O	◒	◒	O	O	O	O
Bldg 3517 Filter Pit	DD			EM-60	S						O	O	O	O	◒	◒	O	O	O	O
Fission Product Devel. Lab - 3517	DD	T	120'x60'x27'	EM-60	S	X				X	O	O	O	O	◒	◒	O	O	O	O
Storage Garden 3033	DD			EM-60	S						O	O	O	O	◒	◒	O	O	O	O
Stronium-90 Power Generators-3028	DD			EM-60	S						O	O	O	O	◒	◒	O	O	O	O

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(See Attachment 1)

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*** Other:**
VOA
Metals
Asbestos
Flammables
Lead & Paints

Well Defined: ●
Partially Defined: ◒
Not Defined: O

000015

DATA SUMMARY SHEET FOR WASTE AREA GROUPING ___1____
CERCLA Status:

Waste Unit Description	Unit Type	Status	Size/ Capacity	Ownership	Waste Forms	Inventory					Contaminant Releases				Hydrologic Model		Potential Risk			
																	Human		Ecological	
						RAD	TRU	PCB	Hg	Other*	Surface Water	Groundwater	Soil	Sediment	Hydrologic Class	Transport Pathways	Current	Future	Current	Future
3038-M Radioactive Pack.& Ship.Facility	Rmvl SE	T	7800 sq ft	EM-60	S	X		X		X	O	O	O	O	◒	◒	O	O	O	O
3033A Radioactive Product. Lab Annex	Rmvl SE	T	945 sq ft	EM-60	S	X		X		X	O	O	O	O	◒	◒	O	O	O	O
3030 Radioisotope Production Lab C	Rmvl SE		825 sq ft					X		X	O	O	O	O	◒	◒	O	O	O	O
3031 Radioisotope Production Lab D	Rmvl SE	T	720 sq ft	EM-60	S	X		X		X	N/A	N/A	NA/	N/A	◒	◒	O	O	O	O
3032 Radioisotope Production Lab E	Rmvl SE		1200 sq ft					X		X	O	O	O	O	◒	◒	O	O	O	O
3118 Radioisotope Production Lab H	Rmvl SE	T	909 sq ft	EM-60	S	X		X		X	N/A	N/A	NA/	N/A	◒	◒	O	O	O	O
3034 Radioisotope Services Building	Rmvl SE	I		EM-60	S	X		X		X	N/A	N/A	NA/	N/A	◒	◒	O	O	O	O
3047 Radioisotope Development Lab	Rmvl SE	A		Isotopes Prog	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3029 Source Devel. Laboratory	Rmvl SE	T	33,000 sq ft	EM-60	S	X		X		X	O	O	O	O	◒	◒	O	O	O	O
3099 Storage Pad	Rmvl SE	T	900 sq ft	EM-60				X		X	O	O	O	O	◒	◒	O	O	O	O

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DATA SUMMARY SHEET FOR WASTE AREA GROUPING ___1____

CERCLA Status:

Waste Unit Description	Unit Type	Status	Size/ Capacity	Ownership	Waste Forms	Inventory					Contaminant Releases				Hydrologic Model		Human		Ecological	
						RAD	TRU	PCB	Hg	Other*	Surface Water	Groundwater	Soil	Sediment	Hydrologic Class	Transport Pathways	Current	Future	Current	Future
High-Level Chem. Dev. Lab-4507	DD	I	16.5 sq m	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3019B High-Level Radiochem.Analy Lab	DD	T	3,000 sq ft	EM-60	S	X			X	X	O	O	O	O	◒	◒	O	O	O	O
O.R. Research Reactor Heat Exchg - 3087	DD	I	4,575 sq ft	EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
4556 Pit, Filter (for Bldg. 4507)	DD	J		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O
3038 Alpha Handling Facility	Rmvl SE	T	7,250 sq ft	EM-60	S	X	X				O	O	O	O	◒	◒	O	O	O	O
3028 Alpha Powder Facility	Rmvl SE	T	80,000 sq ft	EM-60	S	X					O	O	O	O	◒	◒	O	O	O	O
3038-E Isotope Material Lab	Rmvl SE	T	7,250 sq ft	EM-60	S	X	X				O	O	O	O	◒	◒	O	O	O	O
3093 Krypton Storage Cubicle	Rmvl SE	T	176 sq ft	EM-60	S	X				X	O	O	O	O	◒	◒	O	O	O	O
3026C Kryption-85 Enrichment Facility	Rmvl SE	T	11,680 sq ft	EM-60	Air, GW, SS, S	X				X	O	◒	◒	O	◒	◒	O	O	O	O
3026D Metal Segmenting Facility	Rmvl SE	T	14,700 sq ft	EM-60	S	X					O	O	O	O	◒	◒	O	O	O	O
3033 Radioactive Gas Processing Facility	Rmvl SE	T	720 sq ft	EM-60	S	X					O	O	O	O	◒	◒	O	O	O	O
3110 Filter House Isotopes Ductwork	Rem SE	I		EM-40	S	X					O	O	O	O	◒	◒	O	O	O	O

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*** Other:**
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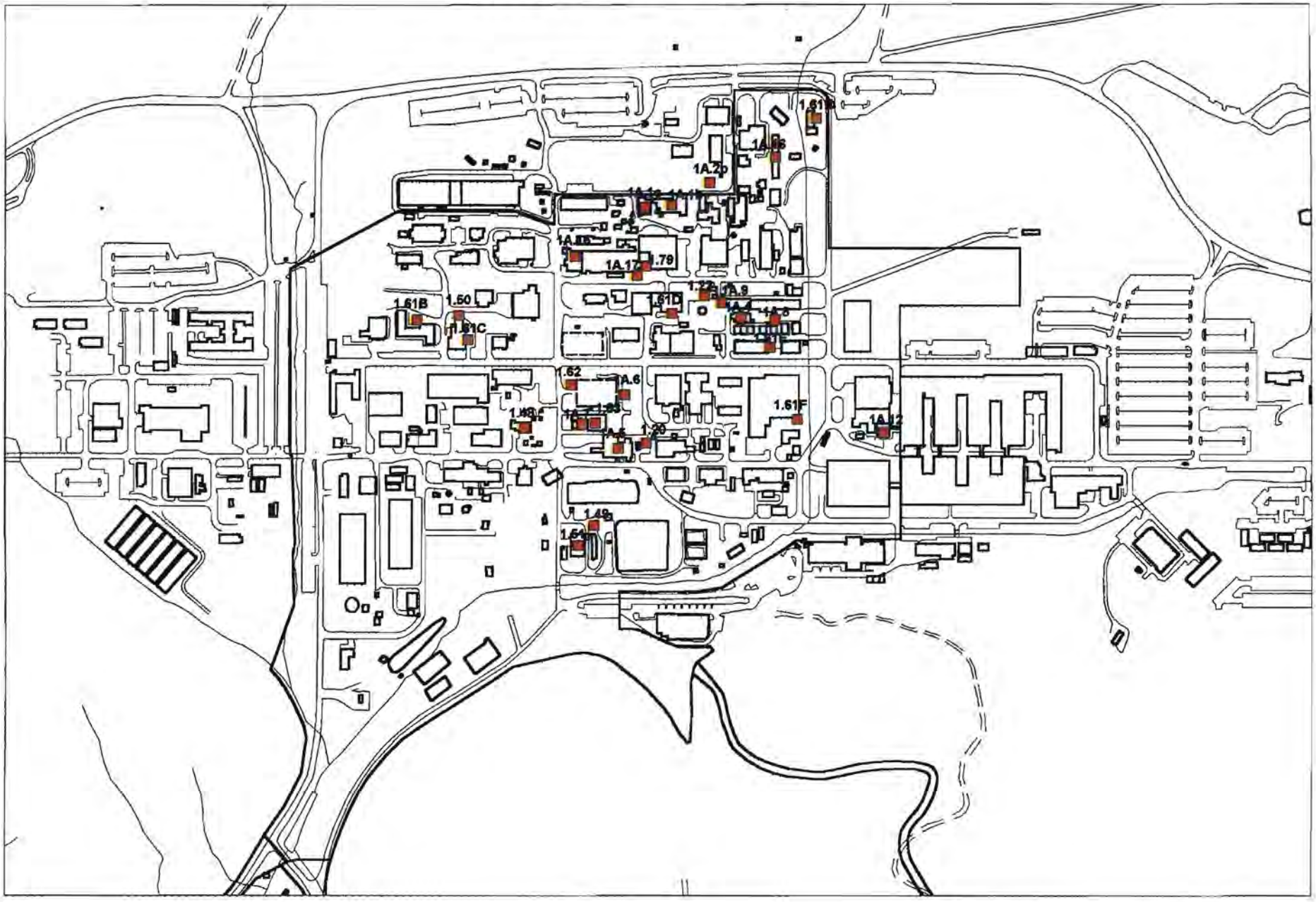
Asbestos
Flammables
Lead & Paints

Well Defined: ●
Partially Defined: ◒
Not Defined: O

000019

WAG 1 D&D FACILITIES



Bethel Valley RI/FS Historical Data Review

Form Completed by: Anita Parker
Date: 3/24/97

Document Reviewed: Site Characterization Report for Building 3506 at ORNL
Doc ID: ORNL/ER/Sub/87-99053/72
Author/Date: Bechtel National/Inc / July 1994

Comments: Building & Reactor 3506 - Waste Evaporator
This building has been demolished

WAG	Description of Study	Waste Unit	Waste Unit Characteristics	Sampling Dates	Sampling Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Decision Rule(s)	Quality or Confidence
1	Characterization	Bldg	3 areas measured	12/1993	10x10 cm	Walls, floor	Smear	GR	1C	M → H
	of Contaminated	3506	East gallery	- 2/94	smears	center of room	direct	B/G		
	areas in Bldg		North cell area		North-South	within +	Core	Gamma Spec		
	3506		South cell area		cells	below the floor		Sr-90/Y-90		
						slab outside				
						of building				

General:
NA = Not Available
NR = Not Researched
(blank) = Unknown

Sampling Media:
surface soil
subsurface soil
surface water
groundwater
seep or spring
sediment
waste
biota

Sampling Protocol:
G = grab
SG = stormflow grab
BG = baseflow grab
FC = flow composite
SC = spatial composite
V = vertical profile
S = site survey

Analytical Fraction:
I = Inorganics
O = Organics
P = PCBs/Pesticides/Herbicides
GR = gross alpha/beta
ISO = isotopic rads
B/G = beta/gamma survey
FLD = field measurements

Decision Rule / Hypothesis
1 = Source characteristics
1A = design/operation
1B = leachate
1C = waste inventory
1D = waste unit hydrology
1E = other FS information
2 = Current releases
2A = shallow groundwater, seeps
2B = deep groundwater
2C = soil around waste units
2D = sediment
2E = cummulative @ integration point
3 = Current risk
4 = Modeling for future risk
3A/4A = human health risk
3B/4B = ecological risk

Waste Unit Characteristics:
type?
status?
size/capacity?
ownership?

Sampling Locations:
List specific locations if possible.
Otherwise, indicate scope of sampling effort.

Confidence:
H = High
M = Medium
L = Low

000023

This summary sheet is included for historical reference. The canal has been grouted in place.

Bethel Valley RI/FS Historical Data Review

Document Reviewed: Action Memorandum for Building 3001 Canal

Form Completed by: Anita Parker

Date: 3/26/97

Doc ID: DOE/OR/02-1533 + D2

Author/Date: Jacobs/ER Team

Comments: Buildings/Reactors – No data regarding destination of leaking water or migration of contaminants
Sediment removed during clean closure in 1992
Potential for release through concrete joints in canal walls + bottom

WAG	Description of Study	Waste Unit	Waste Unit Characteristics	Sampling Dates	Sampling Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Decision Rule(s)	Quality or Confidence
1	Documents approval of the removal action proposed in the EE/CA for Bldg 3001 Canal to remove the shielding protection provided by water with a specific grout formulation.	Bldg 3001 canal	Radioactively contaminated objects recovered from bottom of canal were placed in baskets + lift submerged in the canal after 1992 sediment removal. These objects were removed in FY 1996.						1A 3	

General:
NA = Not Available
NR = Not Researched
(blank) = Unknown

Sampling Media:
surface soil
subsurface soil
surface water
groundwater
seep or spring
sediment
waste
biota

Sampling Protocol:
G = grab
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3A/4A = human health risk
3B/4B = ecological risk

Waste Unit Characteristics:
type?
status?
size/capacity?
ownership?

Sampling Locations:
List specific locations if possible.
Otherwise, indicate scope of sampling effort.

Confidence:
H = High
M = Medium
L = Low

Daily loss of ~ 1514 L of water indicates that the canal is leaking. However, no data is available on the destination of the leaking water or on the migration of contaminants in the unit. No environmental data available.

000013

Bethel Valley RI/FS Historical Data Review

Form Completed by: Anita Parker
Date: 3/26/97

Document Reviewed: RCRA Final Closure Plan for 3001 Storage Canal
Doc ID: ORNL/TM-11684
Author/Date: IT Corporation / 11/90

Comments: Canal was grouted in place

WAG	Description of Study	Waste Unit	Waste Unit Characteristics	Sampling Dates	Sampling Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Decision Rule(s)	Quality or Confidence
1	Purpose to satisfy	3001	Under RCRA	1990	Sediment	Canal	G	TCLP	1A	
	regulatory reqmnts	Storage	listed as a			bottom				
	under RCRA	Canal	hazardous							
			waste storage							
	Plan summarizes		tank for							
	RCRA requirement		lead & Chromium							

General:
NA = Not Available
NR = Not Researched
(blank) = Unknown

Sampling Media:
surface soil
subsurface soil
surface water
groundwater
seep or spring
sediment
waste
biota

Sampling Protocol:
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2E = cummulative @ integration point
3 = Current risk
4 = Modeling for future risk
3A/4A = human health risk
3B/4B = ecological risk

Waste Unit Characteristics:
type?
status?
size/capacity?
ownership?

Sampling Locations:
List specific locations if possible.
Otherwise, indicate scope of sampling effort.

Confidence:
H = High
M = Medium
L = Low

000027

Bethel Valley RI/FS Historical Data Review

Form Completed by: Anita Parker
Date: 3/26/97
Comments: Buildings / Reactors

Document Reviewed: Health Risk Assessment for the Bldg 3001 Storage Canal @ ORNL
Doc ID: ORNL/ER-51
Author/Date: V. Chidambariah, R.E. White 12/91

WAG	Description of Study	Waste Unit	Waste Unit Characteristics	Sampling Dates	Sampling Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Decision Rule(s)	Quality or Confidence
1	Human health risk assessment. Purpose was to evaluate interim closure alternatives for the Bldg 3001 Storage Canal	Bldg 3001 Storage Canal	Used to transport irradiated fuels from Bldg 3001 to Bldg 3019. Storage of radioactive tops.	3/90	SS SW	Canal	G	rad metals	1C	
				2/89	Sludge	canal bottom	G	rad metals	1C	

General:
NA = Not Available
NR = Not Researched
(blank) = Unknown

Sampling Media:
surface soil
subsurface soil
surface water
groundwater
seep or spring
sediment
waste
biota

Sampling Protocol:
G = grab
SG = stormflow grab
BG = baseflow grab
FC = flow composite
SC = spatial composite
V = vertical profile
S = site survey

Analytical Fraction:
I = Inorganics
O = Organics
P = PCBs/Pesticides/Herbicides
GR = gross alpha/beta
ISO = isotopic rads
B/G = beta/gamma survey
FLD = field measurements

Decision Rule / Hypothesis
1 = Source characteristics
1A = design/operation
1B = leachate
1C = waste inventory
1D = waste unit hydrology
1E = other FS information
2 = Current releases
2A = shallow groundwater, seeps
2B = deep groundwater
2C = soil around waste units
2D = sediment
2E = cummulative @ integration point
3 = Current risk
4 = Modeling for future risk
3A/4A = human health risk
3B/4B = ecological risk

Waste Unit Characteristics:
type?
status?
size/capacity?
ownership?

Sampling Locations:
List specific locations if possible.
Otherwise, indicate scope of sampling effort.

Confidence:
H = High
M = Medium
L = Low

000029

Bethel Valley RI/FS Historical Data Review

Form Completed by: Anita Parker
Date: 3/21/97

Document Reviewed: Level 3 Risk Assmt for Bldg 3515 @ ORNL
Doc ID: ORNL/ER-311
Author/Date: D.A. Wollert et al 1995

Comments: Buildings + Reactors
High contamination required samples to be obtained remotely during site characterization activities

WAG	Description of Study	Waste Unit	Waste Unit Characteristics	Sampling Dates	Sampling Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Decision Rule(s)	Quality or Confidence
1	Risk Assessment	Bldg	Bldg consists of	10/93 -	Concrete,	Slab	Core	Inorganics	1A	M -> H
	(Baseline) for Bldg	3515	2 concrete cells	2/94	Sub Foundation	beneath slab	SC	(TAL)	1A	M -> H
	3515.		(north + south)		soil,			Cyanide		
			on a concrete		Paint chip	building	G		1A	M -> H
			pad.			wall		GR		
						(South cell)		B/G		
								FLD		

General:
NA = Not Available
NR = Not Researched
(blank) = Unknown

Sampling Media:
surface soil
subsurface soil
surface water
groundwater
seep or spring
sediment
waste
biota

Sampling Protocol:
G = grab
SG = stormflow grab
BG = baseflow grab
FC = flow composite
SC = spatial composite
V = vertical profile
S = site survey

Analytical Fraction:
I = Inorganics
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B/G = beta/gamma survey
FLD = field measurements

Decision Rule / Hypothesis
1 = Source characteristics
1A = design/operation
1B = leachate
1C = waste inventory
1D = waste unit hydrology
1E = other FS information
2 = Current releases
2A = shallow groundwater, seeps
2B = deep groundwater
2C = soil around waste units
2D = sediment
2E = cummulative @ integration point
3 = Current risk
4 = Modeling for future risk
3A/4A = human health risk
3B/4B = ecological risk

Waste Unit Characteristics:
type?
status?
size/capacity?
ownership?

Sampling Locations:
List specific locations if possible.
Otherwise, indicate scope of sampling effort.

Confidence:
H = High
M = Medium
L = Low

000031

3.5.4.3 Below-ground pits and canals

3517 filter pit (SWMU 1.20). This concrete pit east of Building 3517 houses air filters from the Building 3517. The filter system was put in operation in 1958; fiber filters were replaced in 1960 with washable stainless steel filters. The washable filters were in turn replaced in the 1970s with HEPA filters (Taylor 1986b). A general facility upgrade was completed in 1986 (ORNL 1990) and the filter pit is presently in use. This filter pit was contaminated by backwash water from the former stainless steel filter system. Recent excavation at the site removed large quantities (ORNL 1990) of contaminated soil; maximum radiation levels of 30 R/h were recorded by one monitoring meter. An undetermined amount of contaminated soil remains in place. Levels of radiation in the filters currently measure approximately 200 R/h; the primary radionuclides present are cesium-137 and strontium-90.

Transfer canal and dissolver pit 3505 (SWMU 1.63). These below-ground concrete structures are on the west side of Building 3505. The dissolver pit is under the building and is about 10 ft by 6.5 ft by 10 ft deep. The transfer canal extends beyond the west side of the building and is about 50 ft long, 6.5 ft wide, and 14 ft deep. These structures were used to handle fuel elements from 1952 to 1960, when they were removed from service because they lacked secondary containment. The process involved dissolving fuel element metal cladding for uranium recovery, and water was used for shielding. The structures still contain water, and no releases have been reported. Slight contamination of the canal walls and water with strontium-90, cesium-137, cobalt-60, and uranium and plutonium isotopes is possible. The facility is currently monitored under the surplus facility program.

3001 storage canal (SWMU 1.79). This below-ground concrete structure connects the Graphite Reactor in Building 3001 with the Radiochemical Processing Pilot Plant in Building 3019. The 7-ft-wide, 11.5-ft-deep, and 101-ft-long canal is covered with a concrete lid and soil and has a capacity of 62,000 gal (ORNL 1990). Used for underwater transfer of spent fuel from the reactor to Building 3001, the canal was in operation from 1943 to 1963 when the reactor was shut down. The canal was then used for storage of radioisotopes until 1990, when a leak was discovered and removal of the stored material was initiated (ORNL 1990). The leak was stopped, and remediation of the contaminants in the canal was begun in 1992 in accordance with an approved closure plan.

3.5.5 Above-Ground Structures or Process Facilities

3.5.5.1 Contamination at base of 3019 stack (SWMU 1.7)

This site now referred to as the "3019 Hot Bank" is an area south of Building 3020 and west of Building 3091. Although no longer designated as a structure specifically, the site is included here because of reports that it is a continual source of surface water contamination (ORNL 1990). The area was contaminated in the 1950s and 1960s by a combination of emissions from 3019 stack and LLLW line leaks in the area. A water sample taken in 1987 from the storm sewer catch basin southwest of the chimney-vent station contained 200 pCi/L of strontium-90 and a gross beta activity of 260 pCi/g and sediment samples contained 51 pCi/g of strontium-90 and a gross beta activity of 190 pCi/g (ORNL 1990).

3.5.5.2 Storage pad 3503-3504 (SWMU 1.10A)

These storage pads are located together southwest of Building 3503. The concrete pad covers an area of about 29 ft by 39 ft. Two parts of the pad are roofed over where drums and surplus miscellaneous equipment are stored on metal trays. The equipment and materials are contaminated with radionuclides. Built in the late 1950s, the site is still in use. A 4-in.-thick concrete slab was poured over the pad in the 1970s to cover radionuclide contamination, which is believed to be uranium-238 and plutonium-239 (ORNL 1990). When biased soil samples were taken at the site in 1986, the dominant detectable radionuclide was cesium-137; no RCRA-hazardous substances were detected (ORNL 1990).

The storage pad is just north of WOC, and migration of contamination to the creek by rainwater runoff is possible.

3.5.5.3 Isotopes ductwork/3110 filter house (SWMU 1.22)

This site, on Hillside Avenue between Third and Fifth Streets, consists of the 3110 filter house and underground ductwork connecting to several buildings. The ductwork was put in operation in the 1960s, and the filter house is in continuous operation. Without internal investigation, the inside surfaces of the ductwork are assumed to be contaminated with various radionuclides. A floor drain in the filter house collects water and discharges it to the LLLW system (ORNL 1990). Specific characterization and release data are not available.

3.5.5.4 Waste evaporator facility 3506 (SWMU 1.62)

This facility in Building 3506 consists of a concrete cell with underground piping, a valve pit, and an attached wood-framed operating area. The facility was in service from 1949 to 1954 to use evaporation as a method for concentration and volume reduction of LLLW prior to final disposal. Until roof leaks were repaired in 1990 (ORNL 1990), water from the leaks was pumped to process drains. Inside the structure, contaminated pipe chases and surplus support equipment exhibit dose rates up to 10 mrad/h, with transferable surface contamination of several thousand dpm/100 cm^2 (ORNL 1990). Primary radionuclides are strontium-90, cesium-137, ruthenium-106, and cobalt-60; plutonium, uranium, and other transuranic isotopes are also present.

3.5.5.5 Underground exhaust ducts 3001-3003 (SWMU 1.A1E)

This underground duct system north of Building 3001 was constructed in 1943 to convey air from the Graphite Reactor (3001) to the filter house (3002), the fan house (3003), and then to the stack (3010). It is currently in operation. The inside surfaces of the duct have not been characterized, but they are probably contaminated with fission products (ORNL 1990). No releases from the ducts have been reported.

3.5.5.6 Fission product pilot plant 3515 (SWMU 1.A6)

This structure is located on the east side of STF in Building 3515. This facility has also been called the ruthenium-106 tank arrangement, which consisted of a concrete pad and tanks surrounded by stacks of concrete blocks. The present facility consists of an unlined concrete-shielded cell, approximately 19.7 ft by 9.9 ft by 7.9 ft high, with an adjacent shielded operating area (ORNL 1990). The facility, which was constructed in 1948 and removed from service in 1958, was used to separate curie quantities of various radionuclides from LLLW (ORNL 1990). Specific waste characterization data are not available, but the current radionuclide inventory is believed to be in the range of 10 to 100 Ci (ORNL 1990). A release from the facility was recorded in 1988, but no estimate of radionuclides released is available. The facility was roofed over and the ground to the east was covered with Hypalon and gravel and placarded as a contamination area (ORNL 1990).

3.5.5.7 High-level chemical development laboratory 4507 (SWMU 1.A12)

This facility in Building 4507 is an above-ground structure containing a ground level with four hot cells, a second level for chemical make-up equipment, and a penthouse area above the hot cells with glove boxes, a gantry crane, and a shielded manipulator. Constructed in 1957, the building was removed from service in 1980 and mothballed. The inventory of radionuclides inside this structure is estimated to be less than 1000 Ci, but specific characterization data are not available. No releases have been reported.

3.5.5.8 High-level radiochemical analytical laboratory 3019B (SWMU 1.A15)

This building, located at the intersection of Third Street and Hillside Avenue, is 36 ft by 64 ft and contains seven hot cells and a storage cell. Constructed in 1955 to perform chemical analyses on highly radioactive materials, the facility was removed from service in 1980. Specific characterization data for the contents of the building are not available, but residual contamination from strontium-90, cesium-137, and transuranic materials is probable (ORNL 1990). No releases have been reported.

3.5.5.9 Off-gas filter house 3121 (SWMU 1.A17)

Built in 1966, this structure southeast of Building 3019 contains air filters that were used to filter exhaust air from hot cells in the building. The structure was removed from service in 1986, and no releases have been reported. Specific characterization data for the inside of the structure are not available, but filtered air and gases probably contained volatile fission products from hot cell fuel reprocessing operations (ORNL 1990).

UNIT NAME: Graphite Reactor Storage Canal Overflow (3001/3019)

Unit Number: 01.08

Project Status: Remedial Investigation completed. (Bechtel et al 1992) RCRA closure for sediments - final closure deferred to CERCLA. (Kaiser 1996)

Unit Location: The canal runs under Buildings 3001 and 3019 on Hillside Avenue. The approximate ORNL coordinates are N 22,530 ft and E 31,100 ft. (ORNL 1990) The exact location of the overflow is not known. (Kuhaida 1996)

Approximate Dimensions and Capacity: The canal is 7.0 ft (2.1 m) wide, 11.5 ft (3.5 m) deep, and 101.0 ft (31.0 m) long. (ORNL 1990) The canal is covered with a concrete lid and soil. The capacity of the canal is 62,000 gallons. (Bechtel et al 1992). The dimensions for the overflow are unknown. (Kuhaida 1996)

Dates Operated: Site commissioned: 1943. Taken out of service: 1990). (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The Oak Ridge Graphite Reactor fuel storage canal connected the fuel discharge pit to the adjoining chemical-processing building (3019). (ORNL 1990) It was used for underwater transfer of spent fuel from the reactor to Building 3001. The canal was in operation from 1943 to 1963 when the reactor was shut down. The canal was then used for storage of radioisotopes until 1990, when a leak was discovered and removal of the stored material was initiated. (Bechtel et al 1992). Removal of the RCRA - contamination sludges in the canal began in 1992 in accordance with an approved RCRA closure plan. (Bechtel et al 1992, Kaiser 1996)

Waste Characteristics: Stored isotopes include Co-60 and Sr-90. The canal also contains ~ 1 m(E+3) of contaminated sludge containing Pu-239 (primarily), Pu-238, Am-241, and Cm-244. (ORNL 1990)

Release Data: The canal has bare concrete walls that have absorbed long-lived fission products and Co-60, and probably TRU. Results of radiation surveys were reported in 1984. One ORNL engineering drawing contains the notation "overflow"; however, no documentation of this event can be found; as a result, the exact nature of the overflow or extent of contamination, if any, is not known. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: It is suspected that the canal overflow is the leak that occurred in the canal itself and not a separate SWMU. (Kuhaida 1996)

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

A RCRA Final Closure Plan for the 3001 Storage Canal was issued in 1990 (revised March 1992). A subsequent Engineering Evaluation/Cost Analysis for Building 3001 was issued September 1996, and an Action Memorandum for Building 3001 Canal was issued November 1996. (ORNL 1996)

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation*, DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

FACILITY CONTACT CHECKLIST

Unit Name: Low Intensity Test Reactors Ponds (3085W)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: Pumped and filled in 1964.

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Backfilled

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: Low Intensity Test Reactor (LITR) Ponds (3085W)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: This site is located in the northern part of the main ORNL complex near Building 3005. The two ponds are located ~ 300 ft (92 m) east of the building. ORNL grid coordinates are N 22,790 ft and E 31,760 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The LITR retention ponds were two separate ponds located 350 ft east of the LITR reactor building, with 18,000-gal capacity, dimensions of 2.4 x 14 m, ranging from 1.8 m to 2.4 m deep. The ponds were both lined with limestone, and the stone was covered at the time by earth backfill. (Ford et al 1992)

Dates Operated: Reactor commissioned: 1951. Site inactive: 1964. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The retention ponds were used during the early portion of the LITR operation to serve as holding tanks for process water at the facility to allow settling of particulates and ionized particles with short half-lives to decay before dumping into First Creek. The murky water was completely purged from the LITR, and the ponds were established to completely hold the volume of the primary cooling water. In 1964, the ponds were pumped of remaining groundwater and filled with earth. (Ford et al 1992)

Waste Characteristics: Very little information is available. Principal contamination was probably Na-24 (half-life of 15 h). Hydrogeological conditions are similar to sites in the main ORNL installation in Bethel Valley. (ORNL 1990)

Release Data: A radiological study of the site in 1985 showed average activities of Sr-90, Pu-238, and Pu-239 in the soil higher than background, and that there was some contamination due to Cs-137 and Co-60. The radionuclide inventory was estimated at 20 mCi of Cs-137, 1 mCi of Sr-90, and 100 uCi of Pu-239. (ORNL 1990) Soil samples of the soil directly under and adjacent to the ponds consist of radionuclides Cs-137, Co-60, Sr-90, Pu-238, and Pu-239 detected in concentrations above established background levels. (Ford et al 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

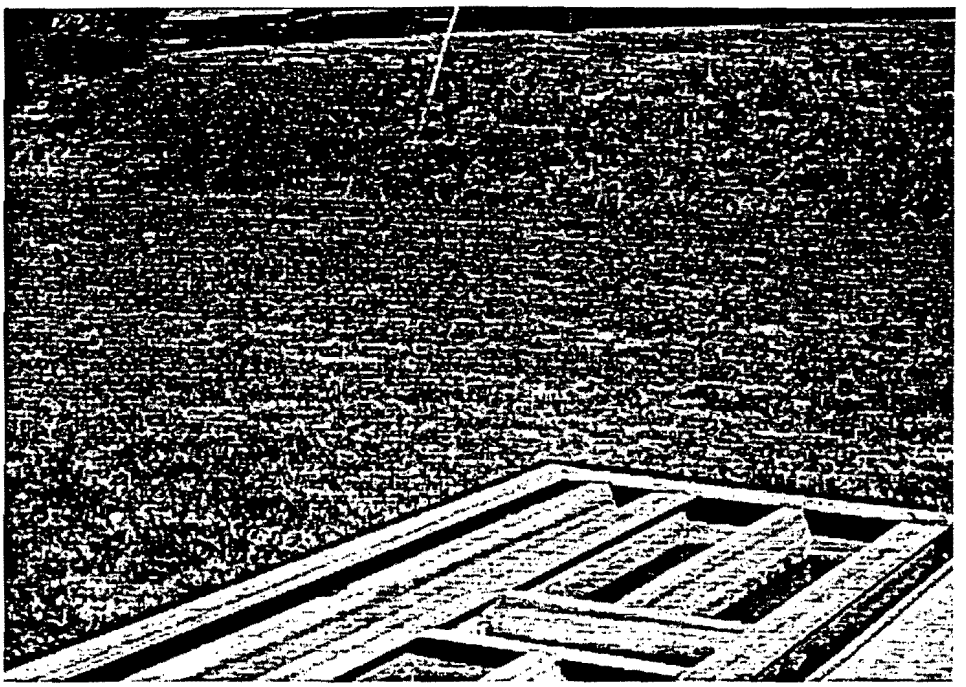
Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K., L. Holder, Jr., and R.G. Jones, December 1992. *Surveillance and Maintenance Plan for Waste Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, ORNL/ER-39, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 03_25.JPG



FACILITY CONTACT CHECKLIST

Unit Name: 3110 Filter House/Isotopes Ductwork
Unit Number:
Facility Manger/Contact: Hollis Wooten
Date:

Historic Use/Purpose:

Current Status: Held under negative pressure. Inactive, deactivated.

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Co-60, Eu-151, Ir-192 ducts and floors contain may have lead based paints on walls, no inventory stored.

Known Releases: Interior of facility as well as the concrete roof are contaminated with primarily Cs-137 and Sr-90. Please see attached radiological survey documentation.

S&M Responsibilities: ER-S&M Remedial Action Group

Database availability/contact:

Comments:

References:
Wooten Hollis, LMES, personal communication with Anita Parker, ASI, April 1997.

Date Prepared:

UNIT NAME: Isotopes Ductwork/3110 Filter House

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Located on Hillside Avenue, between Third Street and Fifth Street in the ORNL main plant area. ORNL grid coordinates are N 22,400 ft and E 31,290 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Site consists of a filter house connected to nearby buildings by underground ductwork. For specific information, see engineering drawings D39120 - D39125, D43475, D45152, and D45155. (ORNL 1990)

Dates Operated: Site began operation in early 1960s. Site was removed from service in 1986. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The Filter House was designed to handle air exhaust from cell ventilation in the isotopes area (Buildings 3028, 3029, 3030, 3031, 3032, 3033, and 3033A). This site also served Building 3038 and Building 3047. The Filter House received exhaust from connected buildings and transfer air to the 3039 stack. Inside the Filter House are 42 HEPA filters. Also inside is a floor drain that collected groundwater and transported it by gravity to a sump; water was then pumped to Tank WC-10 (liquid radioactive waste system). (ORNL 1990)

Waste Characteristics: Type of wastes are not identified but are known to include radionuclides. (ORNL 1990)

Release Data: Contamination results from continuous operation of the Filter House. Specific details of characterization and release data are not available. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & DI, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

October 23, 1996

Mr. Robert C. Sleeman, Director
Environmental Restoration Division
US Department of Energy
P O Box 2001
Oak Ridge TN 37831-8541

Dear Mr. Sleeman

FACILITY SURVEY AT #3110, ORNL

Enclosed is the Tennessee Department of Environment and Conservation, DOE-Oversight's (TDEC/DOE-O) report on the September 9, 1996, survey of facility #3110 HEPA Filter House for the Radioisotope Production Labs. While conducting the inspection the survey team noted the following concerns that the Department would like to bring to your attention.

- This structure and its drain system appear to have integrity and near-to long term stability, but are not state-of-the-art. When scored against criteria and other Oak Ridge Reservation facilities, this facility has been ranked as a moderate threat to the environment.
- In the internal, Lockheed Martin Energy Systems (LMES) *Environmental Restoration Contaminated Sites Summary Database*, facility #3110 is erroneously described as venting to the ***#3029*** stack, when in fact it vents to the ***#3039*** Central Rad. Stack. This office would like to receive confirmation that this correction has been made.
- The floor drains from #3110 go to LLLW Tank WC-10 (single walled) which is listed to be taken out of service. Any scheduled decontamination in #3110 should be done prior to the removal of WC-10.
- Future HEPA filter changeouts should be done in a manner to prevent further radiological contamination to the roof of the building.

If you have any questions or comments concerning this correspondence, please contact David Thomasson or Bud Yard at (423) 481-3032.

Sincerely

J. Dale Rector, Manager
Radiological Monitoring and Oversight Program

cc: Bryan Walker - DOE
Mark Belvin - DOE
Pat Halsey - DOE
Ken Cook - LMES
Joseph Weaver - LMER
Larry Owens - LMES
Kirk Wilson - LMER

rmo746.12

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DOE OVERSIGHT DIVISION

Facility Survey Program

RMO/SAFE SECTION

FACILITY SURVEY REPORT

Facility #3110

File Contents:

1. Cover sheet
2. Cover letter
3. Facility description
4. Facility survey form
5. Facility hazard index
6. Photographs taken by TDEC survey crew
7. Information packet received from Linda Hill, LMES

FACILITY SURVEY PROGRAM

FILE COVER SHEET

FACILITY #3110
HEPA Filter House for the Radioisotope Production Labs.

10-4-96

Location:
Facility #3110 is located on Hillside Ave., between Third St. and Fifth St., adjacent to and Southwest of the Central Rad. Stack (#3039), ORNL.

Description:
The facility is a 890 ft^2 reinforced concrete and concrete block building with no doors or windows. The only entry to the building is via openings in the roof, which are closed with concrete plugs and sealed with caulking. The two level building is connected to nearby buildings by underground ductwork, and houses a bank of prefilters and 42 HEPA filters that cleanse exhaust air from cell ventilation in the isotopes area and transfers it to the 3039 Stack. The site began operation in the early 1960s and was removed from service in 1986; however, it is still used to maintain negative pressure in the system. Filters were last changed in 1992. The facility contains no rad. or chemical inventory.

Related facilities:
3028, 3029, 3030, 3031, 3032, 3033, 3033A, 3038, 3047, 3039 Stack.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE-OVERSIGHT DIVISION
RADIOLOGICAL MONITORING AND OVERSIGHT PROGRAM
FACILITY SURVEY PROGRAM
STANDARD FORM

SF# 01 1-10-95

SITE: **ORNL**	DATE: **9-10-96**	TIME: **0930**	FACILITY NUMBER: **3110** ***HEPA Filter House for Isotopes Area***
SITE STAFF: ***Kirk Wilson***	SURVEY STAFF: ***Dave Thomasson, Bud Yard***	SURVEY TIME: **2 Hours**	FACILITY MANAGER: ***Kirk Wilson***
STATUS: ***Inactive but used to maintain negative pressure in system.***	YEAR BUILT: **Early 1960s**	PROGRAM AREA: ***Environmental Restoration***	FOLLOW UP: YES ☒ NO ☐

D & D Status:

Accepted ☐ Stand by ☐ EM-60 ☐ No D & D Status ☒

Facility Drawings Available:

1) Floor plan available? ***890*** sq. feet ☒ Yes ☐ No

2) Radiation survey map obtained for file? ☐ Requested ☒ Yes ☐ No

3) Plumbing and instrument (P&I) diagrams? ☒ Requested ☐ Yes ☒ No

(Related facilities information available) ***Related facilities: 3028, 3029, 3030, 3031, 3032, 3033, 3033A, 3038 (radioisotopes production labs.), 3037, and 3039 (Central Rad. Stack).***

Radiation Status of Facility:

4) Contaminated areas in facility? ☒ Yes ☐ No

Describe ***The interior of the facility is a respirator zone, and the entire interior of the facility is contaminated. Also, the concrete roof is saturated with nonremovable contamination that occurred during HEPA filter removal.***

5) Contaminated equipment in facility? ☒ Yes ☐ No

Describe ***It is assumed that whatever equipment is inside the bldg. is contaminated.***

6) Radioactive material storage areas? ☐ Yes ☒ No

7) Inventory list in facility survey file? ☒ Requested ☐ Yes ☒ No

8) Hot cells, glove boxes or vent. hoods in facility? ☐ Yes ☒ No

Describe

9) Radiation monitoring system available at exits? ☒ Yes ☐ No

List Type or Types ***Portable monitoring would be accomplished per RWP by the HP present.***

10) Radiation Work Permit (RWP) required? ☒ Yes ☐ No

Request copy ☒

11) Radioactive materials presently used or stored in the facility? ☒ Yes ☐ No

12) Radioactive materials ever used or stored in the facility? ☒ Yes ☐ No

13) Material history inventory list in facility survey file? ☐ Yes ☒ No

☒ Requested

14) Health Physics personnel present during survey? ☒ Yes ☐ No

List Health Physics personnel ***Tom Lay, Roger Underwood.***

Chemical Status of Facility

15) Contaminated area(s) in facility? ☐ Yes ☒ No

Describe

16) Contaminated equipment in facility? ☐ Yes ☒ No

Describe

17) Chemical storage areas in facility? ☐ Yes ☒ No

18) Inventory list in facility survey file? ☐ Yes ☒ No

☐ Requested

19) Hazardous or mixed waste permits required in facility? ☐ Yes ☒ No

List permit number(s)

20) PCB's present in facility? ☐ Yes ☒ No

21) Asbestos present in facility? ☐ Yes ☒ No

Health and Safety Restrictions in Facility:

22) Respirator area(s) in facility? ☒ Yes ☐ No

Location(s) ***The interior of the facility is a respirator zone.***

23) Physical hazard(s) in facility? ☐ Yes ☒ No

Description

24) Chemical hazards(s) in facility? ☐ Yes ☒ No

Description

25) Radiation hazards(s) in facility? ☒ Yes ☐ No

Description ***RWP with rad. survey is in file. Primary radionuclides are Cs 137 and Sr 90. However, a wide array of nuclides are probably present.***

26) Medical screening requirement(s) for entry to facility? ☐ Yes ☒ No

List requirements

27) Special clothing requirement(s) for entry into facility? ☒ Yes ☐ No

List requirements ***This is a full-face respirator zone.***

28) Training requirement(s) for entry into facility? ☒ Yes ☐ No

List requirements ***Rad. worker II.***

Environmental Controls: Drains and Water Source

29) Open drains in facility? ☒ Yes ☐ No

30) Plugged drains in facility? ☐ Yes ☒ No

31) Are drains labeled for intended use? ☐ Yes ☐ No

32) Drain termination point

Oak Ridge City Sewer System:	☐	ORNL Sanitary Sewer	☐
Other Sanitary Sewer System:	☐	ORNL Process Rad System	☐
Storm Sewer:	☐	ORNL LLLW Rad System	☒
Septic Tank:	☐	ORNL Storm Sewer	☐
Drain Field:	☐		

Other: ***The only drains are floor drains that flow by gravity to Tank WC-10, which is part of the liquid low-level waste system. WC-10 is a Category C, single walled tank that has been leak tested O.K. Drains and drain line are made of Sch. 40, seamless stainless steel.***

33) Water source for facility? ☐ Yes ☒ No

List source ***None.***

34) Are backflow prevention device(s) in place for water system? ☐ Yes ☒ No

List location ***NA.***

Environmental Controls: Tanks and Lines

35) Low level liquid waste lines associated with facility? ☒ Yes ☐ No

45) Describe interior condition. ***Unknown.***

46) Damage to floors, walls, windows or doors? ☐ Yes ☒ No

Describe ***No windows or doors.***

47) Housekeeping deficiencies? ☐ Yes ☐ No

48) Are evacuation routes posted? ☐ Yes ☐ No

49) Are exit lights operable? ☐ Yes ☐ No

50) Is lighting adequate? ☐ Yes ☐ No

51) Does fire prevention equipment exist at the facility? ☐ Yes ☒ No

Date Tested

52) Communications at facility during survey? ☒ Yes ☐ No

53) Is facility suitable for storage? ☐ Yes ☒ No

Possible limitations

Follow Up Actions

None.

Comments

References: LMES, Environmental Restoration Contaminated Sites Summary Sheet. Since the interior of this facility was not entered, questions 31, 47, 48, 49, 50 were left blank.

Internal Routing

RMO ☒ **WM** ☒ **ER** ☒ **CA/C** ☒

36) Are underground liquid storage tanks associated with facility? ☐ Yes ☒ No

Capacity, contents and serial #

37) Are above ground storage tanks associated with facility? ☐ Yes ☒ No

Capacity and contents

38) Spill prevention measures in place? ☐ Yes ☒ No

39) Concerns about liquid or sludge in sumps, canals or pools? ☐ Yes ☒ No

Describe

Potential For Environmental Release:

40) Does environmental release potential exist at the facility? ☐ Yes ☒ No

Describe possible pathway and likely contaminant(s) ***Release potential is considered very small.***

41) Are previous releases from the facility documented? ☐ Yes ☒ No

Describe incident(s) ***Although documentation of environmental release is lacking, the deposition of nonremovable contamination on the roof of the building that occurred during HEPA filter changeout, suggests some environmental release has probably occurred.***

Facility Structure:

42) Is power on in the facility? ☒ Yes ☐ No

43) Are access controls in place? ☒ Yes ☐ No

Type ***The only access to the building is through the roof holes, and these are plugged with concrete plugs. At present the plugs are caulked to prevent entry of rain water.***

44) Describe grounds condition. ***Minimal. The facility is pretty much surrounded by a street and the ductwork leading to the central rad. stack.***

LOCKHEED MARTIN

Memorandum

LTR #ER-CARD-96/122

Date: June 27, 1996

To: L. F. Hill

cc: J. H. Hooyman, ERPS Files - RC

From: K. A. Wilson, 6556B, MS-6410, 6-5290 KAWilson

Subject: **Information Request Response**

In response to your May 15, 1996, information request regarding Building 3110 at ORNL, I am supplying the following information:

1. Current radiological survey of Building 3110

   a. ORNL Radiological Survey dated 11-29-94
   This is the latest and current dose rate data for roof of 3110 filter house.

   b. 2-Radiological Survey Maps dated 8-5-92 and 9-17-92
   These are the latest smear data for the roof and filter wedges.

2. Drain diagram and survey for 3110 - Not available

3. Piping and instrumentation drawing - Not available

4. Any chemical and radiological inventory

   a. The building is a prefilter and high-efficiency particulate air (HEPA) filter house and does not carry any inventory.

5. Current Radiation Work Permit (RWP)

   a. 3-RWPs (88080,88081,88083)
   These were used during the last filter change in 1992. Full dress out with full face respirator was required.

The following description from the Environmental Restoration Contaminated Sites Summary Sheet is included as additional information:

WAG ID Number:	1.0
WAG Name:	Main Plant Area
Unit ID Number:	X01-0022
Unit Name:	Isotopes Ductwork/3110 Filter House

Location of Unit:	Located on Hillside Avenue, between Third Street and Fifth Street, in the ORNL main plant area. ORNL grid coordinates are N 22,400 and E 31,290.
General Dimensions and Capacities:	Site consists of a filter house connected to nearby buildings by underground ductwork. For specific information, see engineering drawings D39120 - D39125, D43475, D45152, and D45155.
Function of the Unit:	The Filter House is designed to handle air exhaust from cell ventilation in the isotopes area (Buildings 3028, 3029, 3030, 3031, 3032, 3033, and 3033A). This site also served Buildings 3038 and 3047. The Filter House receives exhaust from connected buildings and transfers air to the 3029 Stack. Inside the Filter House are 42 HEPA filters. Also, inside is a floor drain that collects groundwater and transports it by gravity to a sump, water is then pumped to Tank WC-10 (liquid low-level waste system).
Date of Operation:	Site began operation in early 1960s and was removed from service in 1986.
Waste Characteristics:	Type of wastes are not identified but are known to include radionuclides.
Release Data:	Contamination results from continuous operation of the Filter House. Specific details of characterization and release data are not available.
Regulatory Authority:	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)
Site Characterization Status:	Remedial Facility Investigation (RFI)
Comment:	No new information has been developed since original data sheet was prepared. The Filter House is considered inactive since the isotope cells that were exhausted through these filter banks are now inactive. Negative pressure is maintained throughout the exhaust system to safeguard against any release of contaminated particles. To maintain the negative pressure, leakage airflow is exhausted through the filters into the 3029 Stack. Filter pressure drop is monitored as an indicator for filter change-out.
Date Prepared:	April 1987

This is the extent of information available on Building 3110.

If you have questions or need further assistance, please contact my office.

KAW:reh

Attachments (7)

ERPS9606.12

Kirk Wilson

STATE OF TENNESSEE

FAX TRANSMITTAL MEMO

TO: Linda Hill Phone 241 5834
873-6451

FAX NUMBER: 576-6537

FROM: DAVID THOMASSON
TN DEPT OF ENVIRONMENT & CONSERV. DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD OAK RIDGE, TENNESSEE 37830-7072

SUBJECT: Facility Survey of #3110

DATE: 5-15-96

NUMBER OF PAGES INCLUDING THIS ONE: 2

IF YOU DO NOT RECEIVE THIS ENTIRE DOCUMENT OR HAVE ANY QUESTIONS.
CALL RECEPTIONIST

TELEPHONE NO: (423) 481-0995

FAX NO: (423) 482-1835

MESSAGE:
Linda, please provide the following information on facility #3110. The Manager is Kirk Wilson (65290). He is working on collecting the info. Thanks, Dave

BLDG. 3105 Roger Underwood
6-1603 Tom Lay

Mitch Carner
6-6532

Tennessee Department of Environment and Conservation
DOE Oversight Division

~~3031~~
~~6-1752~~
~~JOHN SLATEN~~

Information Request

☒ Linda Hill
~~Joe Weaver~~
ORNL
Bldg. 130 Mitchell Rd.,MS 6282
Oak Ridge TN 37831-6282
P: ~~241-3399~~ 241-5834
F: 576-6537
PAGE: 873-6451

☐ Sheila Thornton
K-25 Site
Bldg. K303-8 MS 7314
PO Box 2003
Oak Ridge, TN 37831-7314
P: 574-9525
F: 576-7662

As part of our continuing Tennessee Oversight Agreement efforts, the following has been requested.

* Information requests from Y-12 are to comply with Y-12 Document Access Procedures.

Document/Information Title/I.D. Number	Requested From	TDEC Date Received
① Current radiological survey of #3110.		
② Drain diagram and survey for #3110.		
③ Piping and instrumentation drawing.		
④ Any chemical and radiological inventory.		
⑤ Current RWP		

David Thomasson
Requested By

5-15-96
Request Date

em0166.99

U.S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS
OAK RIDGE ORAL SITE OFFICE

TRANSMITTAL OF INFORMATION

The enclosed is to fulfill a request made by the Tennessee Department of Environment and Conservation/DOE Oversight Division, as part of the *Tennessee Oversight Agreement* efforts. These documents have received the necessary reviews and may be released to the State.

TIO Release Approval: _____

Information enclosed: 3110 Rad Survey. Drain diagram and survey for 3110. Piping and instrumentation drawing. Any chemical and radiological inventory. Current RWP.

Requested by: David Thomasson

Requested from: Kirk Wilson

Approved: _____

William M. Belvin
Program Manager
DOE ORNL Site Office

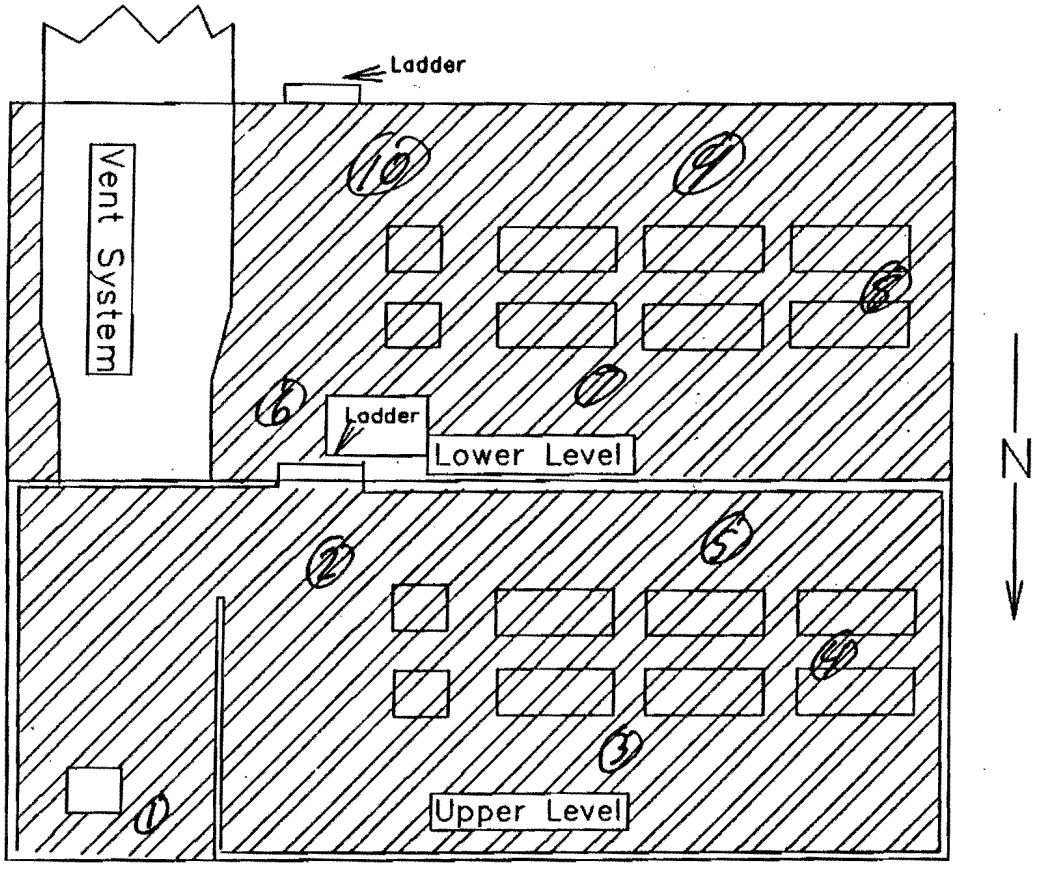
Date: _____

cc w/o enc: J. L. Weaver, 101MID, MS-6481

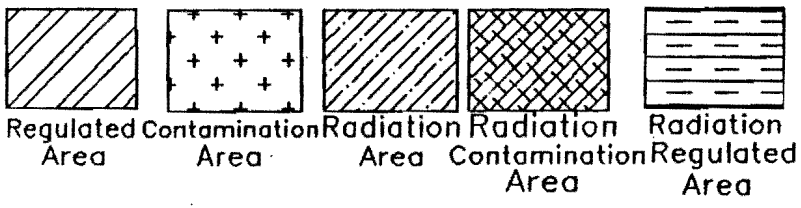
Radiological Survey Map

Building 3110 Date 8-5-92 H.P DRC

Inst# 2652-081 CTA-060 CTB-064 Comments General Background less than 0.2 mR/hr



Smears d/m	alpha	b/g
1	<20	<200
2	<20	<200
3	<20	<200
4	<20	<200
5	<20	<200
6	<20	<200
7	<20	<200
8	<20	<200
9	<20	<200
10	<20	<200

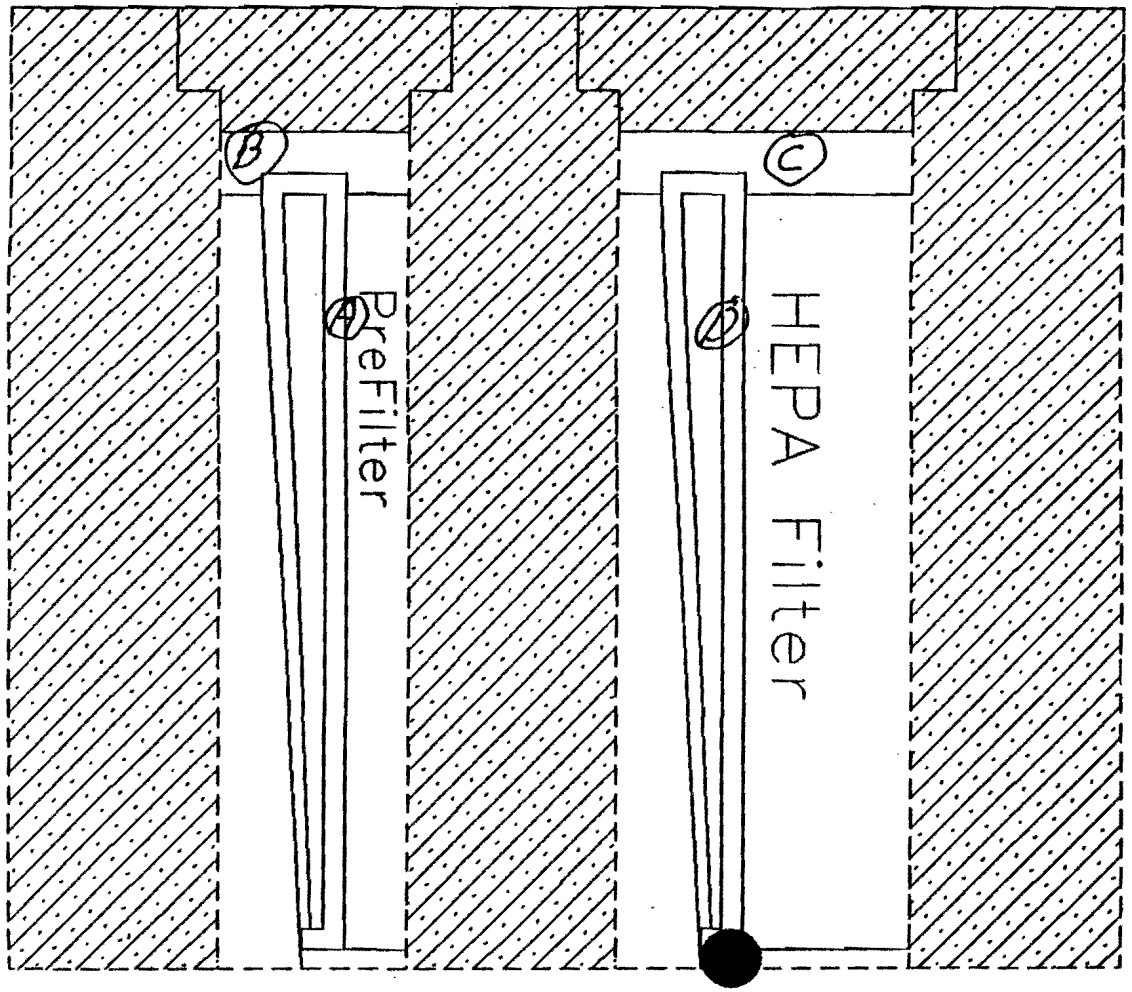


000063

Radiological Survey Map

Building 3110 Date 9/17/92 H.P. DR Anderson

Inst# _____ Comments (A) 1R/hr γ (B) 100mR/hr γ/500mR/hr (C) 27mR/hr β γ (D) 100mR/hr γ Smear from face of PreFilter 30mR/hr β γ 24,000 d/m α



Smears d/m	
alpha	b/g

0000064

ORNL RADIOLOGICAL SURVEY

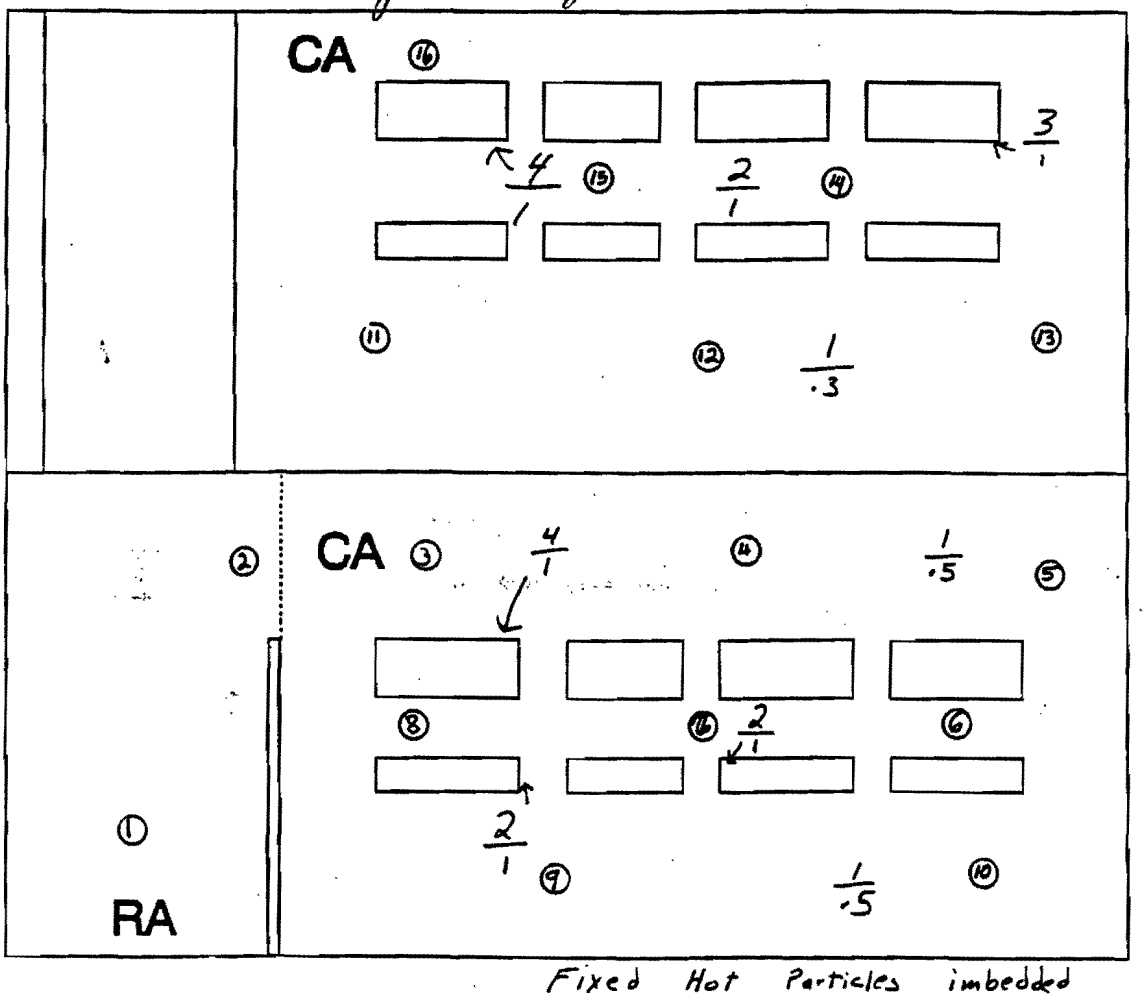
BLDG 3110	RCT R.A. Underwood	DATE 11-29-94

INSTRUMENTS CTA060 CTB064 2652-06I

TYPE OF SURVEY: ROUTINE ☒ SPECIAL ☐ RWP#

COMPLEX LEADER REVIEW R. L. Jeffers 11-30-94

$\frac{4}{1} = \frac{4\ mR/hr \text{ contact dose rate}}{1\ (\approx 30cm) \text{ from surface}}$



Fixed Hot Particles imbedded in concrete. No removeable contamination.

(#) - Smear Location	Boundary Designations	
(#)∿∿(#) - Large Area Smear	RA - Radiation Area	BA - Radiological Buffer Area
# - Contact Dose Rate	HR - High Radiation Area	CA - Contamination Area
# - 30 cm Dose Rate	VR - Very High Radiation Area	HC - High Contamination Area
# - General Area Dose Rate	AR - Airborne Radioactivity Area	FC - Fixed Contamination Area
SOP - Step-off Pad	RM - Radioactive Materials Area	SC - Soil Contamination Area
AS - Air Sample Location	UM - Underground Radioactive Material Area	

Default units are in mR/hr and are for open window beta/gamma readings. Letter suffixes with the number indicate specific radiations: B - Beta(mRad/hr), G - Gamma(mR/hr), N - Neutron(mRem/hr) Boundary designations are looking in the direction the arrow points.

SMEAR RESULTS			
D/M 100/CM2 UNLESS OTHERWISE NOTED			
#	ALPHA	BETA/GAMMA	LOCATION
1	<20	<200	
2	<20	<200	
3	<20	<200	
4	<20	<200	
5	<20	<200	
6	<20	<200	
7	<20	<200	
8	<20	<200	
9	<20	<200	
10	<20	<200	
11	<20	<200	
12	<20	<200	
13	<20	<200	
14	<20	<200	
15	<20	<200	
16	<20	<200	
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			

RADIATION WORK PERMIT (RWP)

FROM:	TO:	EXTENDED BY	TO:	WORK PERMIT NO.
DATE 9-17-92	DATE 9-17-92	DATE		88080
TIME 8AM	TIME 4PM	TIME		

Building: 3110

Room, Cell or Area: EXTERIOR ROOF

Equipment or Process Being Worked On: INSPECTION PLUGS,

Operation Being Performed: REMOVE AND REPLACE PLUGS TO MAKE RADIOLOGICAL READINGS

RADIATION SURVEY DATA (To be filled in by Health Physicist)

LOC. CODE	LOCATION	RADIATION TYPE	RADIATION mrem/hr.	CONTAMINATION PROBE	CONTAMINATION SMEAR	CONTAMINATION AIR	SURVEY BY	SURVEY DATE & TIME
A	Face of Pre Filter	Bγ	1000		~~Smear~~ 24Kd/m α		DRU	1330 9/17/9
B	Top of Pit	Bγ	100				DRU	1330 9/17/9
C	Face of HEPA	Bγ	100				DRU	1330 9/17/9
D	Top of Pit	Bγ	27				DRU	1330 9/17/9

INSTRUCTIONS *

RADIATION PROTECTION MONITORING REQUIRED: ☒ START OF JOB ☐ INTERMITTENT ☒ CONTINUOUS ☒ END OF JO

CONTACT RP FOR SURVEY BEFORE STARTING WORK IN A NEW LOCATION	✓	PROVIDE ASSISTANCE FOR REMOVAL OF PROTECTIVE CLOTHING	✓
TAPE COVERALLS TO GLOVES AND FOOTWEAR	✓	DO NOT WORK ALONE – STANDBY OBSERVER REQUIRED	✓
CHECK TOOLS AT END OF JOB	✓	AIR SAMPLING IN WORK AREA	
CHECK PERSONNEL AT END OF JOB *	✓	TIMEKEEPING REQUIRED	
PRE - JOB ALARA BRIEFING REQUIRED		POST - JOB DEBRIEFING REQUIRED	

REMARKS:

PROTECTIVE EQUIPMENT				MONITORING	
CAP		SHOE COVERS (1 PR.)	✓	SPECIAL METERING	
HOOD		PLASTIC BOOTIES (___ PR.)		DIRECT READING POCKET METER	
LAB COAT		RUBBERS/BOOTS		EXTREMITY MONITOR	
COVERALLS (1 PR.)	✓	PLASTIC GLOVES (___ PR.)		DOSE RATE ALARM	
PLASTIC SUIT		SURGEON'S GLOVES (___ PR.)		CUTIE PIE ID 2652-08I	
HALF MASK **		RUBBERIZED CANVAS GLOVES (___ PR.)		SURVEY METER ID 2652-24P	
FULL FACE MASK **	✓	HOUSEHOLD RUBBER GLOVES (1 PR.)	✓	ALPHA METER ID 2652-08B	
AIR - LINE HOOD **				AIR SAMPLER ID ___	
AIR - LINE SUIT **					

REGULAR APPROVALS	Radiation Protection Certification: D.R. Anderson	Supervision: R.E. Jones	Supervision
SPECIAL APPROVALS	Division Director	EHP Director	Lab. Associate Director

* Only items checked apply.

** Certification by Industrial Hygiene necessary for those required to wear respiratory protec

PERSONNEL EXPOSURE RECORD

PERSONNEL NAME	JOB *** CLASS.	DEPT.	P.R. NO.	LOC. CODE	Estimated Work Time	Planned Exposure (mrem)	TIME/DOSE RECORD BEGIN	END	BEGIN	END	BEGIN	END	Total Time	Estim Do (mr
U.C. Bowles	Rigger	3081	17199				1010	1100 10					50 min	<

*** Job Classification such as Welder, Electrician, Chemical Operator, Health Physicist, etc., should be recorded in this column.

TIMEKEEPER Name: D.R. Anderson

Department: 000087

RADIATION WORK PERMIT (RWP)

FROM: DATE 9-24-92 TIME 8AM
TO: DATE 9-24-92 TIME 4PM
EXTENDED BY DATE TIME
TO: WORK PERMIT NO. 88081

Building: 3110 FILTER HOUSE
Room, Cell or Area: EXTERIOR ROOF
Equipment or Process Being Worked On: FILTERS

Operation Being Performed: REPLACE CONTAMINATED FILTERS

RADIATION SURVEY DATA (To be filled in by Health Physicist)

LOC. CODE	LOCATION	RADIATION TYPE	RADIATION mrem/hr.	CONTAMINATION PROBE	CONTAMINATION SMEAR	CONTAMINATION AIR	SURVEY BY	SURVEY DATE & TIME
A	Gen BKg	BJ	~50				DRA	9/24/ 0800
B	Filters	BJ	up to 1R/hr		24000d/m∝		DRA	9/24/
C	Ply wood Box of Filters	BJ	500				DRA	9/24/
D								

INSTRUCTIONS *

RADIATION PROTECTION MONITORING REQUIRED: ☒ START OF JOB ☐ INTERMITTENT ☒ CONTINUOUS ☒ END OF JO

				PROTECTIVE EQUIPMENT				MONITORING	
CONTACT RP FOR SURVEY BEFORE STARTING WORK IN A NEW LOCATION		PROVIDE ASSISTANCE FOR REMOVAL OF PROTECTIVE CLOTHING	✓						
TAPE COVERALLS TO GLOVES AND FOOTWEAR	✓	DO NOT WORK ALONE – STANDBY OBSERVER REQUIRED	✓	CAP		SHOE COVERS (2 PR.)	✓	SPECIAL METERING	
CHECK TOOLS AT END OF JOB	✓	AIR SAMPLING IN WORK AREA		HOOD		PLASTIC BOOTIES (___ PR.)		DIRECT READING POCKET METER	✓
CHECK PERSONNEL AT END OF JOB	✓	TIMEKEEPING REQUIRED		LAB COAT		RUBBERS/BOOTS		EXTREMITY MONITOR	
PRE - JOB ALARA BRIEFING REQUIRED	✓	POST - JOB DEBRIEFING REQUIRED		COVERALLS (1 PR.)	✓	PLASTIC GLOVES (___ PR.)		DOSE RATE ALARM	
REMARKS:				PLASTIC SUIT		SURGEON'S GLOVES (___ PR.)		CUTIE PIE ID 02L 2652098T	
				HALF MASK **		RUBBERIZED CANVAS GLOVES (___ PR.)		SURVEY METER ID 2652-241P	
				FULL FACE MASK **	✓	HOUSEHOLD RUBBER GLOVES (2 PR.)	✓	ALPHA METER ID 2652[illegible]	
				AIR - LINE HOOD **				AIR SAMPLER ID ___	
				AIR - LINE SUIT **					

REGULAR APPROVALS	Radiation Protection Certification: DR Anderson	Supervision: [illegible]	Supervision: RW Sutter
SPECIAL APPROVALS	Division Director	EHP Director	Lab. Associate Director

* Only items checked apply.

** Certification by Industrial Hygiene necessary for those required to wear respiratory protec

PERSONNEL EXPOSURE RECORD

PERSONNEL NAME	JOB *** CLASS.	DEPT.	P.R. NO.	LOC. CODE	Estimated Work Time	Planned Exposure (mrem)	TIME/DOSE RECORD BEGIN	END	BEGIN	END	BEGIN	END	Total Time	Estim Do (mr
ED Childers	Rigger	3081	14446				1330	1515					1.75 hr	2.
							110	132						
C Dykes	Rigger	3081	28271				1330	1530					2 hrs	2
							85	87						
DG Edds	I&C	3191	29424				1330	1345					.25 hrs	<
							0	0						
DR Anderson	HP	3175	28715				1330	1500					1.5 hr	2
							0	20						
AC Duncan	Mill Wright	3079	24227				1330	1515					1.45 hr	1
							1	18						
B Robinson	Mill Wright	3079	21398				1330	1515					1.45 hr	1
							3	20						
JM Rose	Mill Wright	3079	14890				1330	1515					1.45 h	2
							28	48						
Al Fraker	Carpen	3079	29580				30	9						
H. Hues	Carpen	3079	13428				[illegible]	10						

*** Job Classification such as Welder, Electrician, Chemical Operator, Health Physicist, etc., should be recorded in this column.

TIMEKEEPER Name [illegible] Department 3175

RADIATION WORK PERMIT (RWP)

FROM:	TO:	EXTENDED BY	TO:	WORK PERMIT NO.
DATE 9-30-92	DATE 9-30-92	DATE		88083
TIME 8AM	TIME 4:30PM	TIME		

Building: 3110 Filter House
Room, Cell or Area: Exterior Roof
Equipment or Process Being Worked On: Filters
Operation Being Performed: Replace Absolute Filters

RADIATION SURVEY DATA (To be filled in by Health Physicist)

LOC. CODE	LOCATION	RADIATION TYPE	RADIATION mrem/hr.	CONTAMINATION PROBE	CONTAMINATION SMEAR	CONTAMINATION AIR	SURVEY BY	SURVEY DATE & TIME
A	General Wks Bks	BY	50		15,000		DRA	0900 9-30
B	Filters up to	BY	1000				DRA	0900 9-30
C								
D								

INSTRUCTIONS *

RADIATION PROTECTION MONITORING REQUIRED: ☒ START OF JOB ☐ INTERMITTENT ☒ CONTINUOUS ☒ END OF JOB

				PROTECTIVE EQUIPMENT				MONITORING	
CONTACT RP FOR SURVEY BEFORE STARTING WORK IN A NEW LOCATION		PROVIDE ASSISTANCE FOR REMOVAL OF PROTECTIVE CLOTHING	✓						
TAPE COVERALLS TO GLOVES AND FOOTWEAR	✓	DO NOT WORK ALONE – STANDBY OBSERVER REQUIRED	✓	CAP		SHOE COVERS (2 PR.)	✓	SPECIAL METERING	
CHECK TOOLS AT END OF JOB	✓	AIR SAMPLING IN WORK AREA		HOOD		PLASTIC BOOTIES (___ PR.)		DIRECT READING POCKET METER	✓
CHECK PERSONNEL AT END OF JOB	✓	TIMEKEEPING REQUIRED		LAB COAT		RUBBERS/BOOTS		EXTREMITY MONITOR	
PRE - JOB ALARA BRIEFING REQUIRED		POST - JOB DEBRIEFING REQUIRED		COVERALLS (1 PR.)		PLASTIC GLOVES (___ PR.)		DOSE RATE ALARM	
REMARKS:				PLASTIC SUIT		SURGEON'S GLOVES (___ PR.)		CUTIE PIE ID 2652-08I	
				HALF MASK **		RUBBERIZED CANVAS GLOVES (___ PR.)		SURVEY METER ID 2652-24P	
				FULL FACE MASK **	✓	HOUSEHOLD RUBBER GLOVES (2 PR.)	✓	ALPHA METER ID 2652-08B	
				AIR - LINE HOOD **				AIR SAMPLER ID ___	
				AIR - LINE SUIT **					

REGULAR APPROVALS	Radiation Protection Certification: [signature]	Supervision: [signature]	Supervision: [signature]
SPECIAL APPROVALS	Division Director	EHP Director	Lab. Associate Director

* Only items checked apply.

** Certification by Industrial Hygiene necessary for those required to wear respiratory protect

PERSONNEL EXPOSURE RECORD

PERSONNEL NAME	JOB *** CLASS.	DEPT.	P.R. NO.	LOC. CODE	Estimated Work Time	Planned Exposure (mrem)	TIME/DOSE RECORD BEGIN	END	BEGIN	END	BEGIN	END	Total HRS	Estim Do (mre
FD Childers	R.S.	3081	14446	A			0930 20	1130 40					2hrs	2
AC Duncan	Mill Wright	3079	24227	A			0930 17	1120 32					2hrs	1
JM Rose	Mill Wright	3079	14890	A			0930 50	1130 72					2hrs	2
B Robinson	Mill W	3079	21398	A			0930 20	1130 49					2hrs	2
C Dykes	R.S.	3081	28271	A			0930 110	1130 121					2hrs	1
HK Hughes	Carpen.	3079	13428	A			1000 9	1100 22					1	1
RD Collins	Carpen	3079	15321	A			1600 9	1100 22					1	1
DG Edds	IH	3191	29424	A			0930 20	0950 20					.3	<

*** Job Classification such as Welder, Electrician, Chemical Operator, Health Physicist, etc., should be recorded in this column.

TIMEKEEPER Name: [signature] Department: 000069

FACILITY CONTACT CHECKLIST

Unit Name: Waste Evaporator 3506
Unit Number:
Facility Manger/Contact: Gerry Mandry
Date:

Historic Use/Purpose:

Current Status: Demolished - a below grade structure still exists but it was backfilled and covered in

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: N/A

Known Releases: N/A

S&M Responsibilities:

Database availability/contact:

Comments:

References:
Mandry, Gerry, LMES, personal communication with Anita Parker, ASI, April 8, 1997.

Date Prepared:

FACILITY CONTACT CHECKLIST

Unit Name: 3505 Transfer Canal and Dissolver Pit
Unit Number:
Facility Manger/Contact: Gerry Mandry/Tim Cofer
Date:

Historic Use/Purpose:

Current Status: Transfer canal was filled with rock. The dissolved pit is in passive operation; it collects rainwater coming in through the roof of the building. It was previously pumped periodically to Tank WC-10 but WC-10 has been taken out of commission (~1993). Plutonium levels are high in the dissolve pit and the pit may leak. (Mandry 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: The transfer canal contains spots up to 10 R/hr. (Mandry 1997)

Known Releases: Possible release to soil/groundwater under the building via drains. It is unknown if a release has occurred. (Mandry 1997)

S&M Responsibilities:

Database availability/contact:

Comments: Considered an underground storage tank (inactive).

References:
Gerry Mandry LMES, personal communication with Anita Parker, ASI on April 7, 1997.

Date Prepared: April 1997

FACILITY CONTACT CHECKLIST

UNIT NAME: Transfer Canal and Dissolver Pit (3505)

Unit Number: 01.63

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Located on the west side of the Metal Recovery Facility Building (3505) which is located north of White Oak Avenue. ORNL grid coordinates are N 21,860 ft and E 30,830 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Transfer canal is 6 x 35 x 14 ft deep concrete basin. Dissolver pit is about 8 x 10 ft wide and 10-ft deep with aboveground shield blocks and piping connections. (Ford et al 1992)

Dates Operated: 1952 - 1960. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Used to handle fuel elements (slugs) prior to dissolving the fuel element cladding for uranium recovery. Water was used as shielding. It is connected to the dissolver pit by a 3 in slug chute. (Ford et al 1992)

Waste Characteristics: Canal wall and water probably slightly contaminated with Sr-90, Cs-137, Co-60 and uranium and plutonium isotopes. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee. 1992.

FFA, effective date January 1, 1992. EPA, DOE and TDEC, *Federal Facility Agreement for the Oak Ridge Reservation*, DOE/OR-1014, Appendix C (updated February 13, 1996), Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 09_19.JPG

Unit Name: 3001 Storage Canal
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: Emptied and filled with Grout 3/25/97 (Tim Cofer, 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:
Tim Cofer (April 1997) personal communication with Anita Parker on April 7, 1997.

Date Prepared:

UNIT NAME: 3001 Storage Canal

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992) RCRA closure for sediments - final closure deferred to CERCLA. (Kaiser 1996)

Unit Location: The canal connects the Graphite Reactor (3001) with the Radiochemical Processing Pilot Plant (3019). These two buildings are located on Hillside Avenue near Third Street. Approximate ORNL grid coordinates are N 22,530 ft and E 31,100 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The canal is 7.0 ft (2.1 m) wide, 11.5 ft (3.5 m) deep, and 101.0 ft (31.0 m) long. The canal is covered with a concrete structure and soil. Water capacity of canal is 62,000 gal (235,000 L). (Bechtel et al 1992)

Dates Operated: 1943 - 1990. (Bechtel et al 1992)

Present Function: Not in operation.

Life Cycle Operation: The Oak Ridge Graphite Reactor fuel storage canal connected the fuel discharge pit to the adjoining chemical-processing building (3019). It was used for underwater transfer of spent fuel from the reactor for Building 3001. The canal was in operation from 1943 to 1963 when the reactor was shut down. The canal was then used for storage of radioisotopes until 1990. A leak was discovered in 1990 and removal of the stored material was initiated. Removal of the RCRA - contaminated sludges in the canal began in 1992 in accordance with an approved RCRA closure plan. (Bechtel et al 1992, Kaiser 1996)

Waste Characteristics: Stored isotopes include Co-60 and Sr-90. The canal also contains ~ 1 m(E+3) of contaminated sludge containing Pu-239 (primarily), Pu-238, Am-241, and Cm-244. (ORNL 1990)

Release Data: The canal has bare concrete walls that have absorbed long-lived fission products and Co-60, and probably TRU. Results of radiation surveys were reported in 1984. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: A RCRA Final Closure Plan for the 3001 Storage Canal was issued in 1990 (revised March 1992). A subsequent Engineering Evaluation/Cost Analysis for Building 3001 was issued September 1996, and an Action Memorandum for Building 3001 Canal was issued November 1996. (ORNL 1996)

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Kaiser, Linda, November 1996. ORNL Program Planning Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

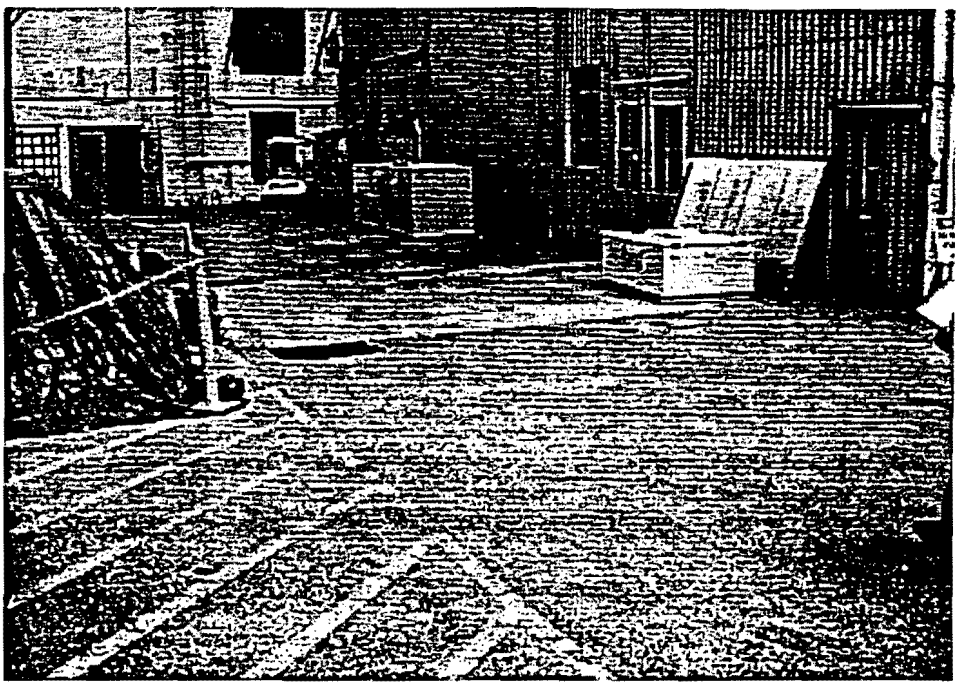
Oak Ridge National Laboratory, September 1996. *Engineering Evaluation/Cost Analysis for Building 3001 Canal, Oak Ridge National Laboratory*, DOE/OR/02-1502 & D2, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, November 1996. *Action Memorandum for Building 3001 Canal, Oak Ridge National Laboratory*, DOE/OR/02-1533 & D2, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, March 1996. *RCRA Final Closure Plan for 3001 Storage Canal*, ORNL/TM-11684, Rev. 2, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 02_06.JPG



Health Risk Assessment for the 3001 Storage Canal
ORNL/ER-51

3. SITE BACKGROUND

The Building 3001 Storage Canal is L-shaped (Figs. 1 and 2) and runs south and then west to the Radiochemical Processing Plant (Building 3019). During pilot operation of the reactor, between 1943 and 1963, the canal was used to transport irradiated fuel from Building 3001 to Building 3019. First the spent uranium fuel slugs were collected in a pit at the head of the canal. Then they were transported underwater by means of an overhead crane to Building 3019. An estimated 200 slugs ruptured in the reactor core and were subsequently transferred through the canal. The contents of some of these slugs can be expected to be present in the sediment at the bottom of the canal. After shutdown of the reactor, the canal was used to store radioisotopes. An estimated 600 to 700 slugs of ^{60}Co and 14 capsules of ^{90}Sr were in the canal, but they have recently been removed.

Action Memorandum for Building 3001 Canal

1. PURPOSE

This action memorandum documents approval of the removal action proposed in the *Engineering Evaluation/Cost Analysis for Building 3001 Canal at the Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE 1996) to replace the shielding protection provided by water with a specific grout formulation. The objective for replacing the shielding protection is to reduce or eliminate potential future risk to human health and the environment and to reduce surveillance and maintenance cost of this canal.

2. SITE CONDITIONS AND BACKGROUND

2.1 SITE DESCRIPTION

2.1.1 Physical Location

Oak Ridge National Laboratory (ORNL) is in East Tennessee near the southern boundary of the U.S. Department of Energy (DOE) Oak Ridge Reservation (ORR), approximately 40 km (24 miles) west of Knoxville and 18 km (11 miles) southwest of the city of Oak Ridge business area (Fig. 1). The closest cities to ORNL are Lenoir City, population 6,100, and Oak Ridge, population 27,000.

Building 3001 Canal is located within the ORNL main plant on top of a small rise in the center of Bethel Valley. This rise is substantially lower in elevation than the two ridges that form Bethel Valley. Surface water and groundwater drain to the south toward White Oak Creek.

The canal runs under a paved alley approximately 15 m (50 ft) wide from beneath the Graphite Reactor in Building 3001 to Building 3019. Numerous other buildings, storm drains, and underground utilities are near the canal, but other than Buildings 3001 and 3019, none were directly associated with operation of the canal. Much of the surface area not occupied by buildings is covered with asphalt or concrete.

2.1.2 Building 3001 Canal Evaluation

In a 1990 evaluation, sediment samples from the canal exceeded Toxicity Characteristic Leaching Procedure (TCLP) limits for lead and cadmium. The sediment was removed during clean closure in 1992. Analysis following the 1992 Resource Conservation and Recovery Act of 1976 (RCRA) closure indicated that all sampled contents of the canal are well below toxic limits for heavy metals. Current analysis of the demineralized water indicates ^{137}Cs content of

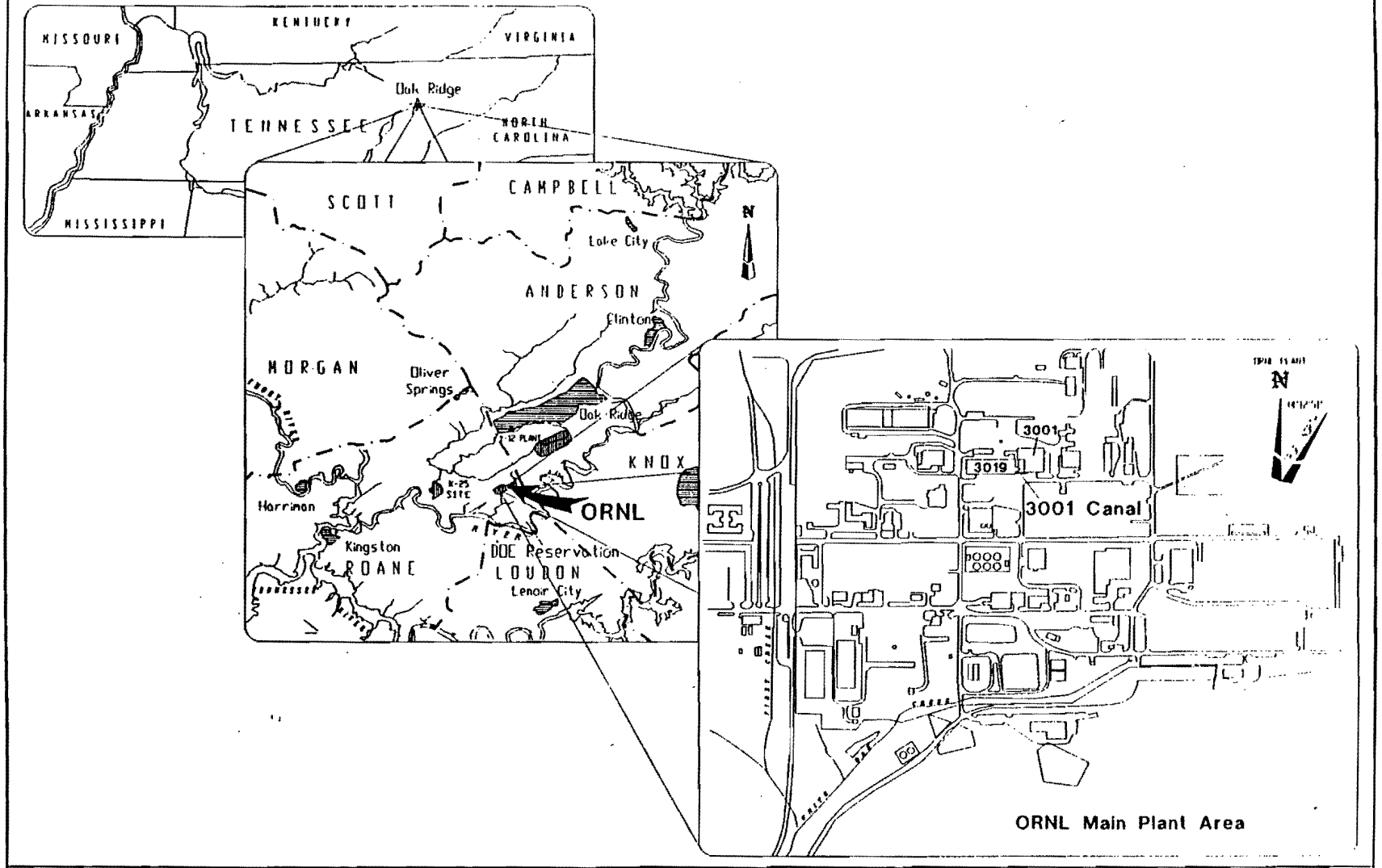


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Fig. 1

Regional location map

DOE - ORNL, 3001 Canal - Oak Ridge, Tennessee

DOCUMENT ID	DRAWING ID	DRAWING DATE
3SH830 0104 40 / ACTION MEMO	96 13114 DWG	OCTOBER 4 1996

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100 Bq/L (2,700 pCi/L) and ^{90}Sr at 80 Bq/L (2,160 pCi/L), respectively. Other radionuclides are well below the DOE derived concentration guide. The level of radionuclides in the water is maintained by a demineralizer, which removes contaminants. The work area around the canal is both a radiation and contamination zone requiring personal protective clothing, thermoluminescent dosimeters, and a radiation work permit to enter the area.

2.1.3 Site Background and Configuration

ORNL was built in the early 1940s to support weapons production and later, medical, energy, and other research. The Graphite Reactor, with its supporting equipment, played a major role in these efforts. Spent uranium fuel slugs were dropped from the Graphite Reactor into a water-filled pit below Building 3001 and transported underwater to Building 3019 through the 3001 Canal. An overhead crane was used to move the submerged assemblies.

The canal is located beneath the Graphite Reactor in Building 3001 and extends underground to Building 3019 in an "L" shape (Fig. 2). The north-south leg under Building 3001 is approximately 23 m (76 ft) long and 2.1 m (7 ft) wide. The east-west leg under Building 3019 is approximately 23 m (76 ft) long but only 1.5 m (5 ft) wide. At the north end adjacent to and below the Graphite Reactor, the canal has a 2.1 by 2.4 m (7 by 8 ft) pit nearly 6.1 m (20 ft) deep. The lower pit walls and floor are lined with ceramic tiles set in a waterproof grout. The remainder of the canal slopes from a depth of 3.2 m (10.5 ft) near Building 3019 to 3.5 m (11.5 ft) near Building 3001. A walkway runs the entire length of the canal except for the extreme west end under Building 3019. The ceiling of the walkway is at grade level. The wall of Building 3019 extends into the canal water approximately 0.76 m (2.5 ft), separating the airspace in the canal hallway from that in Building 3019. The lowest point on this wall is approximately 2.7 m (9 ft) above the bottom of the canal. The quantity of water in the canal is maintained automatically at approximately 234,670 L (62,000 gal).

2.1.4 Release or Threatened Release of Contaminants

Approximately 1,514 L (400 gal) of demineralized water per day must be added to the canal because of leaks and evaporation. Although the canal walls were slightly damaged by the low pH of demineralized water used during reactor operations, they are essentially intact. However, construction joints exist along the canal bottom and canal walls. These joints were sealed with oakum, an expansion joint compound, placed into the formed recesses at the bottom of the canal walls. Also, a water stop made of copper sheets was embedded in the concrete between the wall sections. Some of these joints may have failed, allowing the water to leak from the canal.

The fate of the contaminated water is unknown, creating a need to control this potential release to the environment.

2.1.5 National Priorities List Status

Because of past waste disposal operations, ORR, including Building 3001 Canal, was placed on the National Priorities List in 1989. DOE, the U.S. Environmental Protection Agency (EPA), and the Tennessee Department of Environment and Conservation (TDEC) entered into a Federal Facility Agreement (FFA) that establishes interagency procedures, defines the decision-making process, and establishes schedules for environmental restoration at ORR.

2.2 OTHER ACTIONS TO DATE

2.2.1 Previous Actions

In 1990, sediment samples from the canal indicated lead and cadmium over TCLP limits. The RCRA hazardous characteristic waste sediments were removed in 1992 following a RCRA clean-closure plan. Sediment that accumulated on the bottom of the canal was removed and disposed of at a low-level waste (LLW) disposal site. Radioactively contaminated objects recovered from the bottom of the canal were placed into baskets that were left submerged in the canal after sediment removal activities were completed. These four 2-gal baskets, a 5-gal bucket, five 55-gal stainless-steel drums, and various radioactive objects inside them were removed in a separate action during fiscal year 1996.

No other actions have been taken to reduce the risk from a potential release of contaminated Building 3001 Canal contents since the canal was closed in 1992.

2.2.2 Current Actions

In 1996, DOE, TDEC, and EPA agreed to initiate a non-time-critical removal action to eliminate future risks and cost-effectively reduce the surveillance and maintenance cost on the canal. This removal action is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to eliminate leaks from the canal, which potentially poses future risks to human health and the environment until a final action can be implemented for this site.

TDEC, EPA, and DOE reviewed and approved the engineering evaluation (EE)/cost analysis (CA), which developed, evaluated, and recommended an alternative. A public comment period was provided for community participation; however, no public comments were received.

This action memorandum is prepared to document the decision to implement the selected alternative and address any comments about the proposed action.

2.3 REGULATORY ROLES OF STATE AND LOCAL AUTHORITIES

2.3.1 State Actions to Date

The state of Tennessee is a party to the FFA under which the Building 3001 Canal removal action was initiated. TDEC and EPA have actively participated in the decisions of this non-time-critical removal action by attending strategy meetings and providing review and comments on the DOE-approved EE/CA (DOE 1996).

2.3.2 Potential for Continued State Response

TDEC does not consider this removal action involving replacement of existing shielding protection as a final action. In the future, TDEC and EPA will evaluate the necessity of follow-on actions appropriate for remediating the Building 3001 Canal and its vicinity.

Notice of the proposed action was published locally September 16, 1996.

3. STATUTORY AND REGULATORY AUTHORITIES AND THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

Section 104 of CERCLA addresses responses to releases or threats of releases through removal actions. Executive Order 12580 delegates the response authority to DOE for all DOE sites. DOE is authorized to remove or arrange for the removal of and provide for the remedial action relating to a hazardous substance, pollutant, or contaminant that is released or threatening to be released into the environment when the contaminant presents an imminent and substantial danger to public health or welfare. As part of its removal action authority, DOE can undertake any type of investigation, survey, or testing necessary to plan, design, and carry out the removal action. The potential release of radiological contaminants from the Building 3001 Canal is a risk significant enough to warrant this removal action.

9. RECOMMENDATION

This decision document selects replacement of the radiation shielding material by simultaneously filling the canal with a low-permeability CLSM while removing the canal's water inventory. This action will stop any potential leakage into the surrounding soil and groundwater and minimize S&M cost until additional remedial action is taken. The document is developed in accordance with CERCLA as amended and is consistent with the NCP.

10. REFERENCES

Chidambariah, V., and R. K. White. 1991. *Health Risk Assessment for the Building 3001 Storage Canal at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, ORNL/ER-51. Prepared for the U.S. Department of Energy (DOE) Office of Environmental Restoration and Waste Management by the Office of Risk Analysis, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN.

DOE (U.S. Department of Energy). 1996. *Engineering Evaluation/Cost Analysis for Building 3001 Canal, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1502&D2. Oak Ridge, TN.

Energy Systems (Lockheed Martin Energy Systems). 1995. *ORNL Site Surveillance and Maintenance Program Task Order Proposal*, EPIC-FY 95-014. Oak Ridge, TN.

Ford, M. K., L. Holder, Jr., and R. G. Jones. 1992. *Surveillance and Maintenance Plan for Water Area Groupings at Oak Ridge National Laboratory, Oak Ridge, Tennessee, for FY 1993–2002*, ORNL/ER-39. Prepared by Waste Management and Remedial Action Division, ORNL, Oak Ridge, TN.

RCRA
3001 Canal
ORNL/TM-11684

CLOSURE PLAN, POST-CLOSURE PLAN, AND FINANCIAL REQUIREMENTS
1.0 CLOSURE PLAN

The Oak Ridge National Laboratory (ORNL), located 40km (25 mi) west of Knoxville, Tennessee, began operating in 1943. Initially part of the Manhattan Project, post-World War II research has continued in the area of atomic energy and in other nuclear products applications. The facility, currently managed by Martin Marietta Energy Systems, Inc., for the U. S. Department of Energy (DOE), is part of the DOE Oak Ridge Reservation. Other major facilities located within the boundaries of the reservation include the Oak Ridge K-25 Plant and the Y-12 Plant.

This plan is written as a Resource Conservation and Recovery Act (RCRA) closure plan addressing where applicable, all RCRA requirements. However, the 3001 Storage Canal is presently being assessed under Comprehensive Environmental Response Compensation and Liability Act (CERCLA) authority as a part of Waste Area Grouping 1 (WAG 1). Since the final remediation method has not been determined, this plan describes a RCRA closure to ensure the protection of human health and the environment in a manner consistent with RCRA until such time as activities can be implemented under the CERCLA program and the DOE decontamination and decommissioning program for surplus facilities. RCRA requirements for closure of the tank and other related requirements are addressed to the extent that plans have been determined.

1.1 DESCRIPTION OF THE FACILITY

The 3001 Storage Canal is located under portions of Buildings 3001 and 3019 at ORNL and has a capacity of approximately 62,000 gallons of water. (Figures 1.1 and 1.2 are photographs of the canal.) Design drawings of the canal are present in Figures 1.3, 1.4, and 1.5. The term canal has historically been used to identify this structure. However, the canal is an in-ground reinforced concrete structure satisfying the regulatory definition of a tank. The canal is 7.0-ft (2.1 m) wide, 101.0-ft (31.0 m) long, and is 10.5-ft (3.2 m) deep at one end and 11.5-ft (3.5 m) deep at the other end. The shallow end includes a

deep pit that is 7 feet wide, 7 feet long, and is 11 feet deeper than the canal floor. The canal floor and walls are bare concrete which has absorbed long-lived fission products and cobalt-60, and possibly transuranic metals such as plutonium-239, plutonium-238, and americium-241. The canal is in the lower level/basement of each building and is kept filled with water to provide shielding for the radioisotopes and irradiated samples that were stored in the canal and for radionuclides absorbed in the concrete walls and floor. The floor, walls, and ceiling of the basement housing the canal are constructed of concrete.

1.2 TANK HISTORY

The storage of RCRA hazardous waste was not the original purpose of the canal but the result of radioactive source materials being handled in the canal for many years, and the resulting buildup of residual heavy metal containing sediments. From 1943 through 1963, the canal in Building 3001 was designed to be an integral part of the system for handling irradiated fuel from the Oak Ridge Graphite Reactor. Because one of the main initial purposes of the reactor was to produce plutonium for the chemical processing pilot plant in Building 3019, the canal was designed to be the connecting link between the reactor and the pilot plant. During the war years, natural uranium slugs were irradiated in the reactor and then pushed out of the graphite matrix into the system of diversion plates and chutes which directed the fuel pieces through the shield as they were lowered to the deep pit of the canal. The deep pit was designed to be deeper than the rest of the canal so as to be more certain of adequate shielding for the freshly irradiated fuel slugs. After shutdown of the reactor, the canal was no longer needed for its designed purpose. Since 1964, the canal has only been used to store radioisotopes and irradiated samples under a water pool for radiation protection. The primary radioactive constituents in the canal are cesium-137 and cobalt-60.

The sediments in the canal are transuranic (TRU) and RCRA waste. The TRU classification is due to the high level of radioactivity in the sediments (see radiation analyses in the Appendix). The Resource Conservation and Recovery Act (RCRA) hazardous constituents in the sediments in the canal have been identified from testing conducted in 1990, and confirmed the sediment in the bottom to be a RCRA characteristic hazardous waste, exceeding the Toxicity Characteristic Leaching Procedure (TCLP) standard only for

cadmium and for lead. None of the overlying water sample analyses exceeded the TCLP standards. Average sediment TCLP results are presented in Table 1.1. Additional data is contained in Appendix I.

1.3 CLOSURE PERFORMANCE STANDARD

The Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) have developed a closure and post closure performance standard as part of the Interim Status Closure and Post-Closure regulations (TN Rule 1200-1-11-.05(7)(b)). The standard requires that all hazardous waste management facilities be closed in a manner that (1) minimizes the need for further maintenance, and (2) controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decompostion products to the ground water or surface waters, or to the atmosphere. The Oak Ridge National Laboratory has prepared the 3001 Storage Canal Final Closure Plan in accordance with this standard.

1.4 RCRA CLOSURE AND CERCLA ACTIVITIES

RCRA closure of the 3001 Storage Canal is planned in FY 1992. A RCRA closure phase is necessary because of the complex considerations involved in closing a tank containing both TRU and RCRA materials and the necessity of integrated WAG 1 CERCLA closure, of which the 3001 Storage Canal is a part. The RCRA closure will be conducted in accordance with the performance standards specified in Section 1.3 above. Since the final remediation may not occur for an extended period of time, the RCRA closure will provide additional provisions to ensure the protection of public health and the environment. Final remediation will occur when WAG 1 is remediated under CERCLA and DOE's decontamination and decommissioning program.

The maximum extent of operations during the life of the facility, until implementation of RCRA closure when sediments will be removed, will be limited to the holding of the water and sediments presently in the tank. As discussed in Section 1.2, the RCRA constituents are present in the tank as a result of the handling of fuel sources containing heavy metals.

Table 1.1 3001 Storage Canal Average Analytical Results for Nine Sediment Samples

SEDIMENT

Analyte	Average mg/L	TCLP Limit mg/L	Percent of Limit
Arsenic	0.40	5.0	8.0
Barium	4.6	100	4.6
Cadmium	1.4	1.0	140
Chromium	0.026	5.0	0.52
Lead	6.2	5.0	120
Mercury	0.054	0.20	27
Selenium	0.073	1.0	7.3
Silver	0.28	5.0	5.7

FACILITY CONTACT CHECKLIST

Unit Name: Graphite Reactor Building (3001)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:
Jerry Mandry, personal commonwealth with Anita Parker, ASI, on April 8, 1997.

Date Prepared:

UNIT NAME: Graphite Reactor Building 3001

Unit Number:

Project Status: Remedial investigation completed. (Bechtel et al 1992)

Unit Location: The ORNL Graphite Reactor (OGR) is located in Building 3001 at the ORNL complex in Bethel Valley. Building 3001 is just north of Hillside Avenue between Third and Fifth streets. ORNL grid coordinates are N 22,570 ft and E 31,190 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building 3001 is a five-story corrugated metal structure. The dimensions are 140 ft by 116 ft by 70 ft. The reactor was originally designed for a 1-MW power level, but in 1944 improvements in the cooling system and fuel cladding allowed the power level to be increased to an average rate of 3.6 MW. (Burwinkle 1987)

Dates Operated: Date commissioned: 1943. Taken out of service: 1963. (Burwinkle 1987)

Present Function: Not in operation. A portion of the facility is used to allow the public access to view the reactor face and ORNL visual displays. (Ford and Holder 1992)

Life Cycle Operation: The Graphite Reactor was built to produce the first gram-size quantities of plutonium to provide information for the construction of the large plutonium production reactors located at Hanford, Washington. It was later converted to a training reactor. In 1966, the fuel was removed from the reactor and the OGR was designated as a National Historical Landmark. (Burwinkle 1987)

Waste Characteristics: The reactor is reported to contain 16 Ci of C-14, 5,000 uCi (80 mg) of Pu-239, 200 Uci (< 0.5 kg) of uranium oxide, and lesser radiation sources. Gamma spectroscopy indicates the presence of Cs-137 and Co-60. An order-of-magnitude of less than 10 Ci of each is estimated. Thus, the radionuclide inventory in the reactor probably totals less than 50 Ci. The demineralization room, or hot cell, was checked, and Cs-137 and Co-60 were detected in the gamma spectrum. Five percent of the alpha readings (only one reading) were above the ORNL guidelines for establishing a contamination zone. The beta-gamma contamination levels ranged from less than 500 dpm/100 cm^2 to 1,670 dpm/100 cm^2, with an average of approximately 500 dpm/100 cm^2. The only alpha contamination measured 32 dpm/100 cm^2. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

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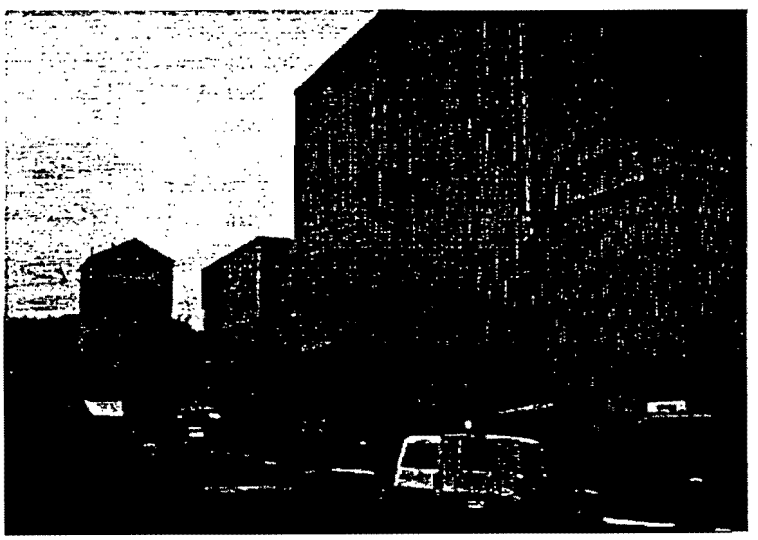


FACILITY CONTACT CHECKLIST

Unit Name: Fan House 3003
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: Fan House 3003

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: The Fan House is located in the ORNL main complex north of the Graphite Reactor (Building 3001). ORNL grid coordinates are N 22,765 ft and E 31,225 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building is 53 ft wide by 88 ft long by 18 ft high. (ORNL 1990)

Dates Operated: 1943 - 1963. (Burwinkle 1987)

Present Function: The OGR is no longer in operation; however, the fan house may still be used as part of the negative pressure contaminant system for the OGR.

Life Cycle Operation: Coolant air was supplied through underground concrete ducts to the inlet manifold where it was routed through the fuel channels to the exhaust manifold. Exhaust air was then passed through underground concrete ducts to a filter house (Building 3002) for HEPA filtration prior to exhaust through the fan house (Building 3003) to a 200 ft concrete stack (Stack 3018). (Burwinkle 1987)

Waste Characteristics: Gaseous waste. Contaminated primarily with Cs-137 and Sr-90 (80-500 Mr/h). (Ford and Holder 1992)

Release Data: No releases have been reported. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

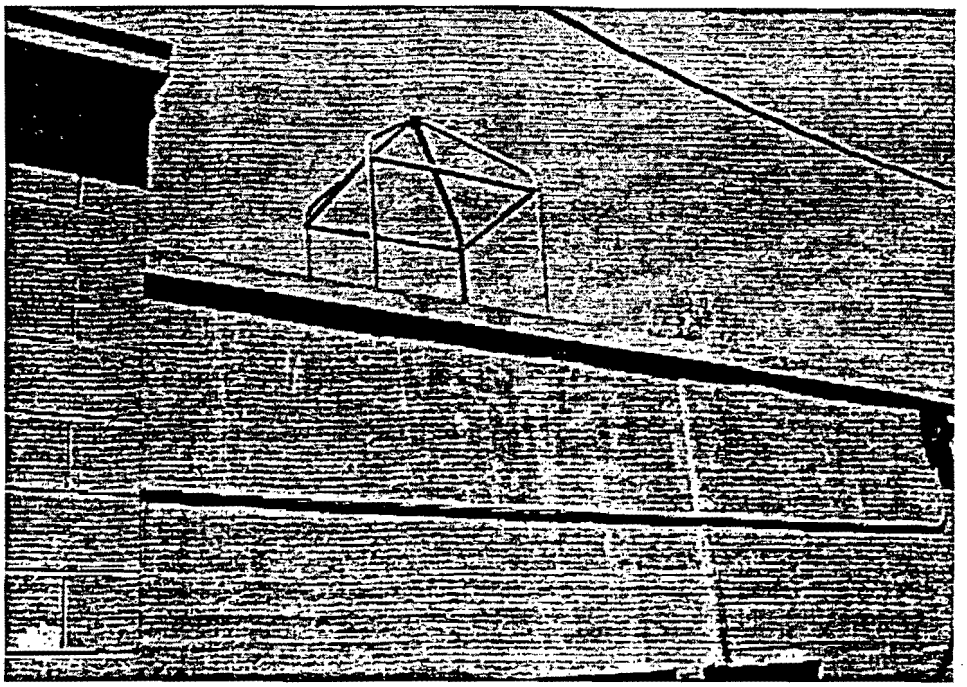
Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr, July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_05.JPG



FACILITY CONTACT CHECKLIST

Unit Name: Filter House 3002 (OGR)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: Filter House 3002 (OGR)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Filter House (3002) is located northwest of Building 3001. ORNL grid coordinates are N 22,765 ft and E 31,110 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Filter House has dimensions of 53-ft by 69.5-ft by 27 ft high. (ORNL 1990)

Dates Operated: 1948 - 1963 (ORNL 1990)

Present Function: The OGR is no longer in operation; however, the fan house may still be used as part of the negative pressure contaminant system for the OGR.

Life Cycle Operation: Located between the Graphite Reactor outlet air duct and the Fan House (3003). Function was to halt the release of radioactive particulates (from the stack, 3018) caused by fuel cladding failure. Coolant air was supplied through underground concrete ducts to the inlet mainfold where it was routed through the fuel channels to the exhaust manifold. Exhaust air was then passed through underground concrete ducts to a filter house (Building 3002) for HEPA filtration prior to exhaust through the fan house (Building 3003) to a 200 ft concrete stack (Stack 3018). (Burwinkle 1987)

Waste Characteristics: Gaseous waste. The building is contaminated primarily with Cs-137 and Sr-90 (80 - 500 Mr/h). (Ford and Holder 1992)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

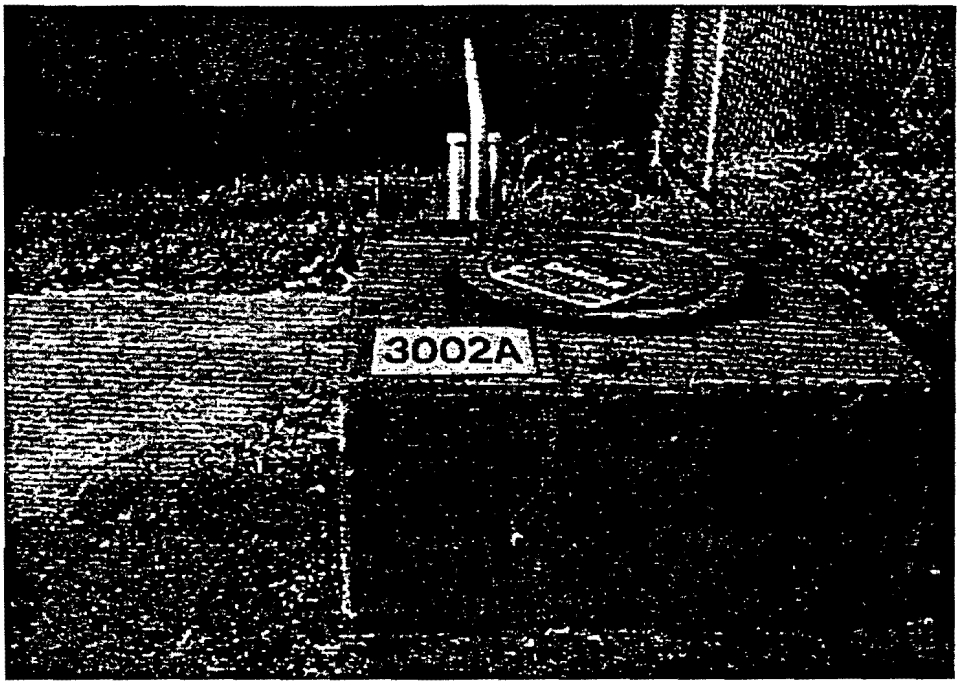
Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 07_22.JPG


3002A

FACILITY CONTACT CHECKLIST

Unit Name: Underground Exhaust Ducts 3001-3003
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status:

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments: No additional information - See SDDS.

References:

Date Prepared:

UNIT NAME: Underground Exhaust Ducts 3001-3003

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: ORNL grid coordinates are N 22,680 ft and E 31,185 ft. Duct system is mainly north of Building 3001 in the ORNL main complex. (ORNL 1990)

Approximate Dimensions and Capacity: Not Applicable. (ORNL 1990)

Dates Operated: 1943-present. Duct changes were made in 1948 when Filter House was added to the cooling system. (ORNL 1990)

Present Function: The underground concrete duct system transmits the Graphite Reactor cooling air from the reactor (3001) to the Filter House (3002), the Fan House (3003), and then to the stack (3018). (Bechtel et al 1992)

Life Cycle Operation: The exhaust ducts served the Graphite Reactor which was built to produce the first gram-sized quantities of plutonium. Later is was used as a training reactor. Fuel was removed from the reactor in 1966. A large portion of the facility has been altered to allow public access to view the reactor face and ORNL visual displays. (Ford and Holder 1992)

Waste Characteristics: Duct walls are probably contaminated with fission products Cs-137 and Sr-90. Both alpha and beta-gamma contamination has been reported on the duct walls. (Ford and Holder 1992)

Release Data: No reported releases. (Bechtel et al 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: Contaminated Site Summary Sheet (CSSS) lists stack no. as 3010. This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee. 1992.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 14_03.JPG; 14_06.JPG

FACILITY CONTACT CHECKLIST

Unit Name: Low Intensity Test Reactor - 3005
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40 (Cofer 1997)

Approximate Dimensions and Capacity:

Dates Operated: 1952-68 (SFIA)

Waste Inventory/Characteristics: Primary contaminants are 45 Ci of Co-60; < 50 Ci of Ni-63 and < 10 Ci of Fe-55. The core is estimated to read 200-300 rad/h.

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:
Tim Cofer personal communication with Anita Parker, ASI, on April 7, 1997.

Date Prepared:

UNIT NAME: Low Intensity Test Reactor (LITR) - (3005)

Unit Number:

Project Status: Remedial investigation completed. (Bechtel et al 1992)

Unit Location: The LITR is located in the northern portion of the main ORNL complex in Building 3005. ORNL grid coordinates are N 22,730 ft and E 31,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The LITR began operation as a 500-Kw reactor but was converted and reached a final power level of 3,000 Kw. The LITR is made up of 5 cylindrical steel and aluminum sections; all but the lowest tank section is aboveground. The facility is primarily steel and is 70 x 62 x 57 ft. (Ford and Holder 1992)

Dates Operated: Date commissioned: March 1951. Taken out of service: October 1968. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: In 1951, the LITR was converted from a hydraulic mockup of materials testing reactor to an operating reactor for the purpose of supplying a variety of irradiation facilities for ORNL and other research groups. Enriched uranium was used as a fuel and beryllium was used as a reflector. (Ford and Holder 1992)

Waste Characteristics: Interior surfaces of the reactor tank and primary water piping system are contaminated with radioactive corrosion products and fission products. It has been estimated that the reactor core contains between 6 and 45 Ci of Co-60, less than 50 Ci of Ni-63, and less than 10 Ci of Fe-55, which are all activation products. It was also estimated that the core might give a reading of about 200-300 rad/h. (ORNL 1990) The core still contains beryllium reflector and other reactor vessel elements. (Ford and Holder 1992)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERLCA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

No photo available

FACILITY CONTACT CHECKLIST

Unit Name: Heat Exchangers (3077)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: Heat Exchangers (3077)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Heat exchangers are located north of the Low Intensity Test Reactor (LITR) (Bldg. 3005) in the ORNL main complex. ORNL grid coordinates are N 22,855 ft and E 31,390 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Not applicable. (ORNL 1990)

Dates Operated: 1951-1968. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: Two 1-MW water to air heat exchangers provided heat dissipation for the final LITR design and one 1-MW water-to-water heat exchanger. (Ford and Holder 1992)

Waste Characteristics: Water containing traces of neutron activation of reactor cooling water. Only very slight amounts of contamination (Co-60, Ni-63, Fe-55) are indicated on the interiors of the LITR heat exchanger and on pipes in the upper levels of Building 3005. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: CERCLA

Media of Concern: This site was included in a CERCLA remedial investigation. (Bechtel et al 1992)

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_04.JPG; 3174_94.JPG; 3193_94.JPG; 7714_95.JPG

FACILITY CONTACT CHECKLIST

Unit Name: ORR Main Facility 3042
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Co-60, Sr-90/Y-90, Cr-137 Rad contam. All fissionable material has been removed but the contamination, inventory has been removed. Waste material is stored in basement and in south annex non nuclear-compressed gas 4 Cyl.

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: Oak Ridge Research Reactor (ORR-Main Building, Facility) - (3042)

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: The Oak Ridge Research Reactor (ORR) is located just north of Hillside Ave. between Third and Fifth Streets. ORNL grid coordinates are N 22,570 ft and E 31,400 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The reactor core was a heterogeneous type which used enriched uranium fuel in the form of aluminum-clad, aluminum-uranium-alloy fuel plates. A fuel element consisted of either 18 or 19 plates. Reactor heat was transferred from the fuel by light water and dissipated to the atmosphere. (Ford and Holder 1992)

Dates Operated: March 1958 - Summer 1960 at 20MW. 1960-1987 at 30MW. Shut down in 1987. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: The ORR was a light-water-moderated and cooled, beryllium and water reflected research reactor designed and built for use as a general purpose research tool. (Ford and Holder 1992) Since 1959, several different experimental facilities have been installed at the Oak Ridge Research Reactor (ORR-Bldg. 3042) for use in testing of various materials, analysis of liquid and gaseous coolant systems, and irradiated sample transfers. Six of these facilities have been designated as surplus and have been accepted into the ORNL SEM. These are (1) GCR A9-B9 experiment (1960-1969) for measurement of fission-product gases from ceramic fuels, (2) Molten Salt Loop (1959-1967) for analysis of homogeneous reactor fuels, (3) Maritime Ship Reactor Loop (1959-1962) for materials testing of structural materials and fuel pins for nuclear merchant ship applications, (4) Pneumatic Tube Irradiation Facility (1968-1973) for transfer of irradiated samples from the ORR to a laboratory in Building 3001, (5) GCR Loop I (1960-1967) to test new fuels for gas-cooled reactors, and (6) GCT Loop II (1962-1963) for the irradiation of unclad graphite fuel specimens for study of fission product releases. (Burwinkle 1987)

Waste Characteristics: All of the experimental facilities involved transfers of irradiated solids, liquids, or gases, during normal operations. (Burwinkle 1987)

Release Data: Hydraulic connection between groundwater in the Building 3019 area and the Building 3042 sump has been documented; contaminants from Building 3019 activities migrated in the groundwater and were found in the Building 3042 sump. Groundwater in this area is contaminated with americium-241, technetium-99, radium-228, and tritium. (Bechtel et al 1992) As a result of handling irradiated materials, the transfer piping became contaminated with long-lived corrosion or fission products to varying degrees depending upon the experiment. In addition, those experiments where significant chemical processing or irradiated product handling and analysis was conducted, much of the process equipment is contaminated. Preliminary characterization efforts have been conducted to determine the radiation/contamination levels and estimate the residual radionuclide inventory present in these facilities. (Burwinkle 1987)

Site Status: CERCLA

Media of Concern: Groundwater

Comments: Other ancillary buildings associated with the ORR Main Facility are ORR Heat Exchanger (3087), Pool-water cooling tower (3086), ORR Pumphouse (3085), ORR Cooling Tower #3 (Building 3103), Heat exchanger pit (3102), two 20,000 gallon above-ground demineralized-water holding tanks; ORR Experimental Facilities in 3042 (GCR A9-B9 Experimental Loop;M), ORR Normal Off-Gas (NOG) Filter Pit charcoal Filter (3126), ORR Neutron Spectrometer Station (Neutron Flight Tube Bldg 3083), ORR Cell Vent Filters (3139), ORR 25-meter Target House (Flight Tube Building) (3107), ORR A/C Cooling Tower (3089), ORR Pressurizable Off-Gas (POG) Filter Pit Off-gas

Filter (3109), and ORR 10,000-gallon decay tank. SDDS's for these sites are located in Appendix A.

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

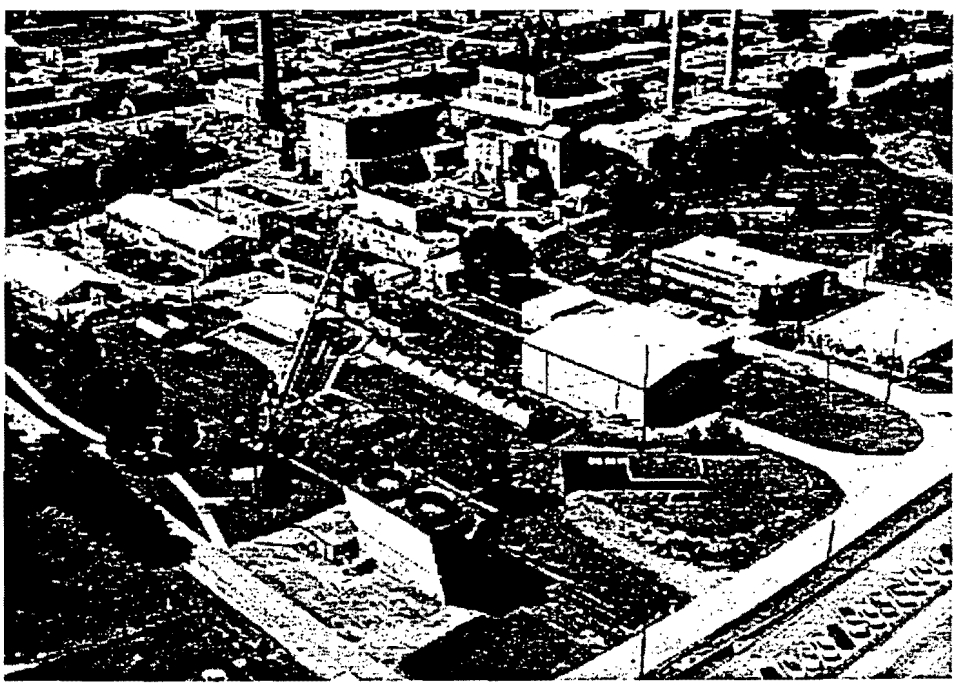
Burwinkle, T.W. March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002,* prepared by Waste Management and Remedial Action Division. Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 7714_95.JPG; 3174_95.JPG; 3193_94.JPG



FACILITY CONTACT CHECKLIST

Unit Name: Pool-Water Cooling Tower (3086)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: Pool-Water Cooling Tower (3086)

Unit Number:

Project Status: D&D facility

Unit Location: North of ORRR 3042. (Childs 1996)

Approximate Dimensions and Capacity: Approximately 25 ft high, 20 ft square. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: The pool secondary coolant is cooled by a United model no. 1818-AM16-10-15 induced-draft-double-flow cooling tower. The cooling tower dissipates the heat to the atmosphere. Adjacent to the tower is the secondary system pumphouse, which houses the electrical switch gear and chemical treatment equipment. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORRR Pumphouse (3085)

Unit Number:

Project Status: D&D facility

Unit Location: Located approximately 300 ft northeast of the reactor building. (Hamrick et al 1968)

Approximate Dimensions and Capacity: The overall size of the building is 68 ft by 42 ft. It is divided into five pump cells and an electrical equipment room. The 3 main pump cells are 30 ft 8 in by 14 ft 8 in The shutdown pump cell is 11 ft 8 in by 22 ft 8 in. The cell for the emergency gasoline-operated pump is 11 ft by 22 ft, and the electrical equipment room is 23 ft 8 in by 19 ft 4 in.

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: The pumphouse contains pumps used to circulate the cooling water through the system. (Hamrick 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: ORRR Cooling Tower 3 (3103)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: ORRR Cooling Tower #3 (Building 3103)

Unit Number:

Project Status: D&D facility

Unit Location: Located approximately 900 yds north of Building 3042. (Childs 1996)

Approximate Dimensions and Capacity: The cooling tower has ~ 50 MW capacity, is 3 stories tall (50-60 ft), and 150 ft long x 75 ft wide. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Part of the reactor secondary cooling system. The cooling water enters the top of the tower. As the hot water falls through the cooling tower, the cooling tower fans draw air past it, evaporating some of the water and cooling the remainder. The cool water is then retained in the cooling tower basin, which serves is a reservoir for the system. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORRR Heat Exchanger Pit (3102)

Unit Number:

Project Status: D&D facility

Unit Location: Located in an open pit in the ground. Approximately 300 ft from the secondary cooling tower which is approximately 900 yds north of Building 3042. (Childs 1996)

Approximate Dimensions and Capacity: The pit consists of four stainless steel shell-and-tube heat exchangers connected in parallel. (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Used to transfer heat generated in the core from the primary system to the secondary system. The reactor cooling water passes from east to west through the shell side of the exchangers. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: ORRR 2-20,000 gal aboveground Demineralized Water Holding Tanks
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments: No additional information is available - see SDDS.

References:

Date Prepared:

FACILITY CONTACT CHECKLIST

Unit Name: ORR NOG Filter Pit (Charcoal Filter) (3126)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: ORR NOG Filter Pit (Charcoal Filter) (3126)

Unit Number:

Project Status: D&D facility

Unit Location: Located south of 3042 along Hill Street. (Childs 1996)

Approximate Dimensions and Capacity: The NOG consists of a piping system embedded in the concrete of the pool wall and building floor with numerous access ports, two water catch tanks to prevent accumulated liquids from blocking the flow channels, and an 8 in diameter steel line from the ORR building to the 3039 stack. (Hamrick et al 1968)

Dates Operated: With some modifications, has been in operation since the initial operation of the building. (Hamrick et al 1968)

Present Function: N/A

Life Cycle Operation: The off-gas systems were designed to handle routine high-concentration radioactive gaseous releases and are connected to the components which are capable of releasing these effluents. The normal off-gas (NOG) system collects gaseous wastes only from components which are not subject to becoming pressurized. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: ORR Neutron Spectrometer Station (Neutron Flight Tube) (Building 3083)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:

UNIT NAME: ORR Neutron Spectrometer Station (Neuton Flight Tube) (Bldg 3083)

Unit Number:

Project Status: D&D facility

Unit Location: The last of three stations located along the neutron flight tube, approximately 300 yds from the cooling tower (Childs 1996).

Approximate Dimensions and Capacity: Building 3083 is a 2 story block structure approximately 25 ft^2. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Used to contain neutrons at a given energy level state. (Childs 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR Cell Vent Filters (3139)

Unit Number:

Project Status: D&D facility

Unit Location: The filters are located in the cell ventilation filter pit, south of the reactor building (3042). (Hamrick et al 1968)

Approximate Dimensions and Capacity: The filter pit is an underground waterproofed concrete structure designed to withstand pressures in the range -57 in H_2O to +15 psig. The top shield of the filter pit is 1.5 ft thick and removable concrete plugs allow access to the filters. Five separate banks of filters are in the pit. They are, in order, a 3 x 3 array of 2 ft square fiberglass prefilters, a 3 x 3 array of 2 ft square fiberglass absolute filter, two 3 x 3 arrays of 2 ft square 0.75 in thick activated charcoal filters, and another 3 x 3 array of 2 ft square absolute filters. The filter frames are of corrosion-protected carbon steel. (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: The cell vent filters are part of the cell-ventilation system which is a maximum reliability system that provides for the removal, decontamination, and disposal of possibly contaminated air from the reactor building. The filters remove particles and radioiodine from the air. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR Experimental Facilities in 3042 (GCR A9-B9 Experimental Loop)

Unit Number:

Project Status: D&D facilities

Unit Location: Located in the northeast corner of the basement in Building 3042. (Childs 1996) ORNL grid coordinates are N 22,536 ft and E 31,381 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Approximately 50 ft x 30 ft. (Childs 1996) Each of the experimental facilities at the ORR are separate, identifiable units with a variety of designs, structural materials, and flow patterns. All of the facilities included an in-reactor section, with associated piping, instrumentation and controls leading to away-from-reactor processing or experimental areas. The out-of-reactor portions of the facilities were normally contained in shielded cells, either lead, concrete block, or concrete and steel, with separate instrument and control panels. The complexity of the systems range from a simple lead-shielded stainless steel pneumatic tube to a large pressurized water loop consisting of pumps, heat exchangers, heaters, surge tanks, water purification systems, sampling stations, emergency electric supply, and a continuously-manned control room. (Burwinkle 1987)

Dates Operated: 1960-1969 (Burwinkle 1987)

Present Function: N/A

Life Cycle Operation: The GCR Aq-Bq was an experiment for measurement of fission-product gases from ceramic fuels. This was one of six experimental facilities designated as surplus in Building 3042. Following completion of the respective experiments, the in-reactor portions of the facilities were removed and the remaining systems placed in standby. Most of the facilities remain as left at the time, with only limited equipment or instrumentation removal conducted to provide room for active experiments, or for reactor maintenance activities. The abandoned experiments are in various states of disrepair and deterioration. (Burwinkle 1987)

Waste Characteristics: All of the experimental facilities involved transfers of irradiated solids, liquids, or gases, during normal operations. (Burwinkle 1987)

Release Data: As a result of the use of irradiated items, the transfer piping became contaminated with long-lived corrosion or fission products to varying degrees depending upon the experiment. In addition, for those experiments were significant chemical processing or irradiated product handling and analysis was conducted, much of the process equipment is contaminated. Preliminary characterization efforts have been conducted to determine the radiation/contamination levels and estimate the residual radionuclide inventory present in these facilities. No significant hazards to operating personnel were identified. (Burwinkle 1987)

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Burwinkle, T.W. March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16.

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc.

UNIT NAME: Two 20,000 gal Above-Ground Demineralized-Water Holding Tanks

Unit Number:

Project Status: D&D facilities

Unit Location: Just south to east of the pump house (Building 3085). (Childs 1996)

Approximate Dimensions and Capacity: 20,000 gal each (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORRR, 1958-1987. (Childs 1996)

Present Function:

Life Cycle Operation: The holding tanks were used to hold pool water while the reactor was being serviced. (Childs 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORRR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Oak Ridge Reactor Pressurized Off Gas Filter Pit (3109)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Tim Cofer, LMES, personal communication with Anita Parker, ASI, on April 7, 1997.

Date Prepared:

UNIT NAME: ORR 10,000 gal Decay Tank

Unit Number:

Project Status: D&D facility

Unit Location: Tank is below ground south of the pumphouse (Building 3085). (Childs 1996)

Approximate Dimensions and Capacity: The tank has a capacity of 10,000 gal. (Hamrick et al 1968)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Part of the reactor cooling system, the decay tank receives water from the reactor core via a 24in line. The purpose of the tank was to delay transport of the water to allow any N-16 that may be present to decay to a safe radiation level. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR POG Filter Pit (Off-Gas Filter) (3109)

Unit Number:

Project Status: D&D facility

Unit Location: The POG filter pit is located just east of Building 3089. (Hamrick et al 1968)

Approximate Dimensions and Capacity: The filter pit consists of 2 banks of filtering systems (north and south). Each filter bank is composed of four compartments. Within the first compartment, the inlet, there is a pair of valves for interconnecting the two banks and a roughing filter for removal of any particulate matter. The second compartment contains an activated-charcoal filter assembly for the removal of gaseous fission products, primarily iodine. The third compartment contains and absolute filter. The last compartment contains the exit line and another pair of bank interconnection valves. The first, second, and fourth compartments have floor drains, with float traps, which discharge the condensate or water collected from the system to a hot drain line connected to waste tank WC-19. (Hamrick et al 1968)

Dates Operated: This system was shutdown and isolated in 1968. (Hill 1993)

Present Function: N/A

Life Cycle Operation: The off-gas systems were designed to handle routine high-concentration radioactive gaseous releases and are connected to the components which are capable of releasing these effluents. The pressurizable off-gas system is connected to components which may become pressurized. (Hamrich et al 1968).

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc.

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Hill, W.E., August 1993. *Oak Ridge Research Reactor Hazard Screening, Phase I, SAR Update Program*, Research Reactors Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, HS/3042/F/ORR/RI.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Oak Ridge Research Reactor 25-meter Target House (Flight Tube Building)(3107)

Unit Number:

Facility Manger/Contact: Tim Cofer

Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Tim Cofer, LMES, personal communication with Anita Parker, ASI, on April 7, 1997.

Date Prepared:

UNIT NAME: ORR A/C Cooling Tower (3089)

Unit Number:

Project Status: D&D facility

Unit Location: Located on the north side of the pool cooling tower (3086). (Childs 1996)

Approximate Dimensions and Capacity: 20 ft x 10 ft x 15 ft. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Chilled water is supplied to the various air-conditioning units in the ORR building by a single large unit that has a capacity of 2.15×10^6 Btu/hr (180 tons). Heat collected at the chiller is dissipated by the ORR coding tower, which is used by that system only. (Hamrick et al 1968)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: ORR 25-meter Target House (Flight Tube Building) (3107)

Unit Number:

Project Status: D&D facility

Unit Location: The time of flight tube extends approximately 600 ft from the northeast corner of Building 3042 to a location south of the reactor secondary cooling towers. (Hamrick et al 1968) Located 25 in from the reactor. (Childs 1996)

Approximate Dimensions and Capacity: Building 3107 is approximately 8 ft x 8 ft. (Childs 1996)

Dates Operated: Approximately the same operating dates as the ORR, 1958-1987. (Childs 1996)

Present Function: N/A

Life Cycle Operation: Used to contain neutrons at a given energy level state. (Childs 1996)

Waste Characteristics: Unknown

Release Data: Unknown

Site Status: CERCLA

Media of Concern:

Comments: Very little detailed information has been written regarding ancillary facilities associated with the ORR.

References:

Childs, Robert, September 27, 1996. Research Reactors Division, personal communication with Anita Parker, Advanced Sciences, Inc..

Hamrick, T.P. and J.H. Swanks, September 1968. *The Oak Ridge Research Reactor - A Functional Description*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-4169.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Fission Product Development Laboratory (FPDL) 3517
Unit Number:
Facility Manger/Contact: Karl Haff
Date:

Historic Use/Purpose: EM-60. Not Scheduled for completion of deactivation until 2002 (Haff 1997).

Current Status:

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Inventory 400g Cm-244; 300,000 Ci Cs-137; 1.4 million Ci Sr-90; 5259 Ci Eu 152/154; 500 gal ZnBr, approximately 10 gal flammable liquids.

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments: Currently, transfer of radioactive materials into/out of the hot cells is permitted. (Eversole 1997)

References:
Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

Site Status: Surplus Facility (SF) (ORNL 1990)

Media of Concern:

Comments: Burwinkle (1987) indicates the facility was put on standby in 1975. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-249/R2 Prepared by the Isotopes Facilities Deactivation Project, Environmental Restoration Division, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available

UNIT NAME: Fission Product Development Laboratory (FPDL) (3517)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The FPDL is located in the ORNL main plant area in Building 3517. ORNL coordinates are N 21,730 ft and E 31,000 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Building 3517 is a three-story, braced steel framework structure with metal deck roofs and 12 in non-reinforced concrete masonry walls in the lower two stories. The building is about 120 ft long (east - west), and the first two stories are about 60 ft wide (north - south) and 27 ft high. A third story, about 27 ft wide by 16 ft high, runs the length of the building east - west. This third story, referred to as the crane bay, supports a 20 ton bridge crane and services the top access plugs to Cells 1 through 15. The crane bay has aluminum siding. (ORNL 1995)

Dates Operated: Site commissioned: 1958. Site placed in standby condition: 1989. (ORNL 1995)

Present Function: No radioactive operations are being conducted in Building 3517. Decontamination activities are continuing with the removal and disposal of some solid and liquid radioactive waste. (ORNL 1995) Activities involving the processing of radioactive source material have ceased in Building 3517. Current operations are limited to surveillance, maintenance, and deactivation activities and storage of most of ORNL's inventory of Sr-90 and Cs-137. (ASI 1996)

Life Cycle Operation: The Fission Product Development Laboratory (Building 3517), was constructed (1) to recover long-lived fission products (e.g., Sr-90, Cs-138, and Ce-144) from aqueous wastes generated in reprocessing irradiated reactor fuel elements, (2) to purify feed materials from other DOE sites, and (3) to prepare radioactive sources. Radioisotopes processing continued in the manipulator cells after 1975 as a reduced level of operation until April 1989, when the building was placed on standby. The principal operations during this period involved the production of Sr-90 and Cs-137 sources from separated product from Hanford. (ORNL 1995)

Other special operations (various short-term periods) include (1) processing of Co-60, Ir-192, and U-235; (2) Am-241 target preparation; (3) Eu-152-154 purification; and (4) separation of Tc-99 from crude concentrate received from the Paducah Gaseous Diffusion Plant. (ORNL 1995)

Waste Characteristics: Primary wastes are Sr-90 and Cs-137. (ORNL 1990)

Release Data: The inactive process cells contain an array of contaminated tanks, piping, samplers, services, and instrumentation with background radiation levels ranging 1-100 rad/h, with isolated hot spots of 100-1,000 rad/h. (ORNL 1990) The following represents the known quantities if substances currently existing in the facility that have been released and that could be released. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.
(ASI 1996)
90,000 Ci Sr-90
350,000 Ci Cs-137
= 3,500 CI Eu-154
= 2,500 Ci Eu-152
= 16,000 Ci uCo-60
= 36,000 Ci C,-244
Quantity of PCB's unknown (assumed to be less than 1 gallon)
= 1,686 pounds total miscellaneous HAZMATs

FACILITY CONTACT CHECKLIST

Unit Name: FPDL Inactive Cells (Cells 4,5,6,7,22 and Service Tunnel)
Unit Number:
Facility Manger/Contact: Karl Haff
Date:

Historic Use/Purpose:

Current Status: EM-60

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: None except contamination. (Haff 1997)

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.

Date Prepared:

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Fission Product Development Laboratory (FPDL) Inactive Cells (Cells 4, 5, 6, 7, 22, and Service Tunnel) - (3517)

Unit Number:

Project Status: The Removal Site Evaluation (RmSE) for the FPDL (Building 3517) was recently completed. (ASI 1996)

Unit Location: Within the FPDL, (Building 3517) is located on the north row of the main cell block. The service tunnel runs along the north side of the cell bank. Cell 22 is located underground adjacent to the building. ORNL grid coordinates are N 21,713 ft and E 31,001 ft.
(ORNL 1995)

Approximate Dimensions and Capacity: Consists of process cells with no viewing windows. Process cells 4 and 5 measure 9 ft by 12.5 ft and process cells 6 and 7 measure 7.5 ft by 12.5 ft by 12 ft. Tank Farm cell 22 measures 25 ft by 12 ft by 14 ft. (ORNL 1995)

Dates Operated: 1958-1975. (ORNL 1995)

Present Function: Not in operation.

Life Cycle Operation: FPDL went on line in 1958 to separate kilocurie amounts of fission products from redox and Purex-type waste streams. A total of 10 MCi of fission product materials was processed during operation of FPDL. In 1975, the chemical processing cells were shut down and maintained in protective storage. Funding restrictions inhibited decontamination of the facility. The initial decontamination program included encapsulation and storage of approximately 500,000 Ci of Sr-90 titanate powder and hot chemical flushes of process equipment and piping within all nine process cells. At one time, Cell 22 housed storage tanks for fission product solutions. Cell 22 still contains an inactive tank and associated piping. (ORNL 1995)

Waste Characteristics: Radioisotopes separated during the late 1950s and early 1960s, include Ce-144, Cs-137, Sr-90, Pm-147, Ru-106, and Tc-99. Cells 4 through 7 contain approximately 430 ft^3 of processing tanks, piping, samples, and instrumentation and are considered to be very high radiation areas. (ORNL 1995)

Release Data: No known releases. (Mandry 1996)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the US Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Mandry, Jerry, September 4, 1996. LMES D&D Project Manager, personal communication with Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

FACILITY CONTACT CHECKLIST

Unit Name: Fission Product Pilot Plant 3515
Unit Number:
Facility Manger/Contact: Gerry Mandry
Date:

Historic Use/Purpose:

Current Status: Entombed - no doors or windows. EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: High contamination levels. The site characterization report for building 3515 (Bechtel___) reported 1000 Ci CS-137 and 600 Ci of Sr-90. The north cell area of 3515 has general dose rates up to 23 R/hr and the south cell contains rad smearable levels. (Gerry Mandry, 1997)

Known Releases: Approximately 8-9 years ago, a release to the soil beneath the building occurred. The soil was covered with pea gravel. During operational days of building 3515, degreaded drain lines allowed LLLW to " bubble up" to the surface, contributing greatly to the soil contamination in this area.

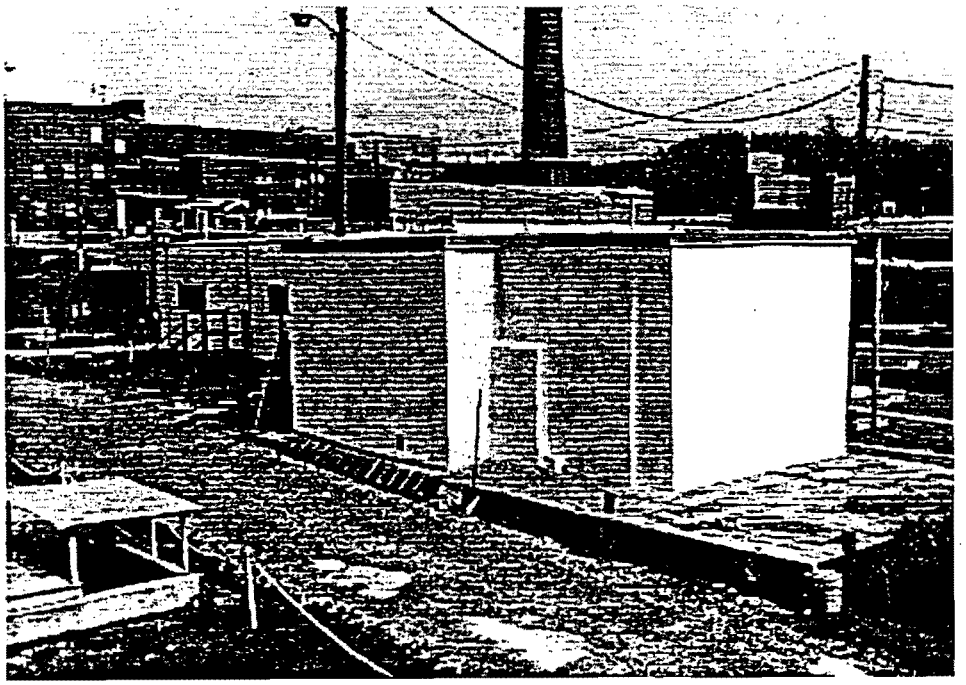
S&M Responsibilities: Not much is done other than periodic surveillance outside of building near door, etc. and groundskeeping (Mandry 1997)

Database availability/contact:

Comments:

References: Gerry Mandry, LMES, personal communication with Anita Parker, ASI on April 7, 1997 and review comments April 30, 1997.

Date Prepared:



UNIT NAME: Fission Product Pilot Plant (3515) [FPPP]

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: The Fission Product Pilot Plant (FPPP) is located at ORNL on the east side of the South Tank Farm in Building 3515. ORNL coordinates are N 21,960 ft and 31,030 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Formally known as the Ru-106 tank arrangement, the facility consists of a concrete pad with tanks surrounded by stacks of concrete blocks. The present facility consists primarily of an unlined concrete-shielded cell, approximately 20 x 10 x 8 ft. (6.0 x 3.0 x 2.4 m high), with an adjacent shielded operating area. (Ford and Holder 1992)

Dates Operated: Site commissioned: 1948. Taken out of service: 1958. (Ford and Holder 1992)

Present Function: Not in operation.

Life Cycle Operation: From 1950-1951, the facility functioned as a hot cell facility. It was then used to separate curie quantities of various radionuclides from low-level liquid wastes. It was abandoned in 1958 when replaced by the Fission Product Development Laboratory (FPDL). (Ford and Holder 1992)

Waste Characteristics: Specific waste information is not available. (ORNL 1990)

Release Data: The current residual radionuclide inventory is believed to be in the range of 10 to 100 Ci, although no recent survey information is available due to lack of direct access. About 3313 cubic ft (92.7 cubic m) of solid radioactive waste and 7063 cubic ft (200 cubic m) of liquid radioactive waste will be generated during decommissioning of this facility. In 1988 a large crack was discovered in the roof that allowed rainwater to enter, penetrate the building, become contaminated and then exit through the exterior walls. The crack was repaired. Contamination is present underneath and adjacent to the building due to drain line leaks during past operations. (Ford and Holder 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Soil

Comments: This site was included in a CERLCA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee, 1992.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 1980_89.JPG

FACILITY CONTACT CHECKLIST

Unit Name: Metal Recovery Building 3505
Unit Number:
Facility Manger/Contact: Gerry Mandry
Date:

Historic Use/Purpose:

Current Status: EM-40, the building is locked up and has restricted access. It is dilapidated however, no plans to demolish it currently exist. (Mandry 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: In 1993, Cell g inside the building was decontaminated and the building was made ready for D&D in 1984-87. High alpha contamination exists in the building. The primary TRU of concern are Pu-238 and Am-241. Degradation of the structure and drain system greatly increase the potential for release. (Mandry 1997)

Known Releases:

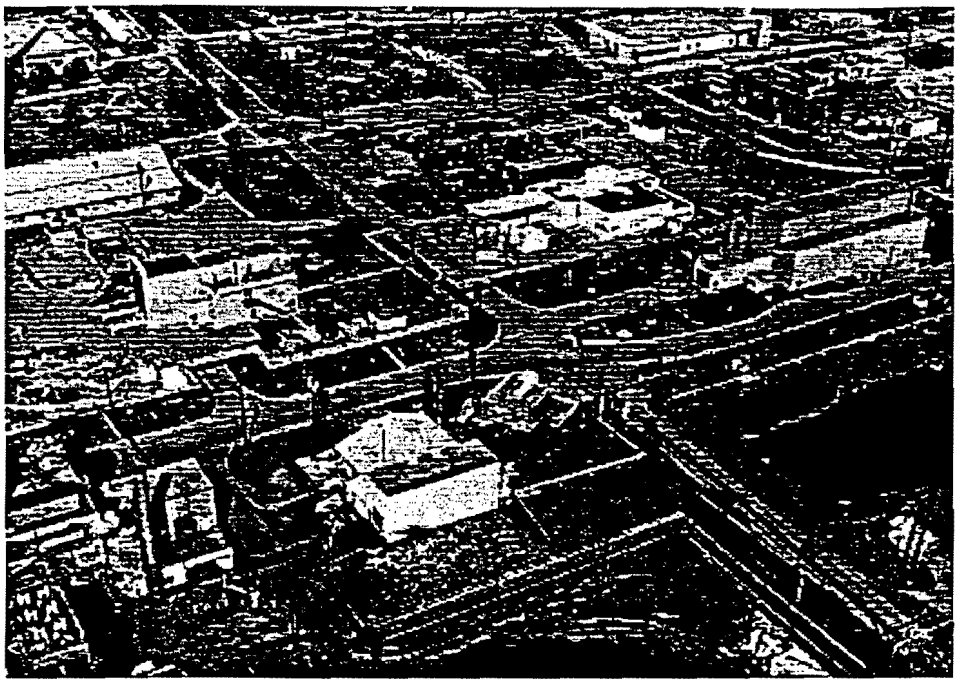
S&M Responsibilities:

Database availability/contact: The health Physics Department maintains a listing of rad survey data by building. Contact Lynn Sowder 574-6709. (Mandry 1997)

Comments: All process equipment was stripped out by 1987. A risk assessment and alternative evaluation was prepared.

References: Gerry Mandry, LMES, personal communication with Anita Parker, ASI on April 7, 1997 and review comments April 30, 1997.

Date Prepared:



UNIT NAME: Metal Recovery Facility (3505)

Unit Number:

Project Status: Remedial Investigation completed. (Bechtel et al 1992)

Unit Location: Located in the ORNL main complex on the corner of White Oak Avenue and Third Street. ORNL grid coordinates are N 21,840 ft and E 31,910 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The Metal Recovery Facility (MRF) is a one-story metal-sided building, approximately 90 ft long by 70 ft wide by 24 ft high. The items of processing equipment that remain are contained in seven concrete or concrete-block cells, which are secured and maintained under negative pressure, with ventilation through HEPA filters. (Burwinkle 1987)

Dates Operated: Commissioned in 1952. Date of closure: 1960 (Burwinkle 1987)

Present Function: Not in operation.

Life Cycle Operation: The MRF was a pilot and small scale production nuclear fuel reprocessing plant used for the processing of various waste solutions, scrap, and miscellaneous fuel elements for the recovery of uranium, plutonium, neptunium, and americium. The facility was shut down in 1960, after some 25 different processing campaigns, due to the lack of secondary containment. (Burwinkle 1987)

Waste Characteristics:

Release Data: The process cells are internally contaminated, primarily along lower walls and inside process equipment. The majority of this activity is due to long-lived (TRU) surface contamination present. (Burwinkle 1987)

Site Status: CERCLA

Media of Concern: none

Comments: Site is listed as decontamination and decommissioning under the DOE surplus facilities program. Surplus facilities are structures that may require further investigation of the extent of internal contamination, but were not considered to be sources of potential contamination of the environment. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc. /CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Burwinkle, T.W. March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, Oak Ridge National Laboratory, ORNL/RAP-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 11243_91.JPG

FACILITY CONTACT CHECKLIST

Unit Name: High-Level Chemical Development Laboratory (4507)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:

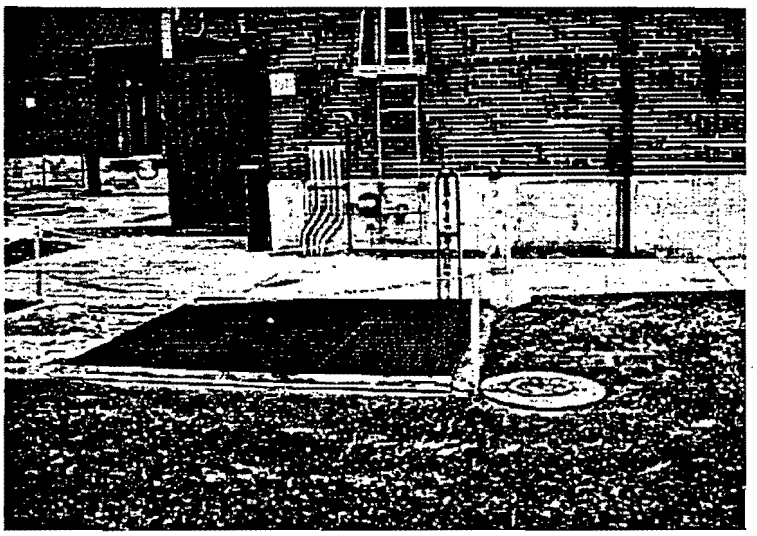
Date Prepared:

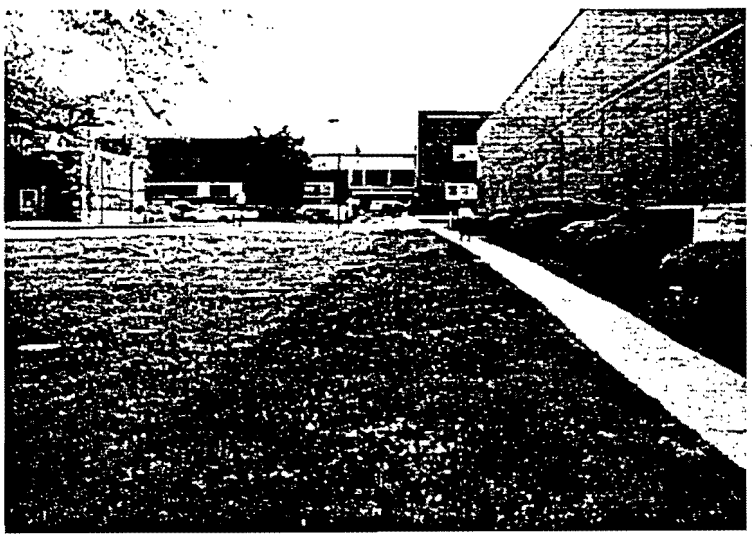
Oak Ridge National Laboratory, April 1996. *Phase I Safety Documentation, The High-Radiation-Level Chemical Development Facility and Filter Pit, Building 4057 and 4556*, prepared by Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 01_12.JPG; 02_14.JPG





UNIT NAME: High-level Chemical Development Lab (4507)

Unit Number:

Project Status: Maintained under the Surveillance and Maintenance program.

Unit Location: This unit is located in the ORNL main plant area near the intersection of Fifth Street and White Oak Avenue. (Bechtel et al 1992) ORNL grid coordinates are N 21,800 ft and E 32,135 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The building consists of four shielded hot cells equipped with master-slave manipulators and associated support equipment in the cell operating area. Chemical makeup and cell charging area above the cells contain a shielded manipulator cave, maintenance glovebox, and a 10-ton gantry crane for handling shielded casks. (Ford and Holder 1992) Building 4507 is a 16.5 m x 16.5 m brick-veneered, concrete-block building with an insulated sheet-metal superstructure. Each of the four cells has internal dimensions of 1.8 m x 3 m with a height of 3.4 m. This block of cells is 13.1 m x 5.5 m and 4.9 m high. Above the cells is a penthouse area which is reached through an airlock from the outside on the western side of the facility. The penthouse contains a large glovebox that straddles cells 3 and 4. (ORNL 1996)

Dates Operated: Constructed in 1957; removed from service 1980 and mothballed. (Bechtel et al 1992)

Present Function: Not in operation. (Bechtel et al 1992)

Life Cycle Operation: The facility is an above ground structure containing 4 hot cells, a second well for the chemical make-up equipment, and a penthouse area above the hot cells with gloveboxes, a gantry crane and a shielded manipulator. (Bechtel et al 1992). It was designed and operated as a laboratory and operated as laboratory and small-scale pilot plant for development studies of reactor fuel processing, separation and recovery of transuranic (TRU) materials, and separation of fission products from aqueous wastes. (Ford and Holder 1992)

Waste Characteristics: The total radiation levels in Building 4507 are <= 0.4 mRad/hr at 30 cm and <= 20 mRad/hr at contact in the penthouse area; <= 0.2 mRad/hr at 30 cm and <= 20 mRad/hr at contact in the area in front of the hot cells; and <= 1.2 mRad/hr at 30 cm and 40 mRad/hr at contact in the area at the rear of the hot cells. The hot cells have total radiation levels as follows (ORNL 1996):

Hot Cell #1 - 7 to 10 Rad/hr at an unknown distance.
#2 - 20 Rad/hr at an unknown distance.
#3 - 200 mRad/hr at an unknown distance.
#4 - 500 mRad/hr at an unknown distance.

Release Data: No releases have been reported. (Bechtel et al 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

FACILITY CONTACT CHECKLIST

Unit Name: High Radiation Level Analytical Facility (3019B)
Unit Number:
Facility Manger/Contact: Karl Haff
Date:

Historic Use/Purpose:

Current Status: EM-60, Shutdown (Haff 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Lead and mercury, Isotopes Sr90/Y90, Cs-137, Cm-244. Contamination present on walls, floors, equipment, piping ,drains, and ducts. PCBs, CFCs, Asbestos, metal, fuels, lubricants, lead paints, peroxides are also present in the building. (Haff 1997)

Known Releases: A light fixture lead resulted in PCB contamination. Mercury contamination is suspected in the cells. Known release to the soil, unknown for groundwater.

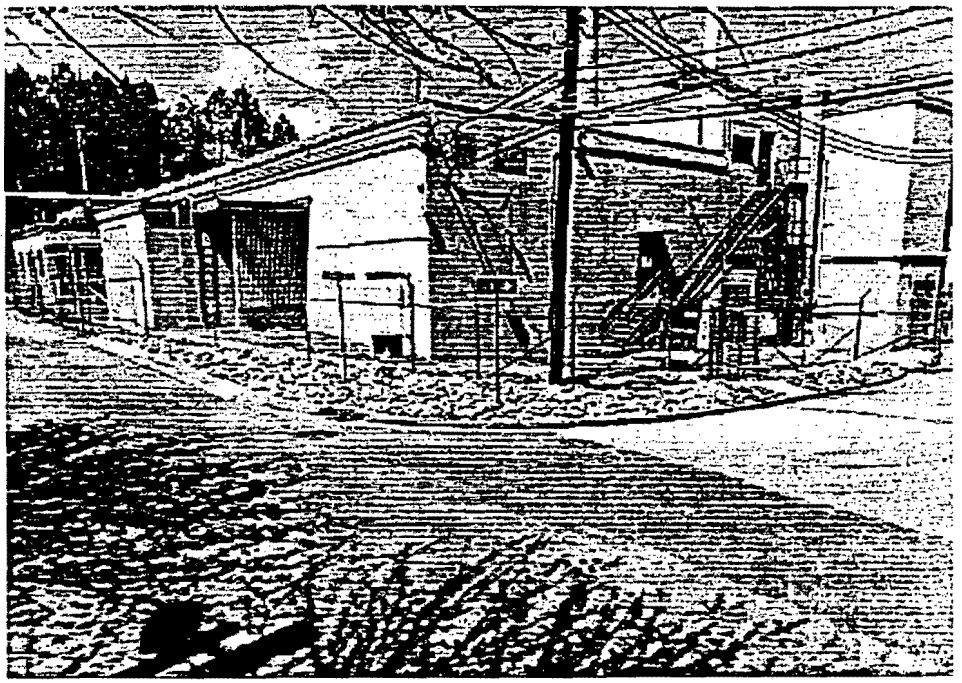
S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.

Date Prepared:



UNIT NAME: High Radiation Level Analytical Facility (3019B)

Unit Number: 1A.15

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Buildings 3019A, 3019B, and 3135 are part of the Radiochemical Development Facility (RDF), otherwise referred to as the Building 3019 Complex. All three buildings are located inside the ORNL main complex near the intersection of Third Street and Hillside Avenue. (ORNL 1996)

Approximate Dimensions and Capacity: The High Radiation Level Analytical Facility (HRLAF) (3019B) is a 3,000ft^3 concrete and masonry block building containing a hot cell bank with seven cells equipped with master-slave manipulators, and a central storage cell from and to which materials were transferred for storage. (ORNL 1996)

Dates Operated: Constructed in 1952. Operation ended in 1984. (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: The HRLAF was used for separating, processing, and analyzing highly radioactive samples from many ORNL programs. Including all those operated in Building 3019A. (ORNL 1996) On the west end of the building is a loading dock that appears as a small appendage with red doors to the outside. This dock was used to load and unload carriers to and from the charging area. The dock was cleaned out in 1990, and has been used within the last 5 years to transport materials from the building. The cells are also serviced by a rear access area providing entry to the back of the cells. (ORNL 1996)

Waste Characteristics: The samples handled in Building 3019B included fission products, activation products, uranium, plutonium, and other transuranic materials. (ORNL 1996)

Release Data: The area within the cells is highly contaminated with both beta-gamma and alpha-emitting radioisotopes but the exact amount is not known. (ORNL 1996)

Site Status: CERCLA

Media of Concern:

Comments: The Contaminated Site Summary Sheets (ORNL 1990) lists date operation ended as 1980.

References:

Advanced Sciences, Inc., August 1996. *Removal Site Evaluation Report on 3019B at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1514 &D1,* prepared for the U.S. Department of Energy, Office of Environmental Management.

Oak Ridge National Laboratory, March 1996. *Work Plan for High Ranking Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-322, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 3656_91.JPG

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FACILITY CONTACT CHECKLIST

Unit Name: Oak Ridge Reactor Heat Exchanger (3087)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

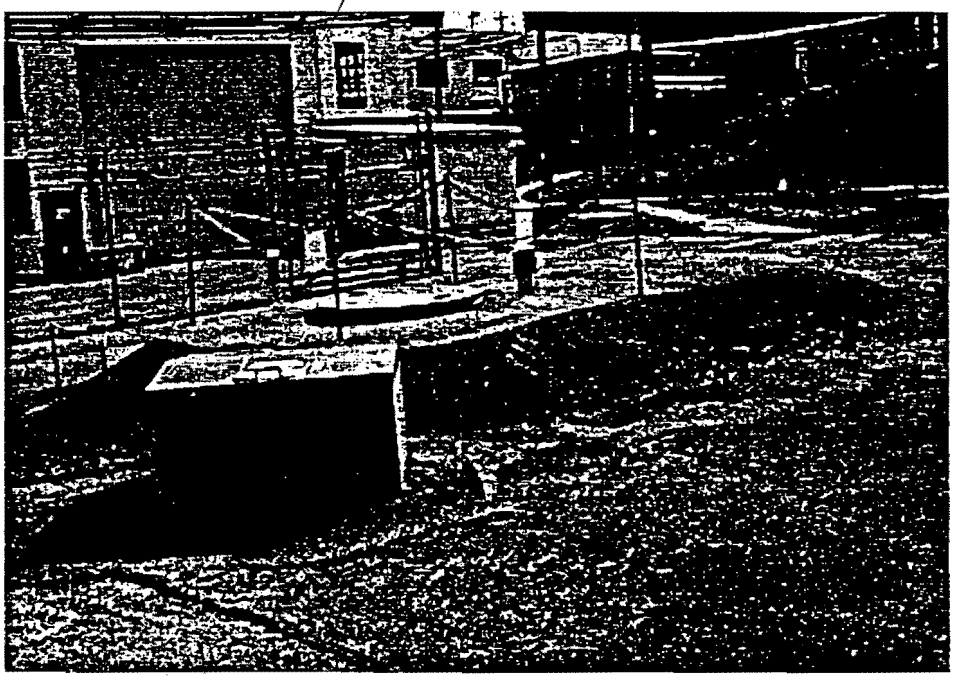
S&M Responsibilities:

Database availability/contact:

Comments:

References:

Date Prepared:



UNIT NAME: Oak Ridge Research Reactor (ORR) Heat Exchanger (3087)

Unit Number:

Project Status: Remedial Investigation completed (Bechtel et al 1992)

Unit Location: Located within the Bethel Valley Secured area. (Burwinkle 1987) The ORR heat exchanger is located southwest of the intersection of Northside Drive and First Street. ORNL grid coordinates are N 23,000 ft and E 31,660 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Consists of 8 aluminum 24 x 24 ft horizontally mounted, finned water-to-air radiators (2.5 MW capacity each). The units were housed in steel support structures, secured to concrete pads and connected to ORR by underground aluminum piping. (Burwinkle 1987)

Dates Operated: 1958-1961. (Burwinkle 1987)

Present Function: Not in operation.

Life Cycle Operation: The ORR heat exchanger was the original heat dissipation system for the ORR. In 1960, the radiators were replaced by a water to water heat exchanger and cooling tower dissipation system. (Burwinkle 1987)

Waste Characteristics: The interior surfaces are slightly contaminated principally with long-lived corrosion products. (Burwinkle 1987)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: The Contaminated Site Summary Sheet (ORNL 1990) identifies the facility as being made up of seven exchangers.

This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Burwinkle, T.W., March 1987. *The ORNL Surplus Facilities Management Program Maintenance and Surveillance Plan, FY 1988-1997*, ORNL/RAP-16, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_02.JPG; 28_03.JPG

FACILITY CONTACT CHECKLIST

Unit Name: Alpha Handling Facility (3038-AHF)
Unit Number:
Facility Manger/Contact: Karl Haff
Date:

Historic Use/Purpose:

Current Status: EM-60 Shutdown process will be completed with 2 years.

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Inventory: Plutonium-238 97.1 g

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.

Date Prepared:

UNIT NAME: Alpha Powder Facility (3028)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The Alpha Powder Facility is located in the ORNL main plant area in the northwest area of Isotope Circle, directly west of Building 3047. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3028 is a steel-frame structure covered by metal siding. The total volume of free space is 80,000 ft^3. The building has a four-story central section with one-story cell operating areas on the east and west sides. (ORNL 1995)

Dates Operated: Constructed in 1950. Operation discontinued in 1985.

Present Function: Not in operation. (ORNL 1995)

Life Cycle Operation: This facility originally housed the I-131 processing facility (now the Short-Lived Fission Product Cells) and the separation facility (a four-story ion-exchange column) for Pm-147. The I-131 facility was converted to manipulator cells in the early 1960s and expanded to the Short-Lived Fission Product Facility. The Xe-131 facility was added at about that time. Products and processes developed for sale included Xe-133, I-131, and Mo-99. The Xe-133 operation continued through 1980, and the Short-Lived Fission Product Program was discontinued in 1985. Water-shielded cells were installed on the first floor in 1964 for the curium source fabrication program of Space Nuclear Systems. The curium cells were partially decontaminated in the mid-1980s and the facility was redesigned as the Alpha Powder Facility, which brought it back into a full-cost-recovery isotopes program. In the late 1970s, the target facility moved to Building 3038 and the upper floors were occupied by Nuclear Medicine Research (NMR), which was funded by Energy Research in the Health Science Research Division (HSRD). NMR turned the laboratory facilities over to the Office of Risk Assessment, HSRD in 1988. (ORNL 1995)

Waste Characteristics: The major contamination in this building is left from curium processing, the source fabrication work, and the Pm-147 processing. The contamination exists primarily on the hot cells and process equipment (vessels, hood, piping, ventilation ducts, etc.). (ORNL 1995)

Contamination levels are reportedly 10 μCi of alpha in the facility and approximately 150 mCi alpha in the hot cells, 25 μCi of beta/gamma contamination in the facility and approximately 0.45 Ci beta/gamma in the hot cells. (Haff et al 1994)

Release Data: Cell 6 is highly contaminated with Pm-147. Cell 5 is contaminated with alpha and beta/gamma (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

UNIT NAME: Alpha Handling Facility (3038 AHF)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The Alpha Handling Facility is located in the ORNL main plant area north of Central Avenue in the west end of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3038 consists of 5 hot cells shielded by water-filled steel tanks. It is a single-story metal frame building. The operating face of each cell has 3 ft of shielding, is 6 ft wide by 8 ft high, and contains a viewing window and manipulator ports. Each cell is 10 ft deep. The building has approximately 7,250 ft^2 of floor space. (ORNL 1995)

Dates Operated: 1949-1990

Present Function: Not in operation. (ORNL 1995)

Life Cycle Operation: Building 3038 Alpha Handling Facility housed the packaging, inspection and shipping activities for radioistopes. The building wall, consisting of 1 ft of concrete, forms the back of the cells. These cells can be used as glove boxes by replacing the front shielding tank and manipulators with an approved window equipped with glove ports and loadout station. The alpha cells drain to the WC-2 tank system. (ORNL 1995)

As the volume of radioisotopes being shipped decreased in the 1960s, the shipping area was reduced. In 1968, the west portion was converted into the Alpha Handling Facility by adding water-shielded hot cells and glove boxes for fabrication of targets. (ORNL 1995)

Waste Characteristics: Unknown.

Release Data: Low levels of residual fixed and transferrable radioactive surface contamination exist in areas of the facility resulting from historical operations. The contamination exists primarily in the hot cells, barricade area, glove boxes, hoods, and related process equipment. Total radiation levels in the facility was < 12 mrem/hr @ 30 cm (gamma/neutron). (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Alpha Powder Facility (3028)
Unit Number:
Facility Manger/Contact: Karl Haff
Date:

Historic Use/Purpose:

Current Status: Shutdown EM-60

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: None

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.

Date Prepared:

FACILITY CONTACT CHECKLIST

Unit Name: Bulk Shielding Reactor (3010)
Unit Number:
Facility Manger/Contact: Bob Childs
Date:

Historic Use/Purpose:

Current Status: EM-60

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Fuel Stored - 73 MTR fuel rods will be shipped to Savannah River start in September 1997. The process will take several months to completed. Lead shielding, and radioactive sources - Radium, Co-60, and Sb-124 are scheduled to be removed in July 1997.

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments: Heavy water with tritium has been removed (mandry 1997)

References: Constant, Ken, LMES personal communication with Anita Parker, ASI on April 8, 1997.
Mandry, Gerry, LMES, review comments April 30, 1997.

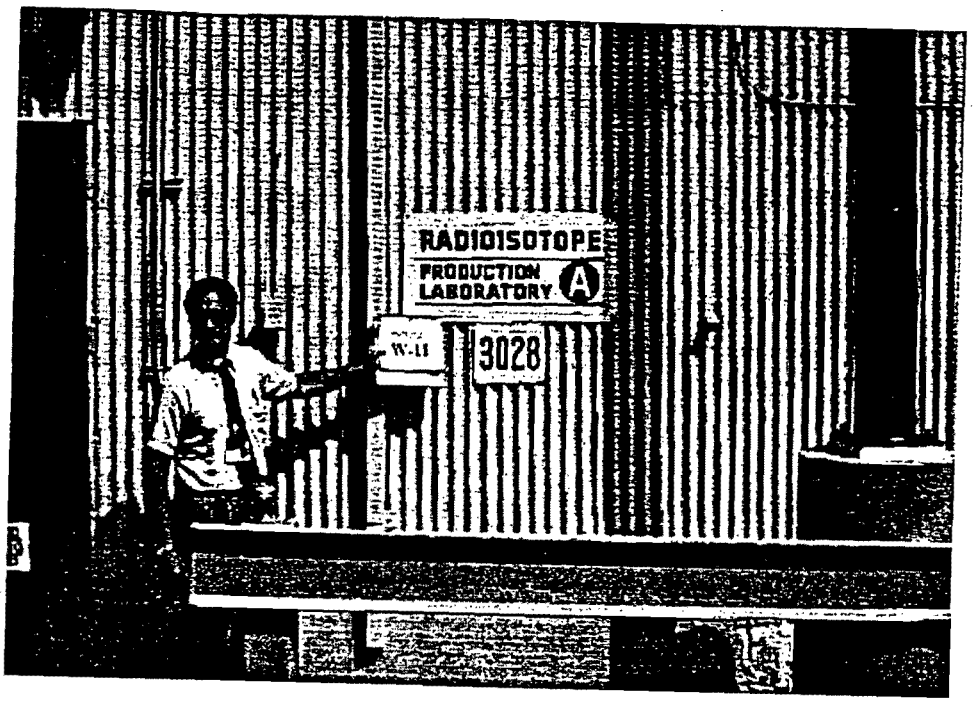
Date Prepared:

Haff, K.W., R.S. Owens, and W. J. Armento, December 20, 1994. *Phase I Safety Documentation, The Source Development Laboratory, Building 3029, Hazard Screening*, HS/3029/F/RT-6, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 18_24.JPG



UNIT NAME: Bulk Shielding Reactor (Building 3010)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996).

Unit Location: The Bulk Shielding Facility (BSF), which houses the Bulk Shielding Reactor (BSR) and the Pool Critical Assembly (PCA), is in the north-central area of the main ORNL site north of Hillside Avenue. (ORNL 1996)

Approximate Dimensions and Capacity: The facility is a two-story steel framed building with corrugated metal siding. Building 3010 covers an overall area of 77 ft x 51 ft. The portion of the facility containing the pool and the 35 ft high reactor bay occupies an area 32 ft wide and 74 ft long. The remainder of the building contains offices, instruments rooms, experiment rooms, and a small shop. The three experiment rooms are located on the main level, on the west, northwest, and northeast sides of the facility. The pool has internal dimensions of 40 ft long x 20 ft wide and varies in depth from 21.5 ft to 27 ft. The pool holds approximately 130,000 gallons of water.
(ORNL 1996)

Dates Operated: 1951-1984 (ORNL 1996)

Present Function: Not in operation.

Life Cycle Operation: Throughout its history, the BSF was used by ORNL and other domestic, international, government, academic, and commercial personnel and organizations for isotope production, materials irradiation, radiation shielding experiments, and training for reactor operators and nuclear engineering students. (ORNL 1996)

Waste Characteristics: The radiological materials stored at the BSF include spent fuel, radioactive source material, and heavy water containing tritium. (ORNL 1996)

There are radioactive sources stored in the reactor bay pool which are stored in two locked aluminum cans. These sources include 2000 Ci of Co-60, 10 Ci of radium, and 1.5E-4 Ci of Sb-124. Also, there are 10 fission chambers used for calibration stored in a locked storage cabinet at the BSF. The reactor bay holds three aluminum tanks containing 907 kg of heavy water contaminated with tritium. (ORNL 1996)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., August 1996. *Removal Site Evaluation Report for the Bulk Shielding Facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1516&D1,* prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory National Laboratory, March 1996. *Work Plan for the High Ranking Facilities Deactivation Project at Oak Ridge National Laboratory,* ORNL/ER-322, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Isotopes Material Laboratory (3038-E)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose: Packaging, inspection and shipping are no longer conducted in this building (Eversole 1997)

Current Status: EM-60 (Haff 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Pu-239/240/241 = 93g; Pu-238 = 1.2g; Am-241 = 0.21g; and, Pu-239 = 28.6g.

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments: No "lazy-susan-type storage holders" currently exist in Building 3038-E as previously noted o the SDDS. (Eversole 1997)

References: Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, January 23, 1995a. *Phase I Safety Documentation, The Isotope Development Laboratory, Building 3038, Hazard and Screening*, Doc. No. HS/3038/F/RT-15.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee..

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Isotope Material Laboratory (3038-E)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Located in the ORNL main plant area. The Isotopes Material Laboratory is located on the east end of Building 3038 on the southwest corner of the Isotopes Circle. (ORNL 1995b)

Approximate Dimensions and Capacity: Building 3038 is divided by concrete block interior walls into three separate facilities: 3038E, 3038M, and 3038AHF. The Isotope Material Laboratory (3038-E) consists of the process cell area which has one manipulator cell (Cell 3), hoods, and a shielded counting room. The cell is constructed of 4-in steel plate on all sides with a mineral oil-filled, leaded-glass viewing window and a 10-in^2 access port. It is supported on concrete pillars. This cell was used for separating Y-90 from Sr-90 and is highly contaminated. There is no provision for wash down since the hot drain was sealed. An empty shielded counting room is adjacent. There is single-stage roughing filtration in the cell. Exhaust from the cell, hoods, and room is routed to a filter house on the roof (double-stage HEPA filtration) and discharged to the 3039 stack. (ORNL 1995b)

Dates Operated: 1949-Unknown. (ORNL 1995b)

Present Function: Packaging, shipping, and receiving of radioisotopes are ongoing activities in Building 3038. There are no operations in the east-end laboratories. However, the plan is to relocate these activities to other ORNL facilities. (ORNL 1995b)

Life Cycle Operation: Building 3038 was constructed to house all the radioisotopes shipping activities for ORNL. The building has been in operation since 1949. Originally, the entire facility was dedicated to radioisotopes shipping as follows: the east portion (3038E) contained the analytical chemistry laboratory to perform analyses of short-lived radioisotopes prior to shipment; the middle section (3038M) housed the radioisotopes handling and transfer barricade; and the west section housed the packaging, inspection, and shipping activities. (ORNL 1995b)

The analytical chemistry laboratories supporting isotopes sales were located in the east end until 1976. When the analytical function was transferred to other ORNL facilities, the east end was converted into an isotopes production and development facility. In the late 1970s and early 1980s, a research program on plutonium alloys and compounds was conducted in the area which was funded by the DOE Office of Basic Energy Sciences. The same glove boxes were used in the mid 1980s to perform research with the Solid State Division on Pm-147-doped crystals and glasses for laser development studies funded by Lawrence Livermore National Laboratory. With these two exceptions, all work in this end of the facility has been dedicated to isotopes efforts. (ORNL 1995b)

Waste Characteristics: Y-90, Sr-90. (ORNL 1995b). The principal materials used in the Isotope Material Laboratory were uranium, transuranic materials, and Pm-147. (ORNL 1995a)

Release Data: The process cell was used to separate Y-90 from Sr-90 and is highly contaminated. Although all inventory is gone, some old containers leaked in the lazy-susan-type storage holders. The contamination is contained and decontamination efforts reduced the background radiation levels and remaining quantities of residual radioactive material. The following were identified as possible contributors to the residual surface contamination and are part of the remaining inventory: Sr-90 (~ 10 Ci), Np-237 (0.0064 Ci), Pu-238 (3800 Ci), Pu-239 (3.7 Ci), Pu-240 (1.8 Ci), Pu-241 (19 Ci), and Am-214 (0.59 Ci). (ORNL 1995a).

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

FACILITY CONTACT CHECKLIST

Unit Name: Radioactive Packaging and Shipping Facility (3038-M)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose: No packaging, inspection or shipping activities are currently performed. (Eversole 1997)

Current Status: EM-60 Shutdown (Haff 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: None (Haff 1997)

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References:
Haff, Karl, LMES, personal communication with Anita Parker, April 8, 1997.
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, January 23, 1995a. *Phase I Safety Documentation, The Isotope Development Laboratory, Building 3038, Hazard and Screening*, Doc. No. HS/3038/F/RT-15.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioactive Packaging and Shipping Facility (3038-M)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area on the southwest corner of Isotopes Circle. The radioactive packaging and shipping facility is located in the middle section of Building 3038. (ORNL 1995b)

Approximate Dimensions and Capacity: Building 3038 is divided by concrete block interior walls into three separate facilities: 3038E, 3038M, and 3038AHF. The radioactive materials shipping and packaging facility (RAMSPAC) consists of a now-empty concrete barricade for storage of isotopes products, a remote pipefitting station, a canning and packaging station, an area for health physics inspection, and an area for labeling of packages. The barricade consists of a concrete wall with lead brick shielding stacked 2 ft high, two lazy-susan-type storage holders behind the shielded wall, a remote manipulator, and an overhead viewing mirror. The products were stored as liquids in glass bottles. (ORNL 1995b)

Dates Operated: 1949 - Unknown. (ORNL 1995b)

Present Function: Packaging, shipping, and receiving of radioisotopes are ongoing activities in Building 3038. However, the plan is to relocate these activities to other ORNL facilities. Barricade operations are discontinued, and all existing inventory has been removed. (ORNL 1995b)

Life Cycle Operation: Building 3038 was constructed to house all the radioisotopes shipping activities for ORNL. The building has been in operation since 1949. Originally, the entire facility was dedicated to radioisotopes shipping as follows: the east portion (3038E) contained the analytical chemistry laboratory to perform analyses of short-lived radioisotopes prior to shipment; the middle section (3038M) housed the radioisotopes handling and transfer barricade; and the west section housed the packaging, inspection, and shipping activities. (ORNL 1995b)

The section of the building called 3038M has always been the radioactive shipping operation for ORNL. Most of the shipments were for the isotopes sales program, but shipments of radioactive materials from other ORNL groups were also handled here. The glove boxes in the Alpha Handling Facility annex were used for loading out of isotopes for sales. (ORNL 1995b)

Waste Characteristics: Some discrete items of inventory remain in transient storage within the facility. Some residual surface radioactive contamination remains. There are some areas of transferrable contamination within the facility but they have been secured. (ORNL 1995a)

Release Data: Although all inventory is gone, some old containers leaked in the lazy-susan-type storage holders. The contamination was contained and decontamination efforts reduced the background radiation levels and remaining quantities of residual radioactive material. The following were identified as possible contributors to the residual surface contamination and are part of the remaining inventory (for the total facility - 3038AHF, 3038E, and 3038M): Sr-90 (~ 10 Ci), Np-237 (0.0064 Ci), Pu-238 (3800 Ci), Pu-239 (3.7 Ci), Pu-240 (1.8 Ci), Pu-241 (19 Ci), and Am-214 (0.59 Ci). (ORNL 1995a)

Site Status: CERCLA

Media of Concern:

Comments: The date of inactivation is not known but is thought to be late 1980s. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge*

FACILITY CONTACT CHECKLIST

Unit Name: Source Development Laboratory (3029)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose: The building no longer operates with a containment system as previously noted on the SDDS. (Eversole 1997)

Current Status: Shutdown EM-60

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: None (Haff 1997)

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., June 1996. *Phase I Removal Site Evaluation (RmSE) Report (Isotopes Facilities)*, prepared for Lockheed Martin Energy Systems, Oak Ridge, Tennessee.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/VI & DI, Oak Ridge, Tennessee.

Haff, K.W., R.S. Owens, and W. J. Armento, December 20, 1994. *Phase I Safety Documentation, The Source Development Laboratory, Building 3029, Hazard Screening*, HS/3029/F/RT-6, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995 *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996, Assistant Facilities Manager, ORNL Special Projects, LMES, Personal communications with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Source Development Laboratory (3029)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3029 is located in the western area of Isotopes Circle, southwest of Building 3047. (ORNL 1995)

Approximate Dimensions and Capacity: The building is a single-story, steel frame structure covered by corrugated metal siding. The floor area is 3,000 ft^2, and the total free-space volume of 33,000 ft^3. The operating area contains four manipulator-type hot cells. Cells 1, 2, and 3 were used to process high-level beta/gamma sources; Cell 4 was used for short-lived materials and Ir-190 monitoring. The cell access area contains a Co-60 storage and irradiation area known as the Co-60 garden. The Co-60 garden has been emptied and is part of the isotopes facilities deactivation. Two laboratory hoods located in the southwest corner of the operating area are used for preparing both elemental I_2-131 and CH_3 I-131. Those hoods are equipped for use as gloveboxes. There are two small gloveboxes in the northwest corner of the cell access area. The exterior of the building is cocooned with polyurethane foam for containment. (ORNL 1995)

Dates Operated: Constructed in 1952 (ORNL 1995) and removed from service: unknown.

Present Function: Not in operation. The outer surface of the building is sealed for air tightness by cocooning with polyurethane foam. All normal entries have air locks for lift trucks and personnel access and have gasketed doors to minimize leakage. Building ventilation is provided by a roof-mounted exhaust fan with HEPA filters. In conjunction with dampered inlet and exhaust vents, it is operated to maintain a slight negative pressure in the building and to automatically place the system in a "contained" state when air monitors detect radioactivity. (ORNL 1995)

Life Cycle Operation: Building 3029 was constructed in 1952 and originally contained a system of remotely- operated barricades and a small manipulator cell (now called Cell 4). The facility was built as part of, and has always been used in, the Isotopes Program. Isotopes originally handled in the facility were Ir-192 (source fabrication) and small Co-60 sources. Cell 1 was built in 1955 - 1956 to handle large quantities of Co-60. Very little Co-60 source fabrication has been done since the late 1950s. Cell 3 was built in 1960-1962 for Cs-137 source fabrication. Cell 2 was built by enclosing the space between Cells 1 and 3 and is used for waste handling and pass-through between the cells. Major building operation included Co-60, Cs-137, Sr-90, and Ir-192 source fabrication. (ORNL 1995)

Waste Characteristics: Major building operation included Co-60, Cs-137, Sr-90, and Ir-192 source fabrication. The contamination exists primarily in the hot cells, Co-60 garden and related process equipment (vessels, hoods, piping, ventilation ducts, etc). (ORNL 1995)

Total facility contamination is reported to be <700 μCi as Sr-90 and 2 Ci as Co-60. (Haff et al 1994) Although the hazard screening indicates no alpha contamination is present, the work plan for the IFDP (ORNL 1995) and findings during the removal site evaluation (ASI 1996) indicate that the area under the Glove Box B is alpha contaminated and sealed.

Release Data: A number of areas within the building are highly contaminated (alpha-Pu, Cm, and beta/gamma). (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities in the isotope production deactivation project were used from the late 1940s to the late 1980s. (Phillips 1996) The hazard screening (Haff et al 1994) indicates "no alpha contamination is present". This site was included in a CERCLA remedial investigation (Bechtel et al 1992)

FACILITY CONTACT CHECKLIST

Unit Name: Storage Pad (3099)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: Shutdown EM-60

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997

Date Prepared:

UNIT NAME: Storage Pad (3099)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area adjacent to the east side of Building 3032. (ORNL 1995b)

Approximate Dimensions and Capacity: Concrete pad approximately 30 ft x 40 ft (Conant 1996)

Dates Operated: 1950s—Present (ORNL 1995a)

Present Function: Used as a temporary storage area for the Isotopes facilities. (ORNL 1995a)

Life Cycle Operation:

Waste Characteristics: DOT-approved prepackaged shipments, (ashes and other materials) were stored on the pad. All radioactive material stored on the pad were in accordance with DOE/DOT regulations. (ORNL 1995a)

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Conant, Todd, April 23, 1996. Removal Site Evaluation Task Manager, Advanced Sciences, Inc., personal observation communicated to Anita Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, June 12, 1995a. *Phase I Safety Documentation, The Radioisotope Development Laboratory Building 3047, Hazard Screening*, Document No. HS/3047/F/RT-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: November 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: High Level Chemical Development Laboratory Filter Pit (4556)
Unit Number:
Facility Manger/Contact: Tim Cofer
Date:

Historic Use/Purpose:

Current Status: EM-40

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

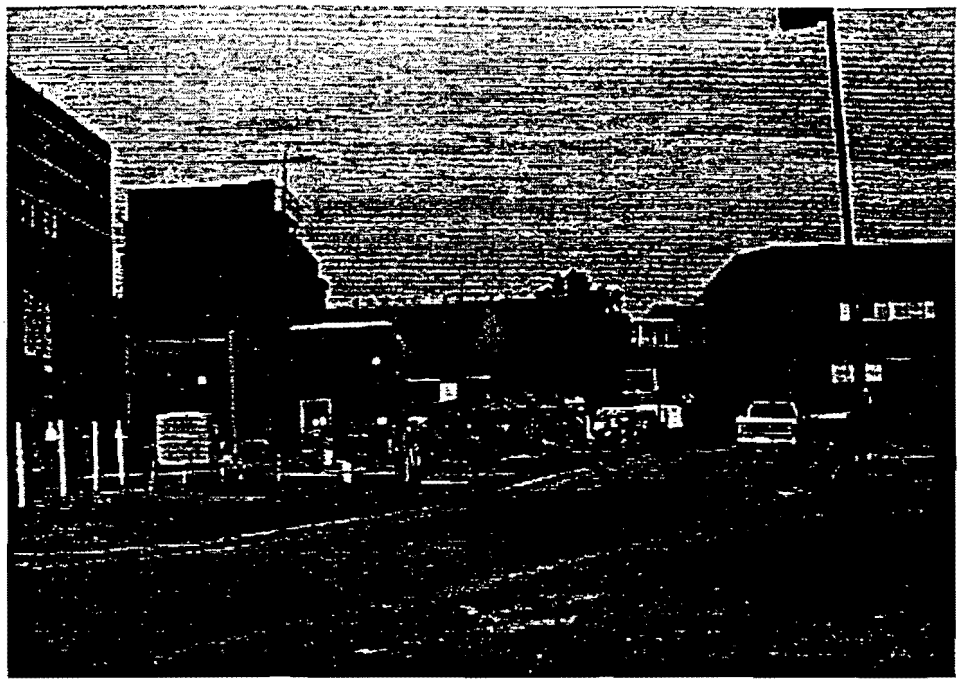
S&M Responsibilities:

Database availability/contact:

Comments: No additional information obtained (see SDDS)

References:

Date Prepared:



UNIT NAME: High-level Chemical Development Lab Filter Pit (4556)

Unit Number:

Project Status: Maintained under the Surveillance and Maintenance Program.

Unit Location: Located just east of the intersection of Fifth Street and White Oak Avenue in the ORNL main plant area. (Bechtel et al 1992) Building 4556 is immediately southwest of Building 4507. (ORNL 1996)

Approximate Dimensions and Capacity: Building 4556 is a below-grade filter pit containing high-efficiency-particulate air (HEPA) filters. A vitreous clay pipe from Building 4507 connects with stainless steel pipes that lead into the filter pit. The pit contains two parallel filter banks, each consisting of prefilters and HEPA filters. There are an additional two positions available for subsequent banks of charcoal filters, but these are not currently in service. A pipe in the bottom of each filter bank allows accumulated moisture to flow to a hot drain. A sump in the pit floor allows inleakage of rain water to be removed by the process drains. (ORNL 1996)

Dates Operated: The high-level chemical development laboratory was operated from 1957-1980. (Bechtel et al 1992) The filter pit remains operational. (ORNL 1996)

Present Function: This facility remains operational, in support of continuing ventilation requirements for Building 4507. (ORNL 1996) The building cell ventilation system is routed through this below grade filter pit before connecting to underground ducts going to the 3039 stack. (Ford and Holder 1992)

Life Cycle Operation: The high level chemical development lab was used as a laboratory and small scale pilot plant for development studies of reactor fuel processing, separation, and recovery of transuranic (TRU) materials, and separation of fission products from aqueous wastes. (Ford and Holder 1992)

Waste Characteristics: The total radiation levels for Building 4556 are <= 20 mRAD/hr at 30 cm and at contact. The hazard level classification for this complex is "radiological." (ORNL 1996)

Release Data: No releases have been reported. (Ford and Holder 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, Inc./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1 & D1, Oak Ridge, Tennessee.

Ford, M.K. and L. Holder, Jr., July 1992. *Surveillance and Maintenance Plan for the ORNL Decontamination and Decommissioning Program, FY 1993 - 2002*, prepared by Waste Management and Remedial Action Division, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, April 1996. *Phase I Safety Documentation, The High-Radiation-Level Chemical Development Facility and Filter Pit, Building 4057 and 4556*, prepared by Chemical Technology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 24_01.JPG; 24_02.JPG

FACILITY CONTACT CHECKLIST

Unit Name: Krypton Storage Cubicle (3093)
Unit Number:
Facility Manger/Contact: Karl Haff
Date:

Historic Use/Purpose:

Current Status: EM-60 Shutdown, ready to transfer to EM-40 but not in budget cycle yet (Haff 1997)

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics:

Known Releases:

S&M Responsibilities:

Database availability/contact:

Comments:

References: Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997

Date Prepared:

UNIT NAME: Krypton Storage Cubicle (3093)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Located in the ORNL main complex northwest of and adjacent to Building 3033. (ORNL 1995)

Approximate Dimensions and Capacity: The cubicle is a roofless reinforced, concrete enclosure, containing four charcoal-filled storage tanks. It consists of a non-ventilated 2 ft-thick reinforced-concrete enclosure. (ORNL 1995).

Dates Operated: Unknown.

Present Function: Not in Service.

Life Cycle Operation: Building 3093 was used to store radioactive materials used in processes conducted in Building 3033. (ASI 1996) Building 3033 was used to process Cr-14, Kr-85, and H-3. Processing of C-14 was discontinued in 1975. Krypton operations included the purification of Kr-85 (from the Idaho National Engineering Laboratory) in preparation for direct sale or as feed to the thermal diffusion columns in Building 3026C. The last Kr-85 campaign was conducted in September 1989. (ORNL 1995)

Waste Characteristics: Much less than 1 Ci of krypton remains in the storage tanks. (ORNL 1996)

Release Data: There is some residual krypton irretrievably absorbed on the charcoal in the storage tanks in Building 3093. This poses no threat of exposure to personnel or the environment. The krypton gas cannot be removed from the charcoal even by extended heat treatment. (ORNL 1996)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities in the Isotope Facilities Deactivation project were used in the late 1940s to the late 1980s. (Phillips 1996) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, February 26, 1996. *Safety Documentation, The Krypton and Tritium Facility, Buildings 3033/3093*, Draft, Doc. No. HS/3033/3093/F/RT-10/Rev 1, prepared by Chemical Technology/ORNL Environmental Restoration Program, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ONRL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Krypton - 85 Enrichment Facility (3026C)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose: All use of Krypton loading equipment has been completed. Nuclear medicine and I&C no longer occupy any space in this building. (Eversole, 1997)

Current Status: EM-60 Scheduled to be completely Inactived sometime in early 1998. Trans to EM-10 after that at some point. (Should be turn down)

Approximate Dimensions and Capacity: 11,680 ft^2 in 2 floors.

Dates Operated: 1994-1992

Waste Inventory/Characteristics: Non Rad 200 gal ZnBr scheduled to be removed

Known Releases: Soil, GW, Air - Broken drain lines and process releases. Rad contam: walls, floors, equipment, piping, tanks, drains Non-Rad Contam: PCBs, CFCs - on equipment, Asbestos - walls, floors, piping, Zn Bromide - on equipment.

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Kuhaida, Jerry, October 1996, LMES Project Manager, Review Comments.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Ramey, D.W. and W.J. Armento, March 31, 1992. *Phase I Safety Documentation, The Krypton-85 Enrichment Facility, Building 3026-C, Hazard Screening*, HS/3026-C/F/RT-4, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Krypton-85 Enrichment Facility (3026C)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3026C located in the ORNL main plant area on Central Avenue between Third and Fifth Streets. (Kuhaida 1996)

Approximate Dimensions and Capacity: The two-story structure (i.e., high bay area) of Building 3026C houses two banks of four hot cells each. These cells are constructed of reinforced concrete 2 ft thick (top, sides, and partitions) with a 4- by 6-foot space for each cell. (ORNL 1995)

Dates Operated: The building was constructed in 1943. The krypton system was installed in the mid-1960s. (ORNL 1995)

Present Function: Krypton loading equipment in Building 3026C is still functional and will be used in the final disposal of all residual Kr-85 as part of the Isotopes Facilities Deactivation Project (IFDP) planned activity. The Health Sciences Research Division (HSRD) now uses only Cell 4 in Bank 1 (west), the Laboratory 11 complex, and the counting room for nuclear medicine research. The Instrument and Control (I&C) Division operates a shop in the southwest corner of the building in which they repair and maintain monitoring equipment. I&C presently occupies offices in Room 5. (ORNL 1995)

Life Cycle Operation: Building 3026C was used for about 5 years (1943-1948) primarily to develop methods of isolating fission products. After World War II, the effort shifted to processing radioisotopes for research and medical purposes. The waste from processing irradiated reactor fuel elements for uranium and plutonium recovery in Building 3019 was piped directly to Building 3026C. At Building 3026C, it was processed to isolate short-lived isotopes. The commercial isotopes program started in Building 3026C. The krypton system was installed in the east cell bank (Cell Bank 2) in the mid 1960s and is still functional but has not operated in over 2 years. By the early to mid 1960s the two front cells of the west cell bank (Bank 1) were being used by the Metals and Ceramics (M&C) Division. It is thought that irradiated reactor fuel elements were segmented in these cells. Cells were also originally used for source safety testing and, more recently, have been used for hot metallographic work. They have now been shut down. Since 1974, Cells 3 and 4 of Bank 1 have been used exclusively for nuclear medicine research. The krypton sales program operations in Building 3026C were discontinued in 1991. (ORNL 1995)

Waste Characteristics: Fission products such as Cs-137 and Sr-90, alpha-emitting actinides, and isotopes recovered during early operations including I-129, I-131, Se-79, Pd-107, Co-60, H-3, Kr-85, W-188, Os-191, and Pm-147. (ORNL 1995)

Release Data: Because of the long operational period, the system is highly contaminated with krypton, which is embedded in the organic gasketing material of the equipment. (ORNL 1995) Contaminants present in the facility include < 1 μCi alpha (no isotope identified), < 10 μCi fission products, including Sc-137, Kr-85, and Co-60, and < 100 μCi H-3. (Ramey and Armento 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

FACILITY CONTACT CHECKLIST

Unit Name: Metal Segmenting Facility (3026D)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: Scheduled to be shutdown by end of August 4, 1998. In process of moving inventory. EM-60 will become EM-40 eventually.

Approximate Dimensions and Capacity: Footprint - 9,000 ft^2, Floorspace - 14,700ft^2 in 3 floors.

Dates Operated: 1948-?

Waste Inventory/Characteristics: 2000 gal of Zn Br, pcbs in light fixture.
All Co-60 has been removed (Eversole 1997)

Known Releases: Unknown, Rad contam: Co-60, Cs-137 on walls, floors, equipment, piping, drains, cells
No non-rad contam.

S&M Responsibilities:

Database availability/contact:

Comments:

References:

Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

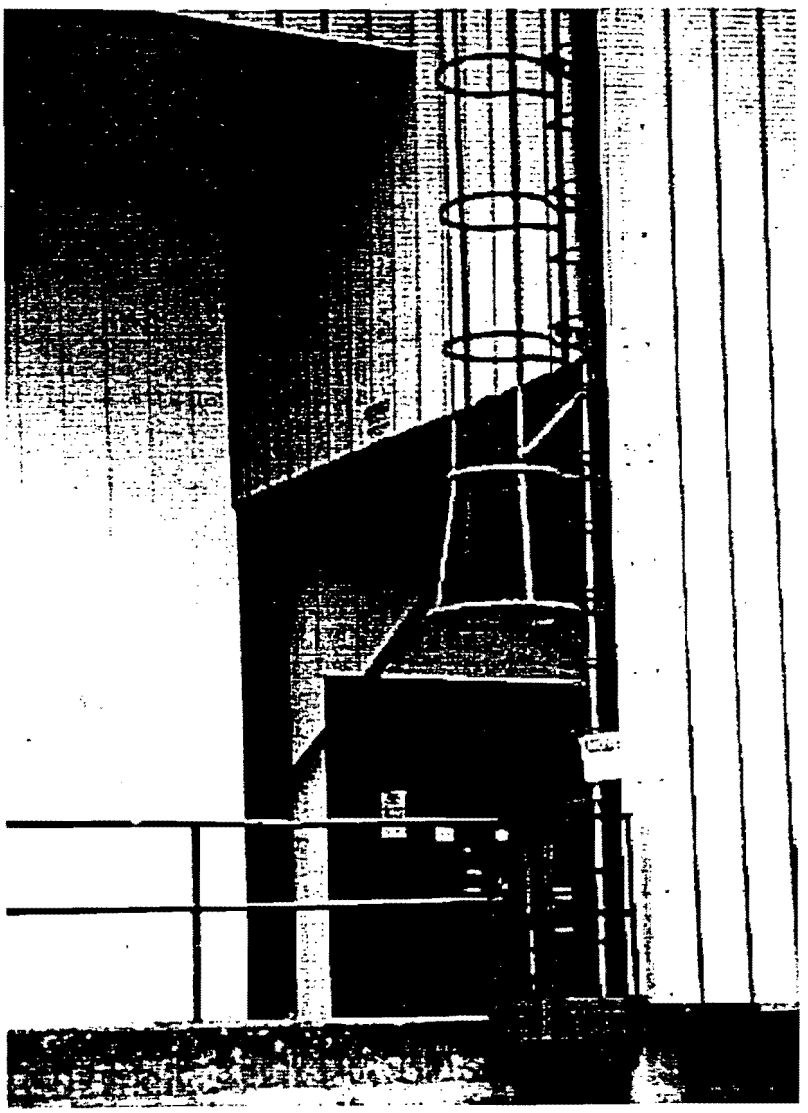
Date Prepared:

Oak Ridge National Laboratory, October 20, 1992. *Hazard Screening, Segmenting Hot Cell Facility, Building 3026D, Phase I Safety Analysis Report*, Document No. HS/3026D/F/92/Rev 0, prepared by the ORNL Metals and Ceramics Division.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 28_16.JPG



UNIT NAME: Metal Segmenting Facility (3026D)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3026D is located in the ORNL main plant area on the north side of Central Avenue. It is east of and adjacent to 3026C. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3026D is a three-story wooden structure. The principal structure within the building is a two-story, 5 ft-thick concrete cell block which is divided into two connecting radioactive material handling cells (hot cells) located in a north-south direction. The west face of the cell block is equipped with manipulators and Zn-Br_2-filled viewing windows. To the west of the cell block, located at floor level is a high-level radioactivity storage facility. This is connected to the south hot cell via a tunnel below the floor for transfer purposes. (ORNL 1995)

Dates Operated: The facility dates back to the 1940s. It was removed from service in 1990. (ORNL 1992)

Present Function: There are no ongoing operations in Building 3026D other than the storage of irradiated metal specimens. (ORNL 1995)

Life Cycle Operation: The Segmenting Hot Cells Facility was originally used to isolate large quantities of fission-produced Ba-140 for criticality testing purposes. The cells in the Segmenting Hot Cells Facility have been greatly modified since the discontinuance of the earlier Ba-140 process. Subsequently they provided facilities for the segmenting, examination, and assembly of irradiated metallurgical specimens. (ORNL 1995)

The building also houses a Chemical Separation Laboratory in addition to the Segmenting Hot Cells Facility. (ORNL 1995)

Waste Characteristics: Historically, the Chemical Separations Laboratory has served as a facility for the production of P-32 and I-131; separation of numerous fission products; isolation of T-99, Pm-147, Np-237; and the isolation of Xn-135 for neutron cross-section determination. (ORNL 1995)

Release Data: Handling cells are contaminated with Co-60 and Cs-137. Several are also highly contaminated with krypton. (ORNL 1995) Hazardous substances consist mainly of residual radioactive surface contamination (alpha, beta, and gamma), irradiated metal specimens, zinc-bromide, and PCB's. The known quantities of substances found in the facility are 150 Ci of Co-60, 2,000 gal of zinc bromide, and < 5 gal of PCBs. (ORNL 1992)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

FACILITY CONTACT CHECKLIST

Unit Name: Radioactive Gas Processing Facility (3033)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-60 ready to be transferred not scheduled.

Approximate Dimensions and Capacity: 720 ft^2 footprint/1 floor

Dates Operated: 1951-1990

Waste Inventory/Characteristics: None

Known Releases: Unknown. Non-rad contam: PCBs/CFCs on equipment Asbestos on floors, piping Rad contam: walls, floors, equipment, piping - H-3, Kr-85.

S&M Responsibilities:

Database availability/contact:

Comments: The three uranium traps were removed from the building. (Eversole, 1997)

References:

Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: 29_04.JPG

UNIT NAME: Radioactive Gas Processing Facility (3033)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: The radioactive gas processing facility is housed in Building 3033, which is located in the ORNL main plant area. It is in the central area of the Isotopes Circle, northeast of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: The building is a single-story steel-frame structure covered with aluminum siding. The floor space is about 1200 ft^2 with a total volume of about 20,000 ft^3. The outer surface of the building has been sealed by a cocooning process to make it as airtight as possible. Personnel and equipment entrances are gasketed. The building is maintained at a pressure of -0.3 in w.g. or more relative to the outside atmosphere. (ORNL 1995)

Dates Operated: Unknown to 1990 (ORNL 1995)

Present Function: Not in operation.

Life Cycle Operation: Building 3033 was used to process C-14, Kr-85, and H-3. Processing of C-14 was discontinued in 1975. The last operations in Building 3033 consisted of two separate radioactive gas processing systems. Tritium operations involved the receiving of bulk tritium shipments from the Savannah River Plant, followed by purification, loading of shipping containers, and shipment. Krypton operations included the purification of Kr-85 (as received from the Idaho National Engineering Laboratory) in preparation for direct sale or as feed to the thermal diffusion columns in Building 3026C. The processing of H-3 for sale to private industry was discontinued in 1990. The last Kr-85 campaign was conducted in September 1989. (ORNL 1995)

Waste Characteristics: Tritium radiation consists of a relatively soft beta emission, which produces essentially no penetrating radiation hazard. Tritium is handled in a hood inside the tritium room. (ORNL 1995)

Release Data: There is presence of tritium in three traps and associated equipment. There are also some small, fixed hot spots of residual radioactive surface contamination, but most of these areas have been decontaminated. (ORNL 1996)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, February 26, 1996. *Safety Documentation, the Krypton and Tritium Facility, Building 3033/3093, Hazard Identification and Facility Classification*, Draft Document No. HS/3033/3093/F/RT-10/Rev. 1, prepared by the Chemical Technology/ORNL Environmental Restoration Program, Oak Ridge, Tennessee.

FACILITY CONTACT CHECKLIST

Unit Name: Radioactive Production Laboratory Annex (3033A)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-60 ready to be transferred not scheduled. May be transferred end of FY1997 effective October 1, 1997.

Approximate Dimensions and Capacity: 945 ft^2

Dates Operated:

Waste Inventory/Characteristics: None

Known Releases: Unknown. PCBs, CFCs, - equipment Asbestos - walls, floors, piping

S&M Responsibilities:

Database availability/contact:

Comments: Volatiles used hoods and gloveboxes have been removed from the building. (Eversole, 1997)

References:

Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:

UNIT NAME: Radioisotope Production Laboratory -- C (3030)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the west-central area of the Isotopes Circle, north of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3030 is a single-story steel-frame structure covered by corrugated aluminum siding. The single-story facility has a floor area of 825 ft^2. A manipulator-type hot cell is located on the middle of the east wall. (ORNL 1995)

Dates Operated: Unknown.

Present Function: Not in Operation.

Life Cycle Operation: Building 3030 was constructed to perform limited production and development work with radioisotopes used for industrial, medical, and research applications. The hot cell in Building 3030 has been used to process irradiated cyclotron and reactor targets to produce numerous unique radioisotopes such as (1) Co-56 recovery from an iron target, (2) Co-57 recovery from a nickel cyclotron target, (3) preparation of a purified Au-198 solution, (4) purification of Fe-55, (5) separation of Np-234 from a uranium target, (6) processing of Se-75, (7) preparation of purified Sr-90 nitrate, (8) processing of Sn-11, (9) purification of U-237, (10) processing of P-33, and (11) processing of Ir-192. (ORNL 1995)

Waste Characteristics: Small quantities of Ni-63 and Pd-103 are present in the facility (laboratory). (ORNL 1995)

Release Data: Some areas of the building are contaminated. (ORNL 1995)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities now in the Isotope Facilities Deactivation Project were used from the late 1940s to the late 1980s. (Phillips 1996). The IFDP Work Plan indicates small quantities of Ni-63 and Pd-103 are present but the Hazard Screening (ORNL, no date) does not mention this. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, no date. *Phase I Safety Documentation, Radioisotope Production Laboratories C, D, and H, Buildings 3030, 3031, and 3118, Hazard Screening, Draft*, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Radioactive Production Laboratory Annex (3033A)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Building 3033A is located in the ORNL main plant area in the central portion of the Isotopes Circle, south of Building 3047. (ORNL 1995a)

Approximate Dimensions and Capacity: It is a single-story metal structure erected by bridging the space between Buildings 3033 and 3034 and using their walls for support. Floor space is about 242 ft^2, with a free-space volume of about 718 ft^3. Personnel access is through gasketed, air-lock entries. The exterior has been sealed by a polyurethane cocooning process and the building is maintained under negative pressure. (ORNL 1995a)

Dates Operated: 1960 - 1990 (ORNL 1995a)

Present Function: Not in Operation. (ORNL 1995a)

Life Cycle Operation: Building 3033A (Annex) was used to house and contain the facilities for the production, loading, welding, and decontamination of neutron dosimeter materials as well as the weighing and packaging of milligram to gram quantities of actinide materials for research applications. The building does not contain a hot cell and was used only for low-level radioactive operations in glove boxes and one hood. Special nuclear materials were, at one time, stored in the building. (ORNL 1995a)

Waste Characteristics: Actinide isotopes and C-14. (ORNL 1995a)

Release Data: There is presence of small, fixed hot spots of residual alpha-emitting and C-14 radioactive surface contamination, but these areas have been decontaminated as much as practical. Building 3033A is maintained using good radiological surveillance practice. These is no potential for significant radiation exposure to personnel working within Building 3033A. Current quantities of radioactivity existing in the building are 1.1 mCi of alpha, 2.2 mCi of beta/gamma and 72 μCi of C-14. (ORNL 1995b)

Site Status: CERCLA

Media of Concern:

Comments: This site is also referred to as the Actinide Fabrication Facility. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995a. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 13, 1995b. *Phase I Safety Documentation, The Actinide Fabrication Facility, Building 3033A, Hazard Screening*, Document No. HS/3033-A/F/RT-11/Rev 1, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Radioisotope Production Laboratory - D(3031)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-60 ready for transfer.

Approximate Dimensions and Capacity: 720 ft^2

Dates Operated: 1953-1989

Waste Inventory/Characteristics: None

Known Releases: Unknown. Rad contam - walls, floors, equipment, piping, drains
Nonrad contam - PCBs, CFCs on equipment, Asbestos - walls, floors, piping.

S&M Responsibilities:

Database availability/contact:

Comments: Volatiles used.

References:
Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997

Date Prepared:

UNIT NAME: Radioisotope Production Laboratory -- E (3032)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the central area of the Isotopes Circle, east of Building 3031. (ORNL 1995b)

Approximate Dimensions and Capacity: The building is a single-story steel-frame structure covered with aluminum siding. The floor space is about 1200 ft^2 with a total volume of about 20,000 ft^3. The facility has a laboratory containing 5 hoods on the north side of the building and an office area on the south side of the building. An open passage connects the two areas. (ORNL 1995b)

Dates Operated: Constructed in the 1950s. (ORNL 1995a) Removed from service: unknown.

Present Function: Not in operation.

Life Cycle Operation: Originally it housed the analytical facility for radiochemical support of the isotopes production activities. (ORNL 1995a)

Waste Characteristics: Am-241 and several shorter half-lived materials. (ORNL 1995b)

Release Data: The five hoods are contaminated with a variety of materials from old radioisotope processing and development work (including Am-241 and several shorter half-lived materials). Smears up to the 100K beta/gamma and 10-20K alpha range have been obtained in these hoods. Radiation levels are very low, with hot spots being in the 10-100 mrad/hr range. (ORNL 1995b)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities now in the Isotope Facilities Deactivation Project were used from the late 1940s to the late 1980s. (Phillips 1996) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, June 12, 1995a. *SARUP Hazard Screening Document, Radioisotope Production Laboratory E, Building 3032*, Document No. HS/3032/F/RT-9/Rev 0, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker , Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 29_02.JPG

UNIT NAME: Radioisotope Production Laboratory -- D (3031)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed (ASI 1996)

Unit Location: Located in the ORNL main plant area in the west-central area of the Isotopes Circle and north of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: The building is a single-story, steel-frame structure covered by corrugated metal siding with a floor area of 825 ft^2. It has one manipulator cell located in the middle of the west wall and hoods in the corners. The hot cell has 1 ft barytes concrete walls with 5-in steel armor plate on the operating (east) face of the cell wall starting 2 ft 10 in above the floor and an unshielded top cover. (ORNL 1995)

Dates Operated: Unknown.

Present Function: Not in operation.

Life Cycle Operation: Building 3031 was constructed to perform limited production and development work with radioisotopes used for industrial, medical, and research applications. The hot cell in Building 3031 was used in the final separation stage of gadolinium from europium targets. The Gd-153 processed here is used in nuclear medicine research to determine bone density for osteoporosis research and treatment evaluation. (ORNL 1995)

Waste Characteristics: Residual and trace levels of beta/gamma and alpha contamination, respectively. (ORNL, date unknown)

Release Data: Some areas within the building (cell and hoods) are contaminated. (ORNL 1995) Quantities of contamination are residual for miscellaneous beta/gamma and traces (very low) for miscellaneous alpha. (ORNL, date unknown)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities now in the Isotope Facilities Deactivation Project were used from the late 1940s to the late 1980s. (Phillips 1996) This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, date unknown. *Phase I Safety Documentation, Radioisotope Production Laboratories C, D, and H, Buildings 3030, 3031, and 3118, Hazard Screening, Draft*, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Radioisotope Production Laboratory - H(3118)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-60, Currently ready to be transferred to EM-40 no actual schedule to transfer to EM-40.

Approximate Dimensions and Capacity: 909 ft^2

Dates Operated: 1965-1993

Waste Inventory/Characteristics: None

Known Releases: Unknown. Rad contam: (From 3030, 3031) - walls, floors, equipment, piping, drains Non-rad contam: PCBs, CFCs, - equipment, Asbestos - walls, piping.

S&M Responsibilities:

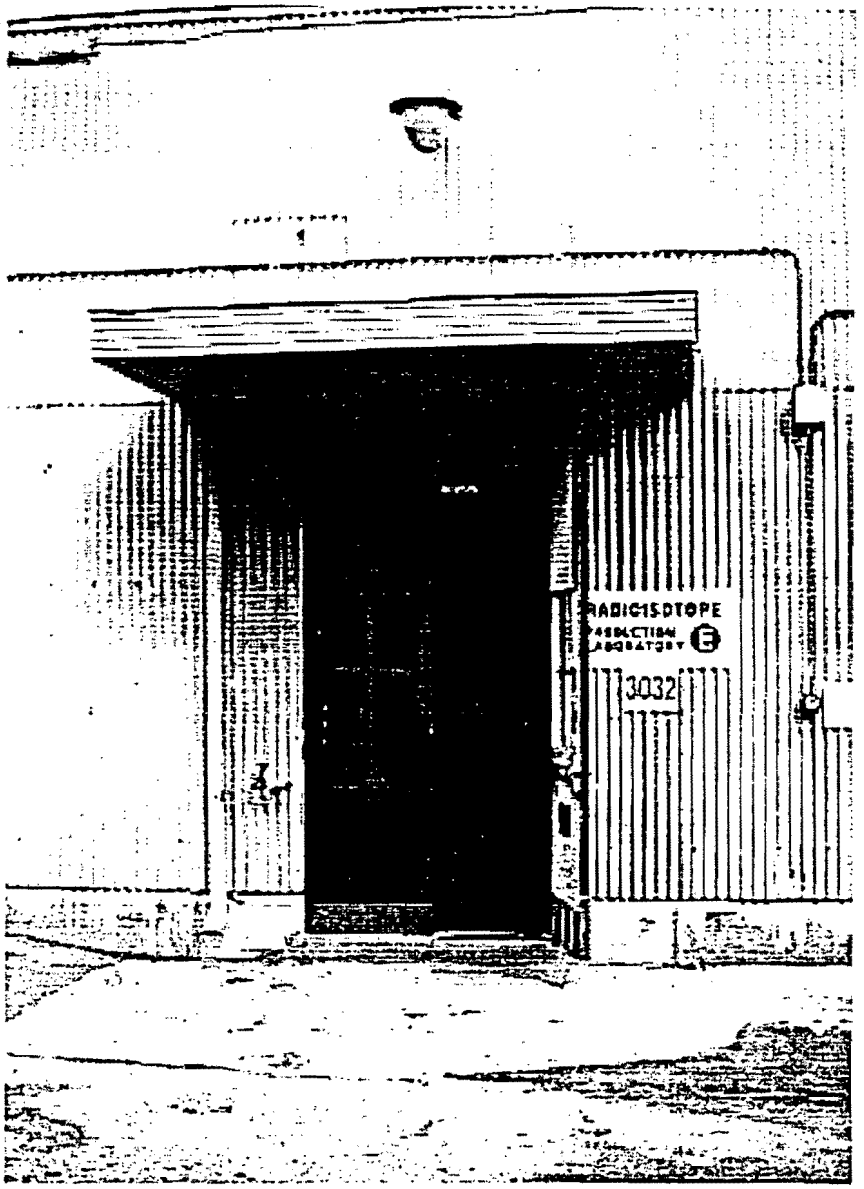
Database availability/contact:

Comments:

References:

Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997

Date Prepared:


RADIOISOTOPE
3032

UNIT NAME: Radioisotope Production Laboratory -- H (3118)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the west-central area of the Isotopes Circle, north of Building 3038. (ORNL 1995)

Approximate Dimensions and Capacity: Building 3118 is a single-story, steel-frame structure covered with corrugated aluminum siding that was erected by roofing and enclosing the space between Buildings 3030 and 3031. The floor consists of a concrete pad. It covers the access doors to the cells in these buildings. (ORNL 1995)

Dates Operated: Early 1960s to unknown. (ORNL 1995)

Present Function: Not in operation. (Phillips 1996)

Life Cycle Operation: It provides access to the rear entry doors for the hot cells in Buildings 3030 and 3031, cask storage of some old radioactive sources, and temporary holding of contaminated waste. (ORNL 1995)

Waste Characteristics: Unknown.

Release Data: Unknown.

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: No photo available.

FACILITY CONTACT CHECKLIST

Unit Name: Radioisotopes Services Building (3034)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: EM-60, Completely deactivated, no schedule.

Approximate Dimensions and Capacity: 600 ft^2

Dates Operated: 1953-?

Waste Inventory/Characteristics: None

Known Releases: None. Non-rad contam: PCBs - equipment, Asbestos - floors, piping Lead paint - walls.

S&M Responsibilities:

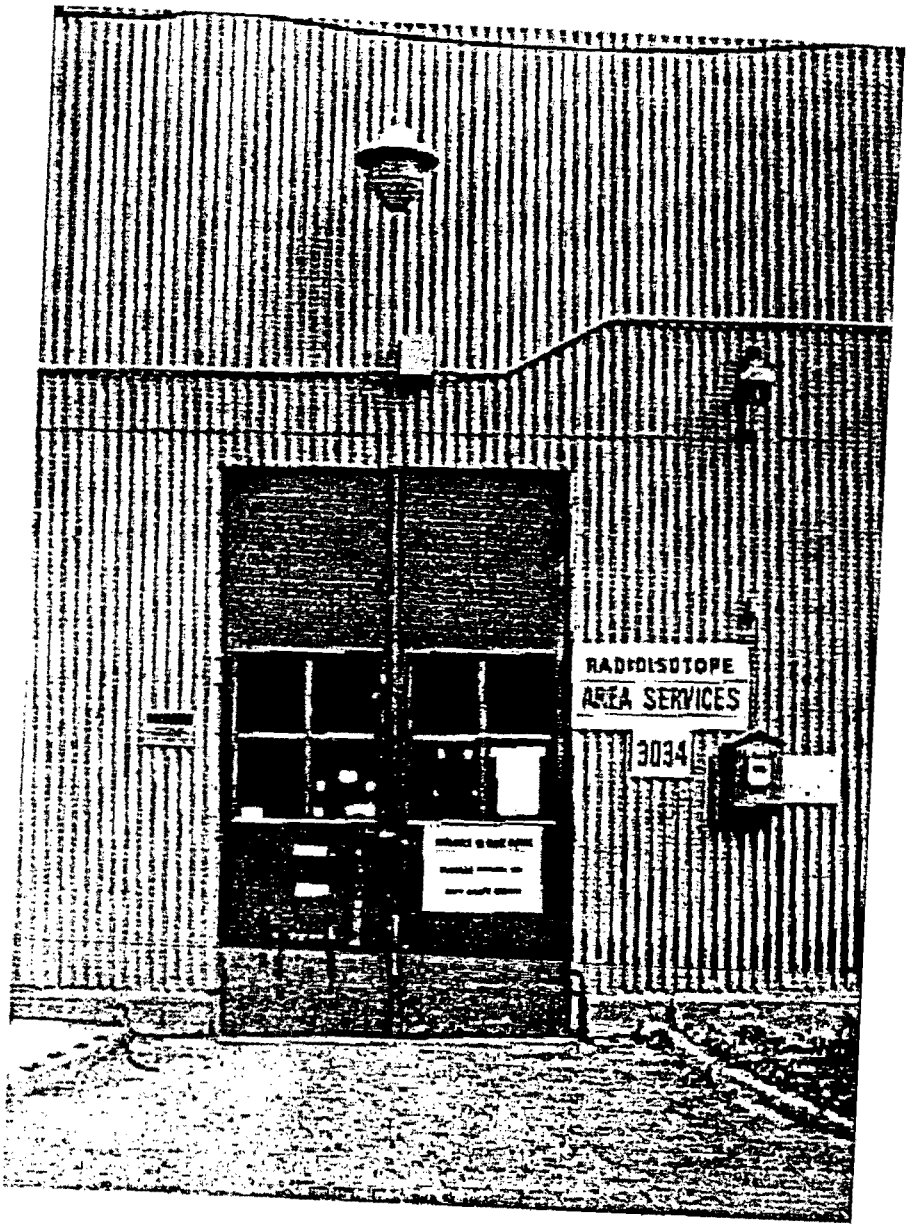
Database availability/contact:

Comments: Radioactive hot spots in the building resulted from inadvertent tracking of contamination from other buildings. (Eversole, 1997)

References:

Haff, Karl personal communication with Anita Parker, ASI on April 8, 1997
Eversole, Bob, LMES IFDP Project Manager, review comments, April 30, 1997.

Date Prepared:


RADIOISOTOPE
AREA SERVICES
3034

UNIT NAME: Radioisotopes Services Building (3034)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the east end of the Isotopes Circle, adjacent to Building 3033-H. (ORNL 1995b)

Approximate Dimensions and Capacity: Unknown.

Dates Operated: Constructed in the 1950s. (ORNL 1995a)

Present Function: Building 3034 houses the central electrical distribution station for the Isotopes Circle area. (ORNL 1995b)

Life Cycle Operation: This facility was used as a field shop for the Plant and Equipment Division in supporting past isotope production operations in other facilities. No handling of radioactive materials has occurred in this building. (ORNL 1995b)

Waste Characteristics: No handling of radioactive waste occurred in this building. (ORNL 1995b)

Release Data: Although no radioactive materials were ever handled in this facility (ORNL 1995b), the Hazard Screening Report (ORNL 1995a) for the facility indicates that some small, fixed hot spots of residual radioactive surface contamination remain in inaccessible areas. The quantity of contamination detected is <1.7 mCi beta/gamma activity. (ORNL 1995a)

Site Status: CERCLA

Media of Concern:

Comments: The exact date of operation is not known. Most of the facilities in the Isotopes Facilities Deactivation Project (IFDP) were used from the late 1940s to the late 1980s. (Phillips 1996) The Hazard Screening Report conflicts with the IFDP Work Plan that says no radioactive materials were handled in Building 3034. This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, June 12, 1995a. *SARUP Hazard Screening Document, Radioisotopes Area Services Building, Building 3034*, Document No. HS/3034/F/RT-12/Rev 0, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Phillips, Herman, April 29, 1996. Assistant Facilities Manager, ORNL Special Projects, LMES, personal communication with Anita F. Parker, Advanced Sciences, Inc.

Date Prepared: December 1996

Photo: 29_01.JPG

FACILITY CONTACT CHECKLIST

Unit Name: Radioisotopes Development Lab (3047)
Unit Number:
Facility Manger/Contact:
Date:

Historic Use/Purpose:

Current Status: Turned over to Isotopes program September 30, 1996 from EM-60, Active facilities (Herman Phillips 4-7047).

Approximate Dimensions and Capacity: 16,000 sq ft 3 floors, concrete/mason stock.

Dates Operated: 1962-1992

Waste Inventory/Characteristics: Isotopes Co-60, Sr-90/Y-90, I-131 *contam on walls, floors, equipment, piping, tanks, ducts and drains; PCBs, CFCs, Asbestos/ACMs metals, fuels, volaties, chemicals, adhesives, used in building. Suspected lead paint, carcingous proxides.

Known Releases: Unknown rad release or chem releases.

S&M Responsibilities:

Database availability/contact:

Comments: Inventory: low level 33 Ci' possibly nonnuclear PCBs, CFCs, asbestos, lab chemicals - 1,500 # * other isotopes are also present.

References:

Date Prepared:

UNIT NAME: Radioisotopes Development Lab (3047)

Unit Number:

Project Status: Removal Site Evaluation (RmSE) completed. (ASI 1996)

Unit Location: Located in the ORNL main plant area in the north-central area of Isotopes Circle. (ORNL 1995b)

Approximate Dimensions and Capacity: Building 3047 is a three-story steel-frame building with concrete block exterior and interior walls. The Radioisotopes Development Laboratory houses four high-level beta-gamma cells, one alpha hot cell, seven laboratories for handling low-level materials, a decontamination room, offices, and service areas. (ORNL 1995b)

Dates Operated: Constructed in 1962; still in operation. (ORNL 1995b)

Present Function: Isotope activities are shut down except for waste removal and transloading of radioactive materials in the beta-gamma hot cells. (ORNL 1995b) Presently used for processing, temporary storage, packaging and disposal of radioactive materials. Radioisotopes and radiopharmaceutical research is conducted in parts of the facility. (ORNL 1995a)

Life Cycle Operation: Used to conduct research and development, and production of radioisotopes. (ORNL 1995b)

Waste Characteristics: Radioactive materials normally handled at the facility are Sr-90 (up to 100,000 Ci). Single sealed sources of material handled could be equivalent to 350,000 Ci of Sr-90. Other isotopes handled include Cs-137 and Eu-152/154. Stored items include Pu-238 materials. Between 20–100 Ci of short-lived radioisotopes are studied periodically including Sn-177m, Dy-166/Ho-166, Re-186, and W-188/Re-188. (ORNL 1995a)

Release Data: Past programs and processes previously conducted have resulted in remaining inventory. (ORNL 1995a) Low levels of residual fixed and transferrable radiologic surface contamination exist in areas of the facility as a result of historical operations. Residual radiologic surface contamination consists of < 1 mCi beta activity as Sr-90 and < 5 mCi of alpha activity as Pu-239. The remaining radioisotope inventory consists of 3,000 Ci of bulk Pu-238 (alpha activity) and 500,000 Ci of Sr-90 (beta/gamma activity). Approximately 1 gal of PCBs is also present (ORNL 1995a)

Site Status: CERCLA

Media of Concern:

Comments: This site was included in a CERCLA remedial investigation (Bechtel et al 1992) and will be remediated in accordance with the FFA.

References:

Advanced Sciences, Inc., July 1996. *Removal Site Evaluation Report for the Isotopes Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1501 & D1, prepared for the U.S. Department of Energy, Office of Environmental Management.

Bechtel National, In./CH2M Hill/Ogden/Peer, September 1992. *Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory*, DOE/OR-1043/V1&D1, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, June 12, 1995a. *Phase I Safety Documentation, The Radioisotope Development Laboratory Building 3047, Hazard Screening*, Document No. HS/3047/F/RT-16, Oak Ridge, Tennessee.

Oak Ridge National Laboratory, August 1995b. *Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory*, ORNL/ER-249/R2, prepared by Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

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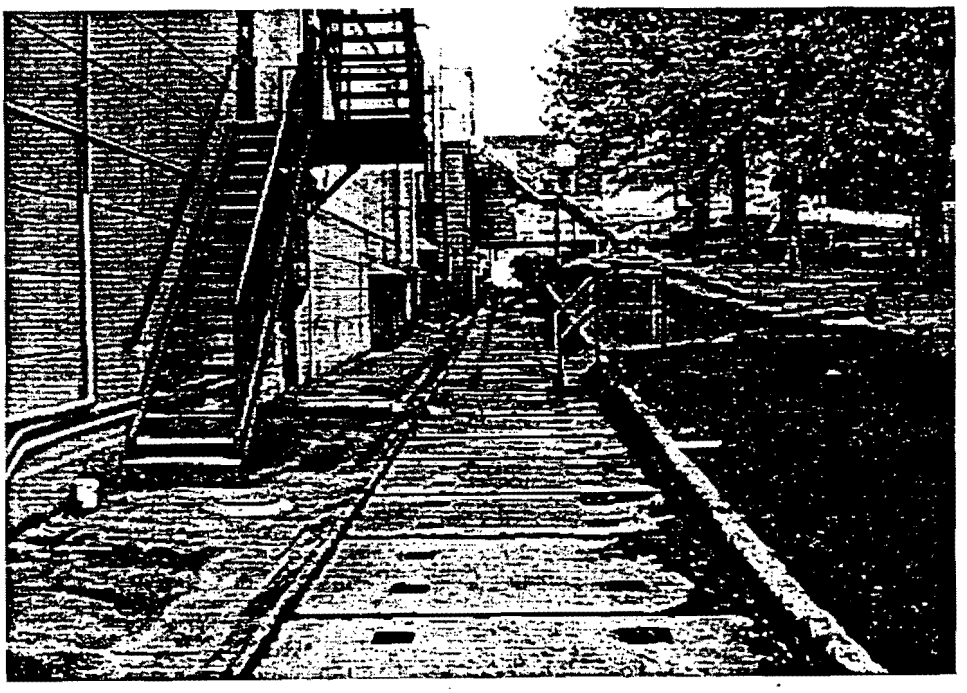

SC Report for Bldg 3515 at ORNL
ORNL/ER/Sub/87-99053/3-2
8/94

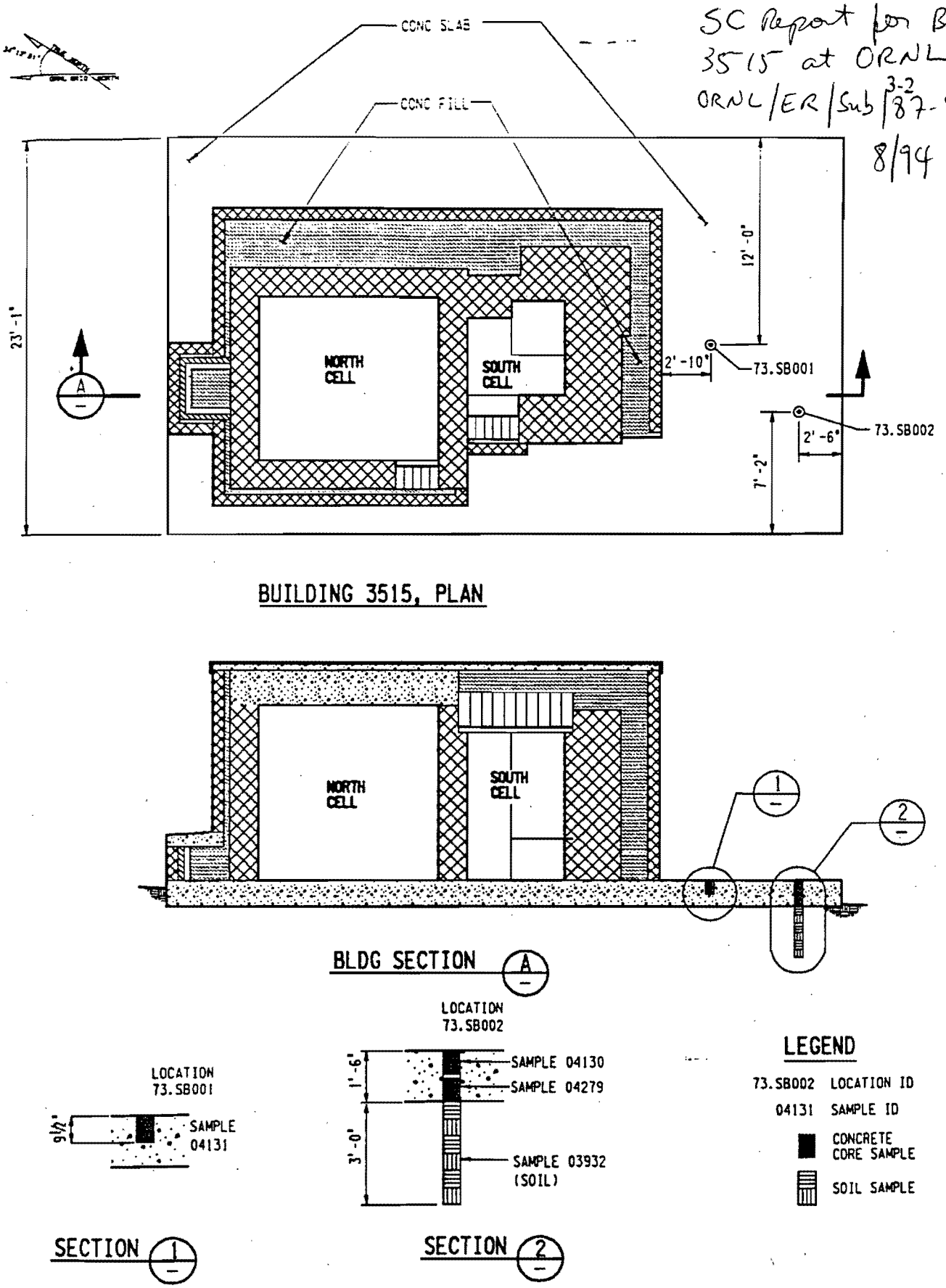

Fig. 3.1. Concrete core and soil sampling locations.

Table 3.1. Sampling summary

Location No.[a]	Sample No.	Sample Type	Sample Description	Chemical Analysis: TCL VOCs	TCL BNAEs	TCL Pest./ PCBs	TAL Metals	TAL Cyanide	Radiological Analysis
73.SB001	04131	Concrete core	Core taken from the slab outside and to the south of Building 3515. The coring stopped when a steel plate was encountered; the plate made a hollow sound on contact. The core length is 0.8 ft.		X	X	X	X	X
73.SB002	04130	Concrete core	Core taken from the top half of the slab at a location approximately 10 ft south of Building 3515. The core length is 0.8 ft.		X	X	X	X	X
	04279	Concrete core	Core taken from the bottom half of the slab at the same location as sample 04130. The core length is 0.7 ft. The top surface of the core was painted grey. While most of the core was at background radiologically, the bottom surface was relatively "hot": 6 mR/h closed window and 100 mrad/h open window.		X	X	X	X	X
	03932	Soil	Hand-augered composite soil sample taken below the Building 3515 slab at depths of 1.5 to 4.5 ft. (Exception: the VOC sample was taken from a depth interval of 2.2 to 3.2 ft.) Refusal was not reached but drilling was stopped at 4.5 ft because of the relatively high radiation levels of the collected soil: gross gamma of 20 mR/h closed window and 100-plus mrad/h open window.	X	X	X	X	X	X
	04180	Trip blank/ water	Submitted with sample 03932.	X					
Foyer wall in south cell	04243	Paint chips	Sample was submitted for TAL metals analyses without mercury analysis. Due to the limited volume of the sample, all of the sample volume was used to achieve the best detection limits; as a result, the analyses were performed without a matrix spike or duplicate.				X		X

[a]Locations are shown in Fig. 3.1.

R-176-1.TBL

000252

Table 4.1. Analytical detects for organic compounds

Location ID	73.SB001	73.SB002		
Sample ID	04131	04130	04279	03932
Sample Type	Concrete Core	Concrete Core	Concrete Core	Soil
Units	mg/kg	mg/kg	mg/kg	mg/kg
VOC TICs (No. of TICs)[a]				
Unknown	NA	NA	NA	0.007 NJ(1)
BNAEs				
Bis(2-ethylhexyl)phthalate			0.5 J	
BNAE TICs (No. of TICs)[a]				
Aldol condensation				11. NJ(1)
Unknown				0.495 NJ(4)
Unknown alkane			2.77 NJ(6)	
Unknown hydrocarbon	1018.2 NJ(19)	1536.5 NJ(7)	1602.5 NJ(7)	
Pesticides/PCBs				
Aroclor-1254			1.1 J	
Aroclor-1260			0.46 J	
Heptachlor	0.0008 J			

[a] The result is the sum of the tentatively identified compounds (TICs). The number of TICs is shown in parentheses.

Notes: (1) No organic analysis was performed for sample 04243 (paint chip sample from south cell).
(2) "NA" indicates that analyses were not conducted; a blank space indicates that the analyte was not detected.

000256

Table 4.2. Analytical results for metals and cyanide

Location ID	73.SB001	73.SB002			South Cell	RCRA Toxicity Characteristic Equivalent Limits for Solids[a]
Sample ID	04131	04130	04279	03932	04243	
Sample Type	Concrete Core	Concrete Core	Concrete Core	Soil	Paint Chips	
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RCRA Metals						
Arsenic	<3.	4.5 J	4. J	5.5	2.4	100
Barium	57.5 J	55.9	23.6	54.5	4,300	2,000
Cadmium	<0.21	<0.36	0.94	2.3	<0.26	20
Chromium	10.1	9.4	20.4	21.9	<5.3	100
Lead	79.8	8.2 J	15.9 J	213	158	100
Mercury	<0.05	<0.05	<0.05	12.4 J	NA	4
Selenium	<2	<0.82 R[b]	<4.2 R[b]	<0.17	<1.4	20
Silver	<0.84	<0.44	<0.44	1.5	<0.6	100
Other TAL Metals						
Aluminum	5,710	6,220	5,740	12,200	14,300	NA
Antimony	<2.8	<2.6	<2.6	12. J	<6.1	NA
Beryllium	0.42	0.34	0.34	1.2	<0.15	NA
Calcium	255,000	284,000	284,000	41,300. J	15,000	NA
Cobalt	3.6 J	4.1	2.3	15.1	18.9	NA
Copper	16.3	128. J	8.3 R	15.7	8.7 J	NA
Iron	5,980	6,780	6,270	34,600	2,680	NA

R-176-1.TBL

000257

Table 4.2 (continued)

Location ID	73.SB001	73.SB002			South Cell	RCRA Toxicity Characteristic Equivalent Limits for Solids[a]
Sample ID	04131	04130	04279	03932	04243	
Sample Type	Concrete Core	Concrete Core	Concrete Core	Soil	Paint Chips	
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RCRA Metals						
Magnesium	20,600	20,300	9,280	3,410	472	NA
Manganese	273	284	216	731	34.6	NA
Nickel	5.8	6.5	6	19.1	4.8	NA
Potassium	1,280. J	1,250	731	<2,500	414	NA
Sodium	<322	224. J	202. J	189	106	NA
Thallium	<0.26	0.22 J	0.62 J	<0.32	<0.18	NA
Vanadium	9.4	8.8	7.1	33.1	<2.8	NA
Zinc	29.4 J	29.8	151	56.4 J	103	NA
TAL Cyanide						
Cyanide	<0.49	<0.53	<0.53	<0.03	NA	NA

[a] The RCRA equivalent limits are derived from values in 40 CFR 261.24; the maximum concentrations of contaminants for the toxicity characteristic, listed by EPA in 40 CFR 261.24 in units of mg/L, were multiplied by a factor of 20 to obtain equivalent limits for solids in units of mg/kg.

[b] Selenium nondetects were rejected because of zero percent recovery on the matrix spike analysis.

Note 1: Sample 04180 (trip blank) did not undergo metals and cyanide analyses. Sample 04243 (paint chip) did not undergo mercury or cyanide analyses.

Note 2: Shaded values indicate that the total metal content is greater than RCRA toxicity characteristic equivalent limits.

000258

C-RD-632 (Revisions to Cell Floor, Building 3515, January 25, 1952) indicates that (1) a lead cover was placed over the 6-in.-high floor sills in each of the cell entrance ways, (2) lead sheet was wrapped around some protruding pipes, and (3) lead pipe and poured lead were used to shield floor drainage culverts through the north and east walls of the south cell. Photographs indicate what appears to be lead sheet and a lead brick on the radiator/heat exchanger on the north wall of the south cell. As indicated in ORNL drawing D-RD-613, a layer of lead brick may also surround the product sample and removal station.

The lead would probably be considered a mixed low-level radioactive waste, and decontamination activities would be governed by the exposure limits of DOE Orders 5400.5 and 5820.2A as well as the RCRA LDRs. Lead shielding is classified in the LDRs under waste code D008, which includes radioactive lead solids (40 CFR 268.42, Table 3). The LDR for D008 is a technology-based standard: macroencapsulation with surface coating materials such as polymeric organics (e.g., resins and plastics) or with a jacket of inert organic materials to substantially reduce surface exposure to potential leaching media.

4.8 HISTORICAL SOIL SAMPLING EXTERIOR TO BUILDING 3515

Two soil borings (01.SB182 and 01.SB183) were hand-augered near Building 3515 in July 1991, during Phase I of the WAG 1 RI (Bechtel 1992). These 4-in.-diameter borings yielded five soil samples. Figure 4.1 shows the location of the borings relative to Building 3515, and Table 4.3 presents the total drilling depth, number of soil samples collected, intervals sampled, and analyte groups investigated by the laboratories. The analyte groups included VOCs, BNAEs, metals and cyanide, sulfide, and total organic carbon (TOC); pesticides and PCBs were not targeted for analysis.

Table 4.4 presents the concentrations of the organic compounds detected. No VOCs were detected in any of the exterior samples; however, one unknown VOC TIC was found at a concentration of 0.061NJ mg/kg in boring 01.SB182 at a depth interval of 0 to 2 ft.

BNAEs and BNAE TICs were both detected in boring 01.SB183, approximately 12 ft east of Building 3515; no BNAE analysis was performed for samples from boring 01.SB182. The 0- to 2-ft interval (sample 2338) contained 10 BNAEs, including one phthalate, at minor concentrations ranging from 0.05J to 0.31J mg/kg. In the 2- to 4-ft interval (sample 2342), only one BNAE was detected: di-n-butylphthalate at 0.11J mg/kg. The upper soil interval (sample 2338) contained 18 BNAE TICs with a total (summed) concentration of 35.7NJ mg/kg, and the lower interval (sample 2342) contained 16 BNAE TICs with a total concentration of 19.25NJ mg/kg.

Table 4.5 lists results for the metals and cyanide analyses for the soil samples. The RCRA metals were all detected at concentrations less than their toxicity characteristic equivalent limits.

Sulfide and TOC analyses were performed for the 2- to 4-ft interval sample (02342) from boring 01.SB183. No sulfide was detected above the detection limit of 0.5 mg/kg, and the TOC level was 3000 mg/kg.

Table 4.3. Chemical sampling summary for WAG 1 soil borings near Building 3515

Location	Distance from Bldg. 3515[a]	Total Depth (ft BGS[b])	Interval (ft)	Sample	Chemical Analyses: VOCs	BNAEs	Metals	Cyanide	Sulfide	TOC
01.SB182	Approximately 14 ft (3 ft from SW corner of slab)	5.4	0–2	2206	X					
			2–4	2207[c]						
			4–5.4	2251[c]						
01.SB183	Approximately 12 ft (8 ft from SE corner of slab)	4.1	0–2	2338	X	X	X	X		
			2–4	2342	X	X	X	X	X	X

[a] For location 01.SB182, the ORNL grid coordinates are 21935 (northing) and 31021 (easting); for location 01.SB183, the coordinates are 21942 (northing) and 31048 (easting).
[b] The acronym BGS is "below ground surface."
[c] Samples sent to the CSL only.

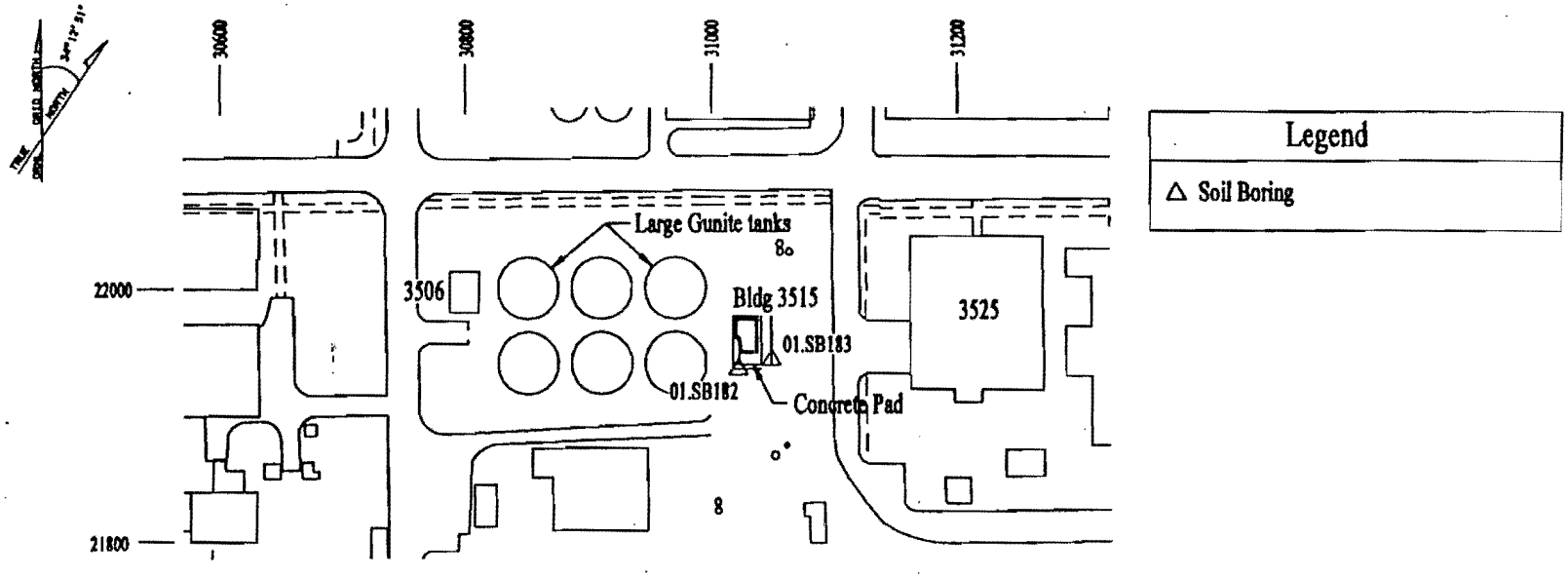

Fig. 4.1. WAG 1 soil boring locations near Building 3515.

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Table 4.4. Analytical detects for organic compounds in WAG 1 soil borings

Location ID	01.SB182	01.SB183	
Sample ID	2206	2338	2242
Interval	0 to 2 ft	0 to 2 ft	2 to 4 ft
Units	mg/kg	mg/kg	mg/kg
VOC TICs (No. of TICs)[a]			
Unknown	0.061 NJ(1)		
BNAEs			
Benzo(a)anthracene	NA	0.11 J	
Benzo(a)pyrene	NA	0.11 J	
Benzo(b)fluoranthene	NA	0.24 J	
Benzo(g,h,i)perylene	NA	0.05 J	
Chrysene	NA	0.19 J	
Di-n-butylphthalate	NA	0.098 J	0.11 J
Fluoranthene	NA	0.31 J	
Indeno(1,2,3-cd)pyrene	NA	0.063 J	
Phenanthrene	NA	0.066 J	
Pyrene	NA	0.3 J	
BNAE TICs (No. of TICs)[a]			
Unknown alcohol	NA	0.4 NJ (1)	
Unknown alkane	NA	3.72 NJ(4)	2.09 NJ(2)
Unknown carboxylic acid ester	NA	0.4 NJ(1)	0.99 NJ(2)
Unknown hydrocarbon	NA	30.42 NJ(11)	15.38 NJ(10)
Unknown ketone	NA	0.76 NJ(1)	0.55 NJ(1)
Unknown phthalate	NA		0.24 NJ(1)

[a] The result is the sum of the tentatively identified compounds (TICs). The number of TICs is shown in parentheses.

Notes: (1) Samples from boring 01.SB182 did not undergo BNAE analysis.
(2) "NA" indicates that the analyses were not conducted; blanks indicate that the analyte was not detected.

Table 4.5. Analytical results for metals and cyanide in WAG 1 soil borings

Location ID	01.SB183		RCRA Toxicity Characteristic Equivalent Limits for Solids[a]
Sample ID	2338	2342	
Interval	0 to 2 ft	2 to 4 ft	
Units	mg/kg	mg/kg	mg/kg
RCRA Metals			
Arsenic	3.7 J	3.9 J	100
Barium	83.6	69.9	2,000
Cadmium	<0.52	<0.68	20
Chromium	9.7	27.7 J	100
Lead	19.5 R	25.7 J	100
Mercury	0.35	1	4
Selenium	0.79 J	<0.69 R	20
Silver	<0.35	<0.45	100
Other TAL Metals			
Aluminum	11,800	17,100	NA
Antimony	<2.3 R	<2.9 R	NA
Beryllium	0.8	0.63	NA
Calcium	36,900. J	46,700	NA
Cobalt	8.8 J	11. J	NA
Copper	10.2 J	13.1 J	NA
Iron	16,300	25,200. J	NA
Magnesium	8,330	6,250	NA
Manganese	648	650. J	NA
Nickel	12.6	20.7	NA
Potassium	1,580	2,660	NA
Sodium	<48.6	197. J	NA
Thallium	<2.8	<3.5 R	NA
Vanadium	16. J	23.5 J	NA
Zinc	48.6	45.1 J	NA
TAL Cyanide			
Cyanide	<0.35	<0.31	NA

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Table 4.5 (continued)

[a] The RCRA equivalent limits are derived from values in 40 CFR 261.24; the maximum concentrations of contaminants for the toxicity characteristic, listed by EPA in 40 CFR 261.24 in units of mg/L, were multiplied by a factor of 20 to obtain equivalent limits for solids in units of mg/kg.

Note: Samples from boring 01.SB182 were not analyzed for metals and cyanide.

The above review of historical soil sampling data does not identify any chemical hazards that would be of particular concern in safeguarding worker health during D&D or indicate any chemical-related issues that would potentially interfere with coordination of Building 3515 D&D and the GAAT OU soil remediation.

4.9 SUMMARY

Three concrete core samples from the slab were analyzed for TCL BNAEs, TCL pesticides/PCBs, and TAL inorganics. No BNAEs were detected except for 0.5J mg/kg bis(2-ethylhexyl)phthalate in core sample 04279. Moderate quantities of BNAE TICs (1018NJ to 1605NJ mg/kg) were detected in each core sample; a possible source of these TICs is core drill grease released during wet drilling operations. With regard to pesticides/PCBs, heptachlor at 0.0008 J mg/kg was found in one of the three core samples, and aroclors at 1.56J mg/kg (ppm) were found in another; this PCB concentration is below the TSCA limit of 50 ppm. No RCRA constituent metals were found. It should be noted that since the cores were all obtained outside Building 3515 but the chemical processing/activity was primarily inside the building, the chemical findings presented for the cores should *not* be considered representative of the concrete comprising the walls and floors of the cells.

One soil sample (03932) collected from under the building slab was analyzed for TCL organics and TAL inorganics. Although no VOCs, BNAEs, or pesticides/PCBs were detected, one unknown VOC TIC was detected at a concentration of 0.007NJ mg/kg, and 5 BNAE TICs were detected at a summed concentration of 11.5NJ mg/kg. Inorganic analyses indicated two potential RCRA constituent metals (lead and mercury); a TCLP test can determine whether or not they are RCRA constituents, and therefore whether the soil in its present form is a hazardous (or mixed) waste that may need to be segregated from D&D wastes.

One paint chip sample was submitted for TAL metals analyses (with the exception of mercury), and two potential RCRA constituent metals (barium and lead) were identified. A TCLP test should be performed before waste disposal to determine whether they are RCRA constituents; however, the paint is not expected to fail the TCLP test because of its relatively low leachability.

ORNL drawings indicate the presence of lead shielding, a potential mixed low-level radioactive waste, at various locations, and the wall around the crystallizer in the south cell may also be formed of lead bricks.

Table 5.1. Analytical methods

Parameter	Analytical Technique	Method Number[a]	Detection Limit[b] (solids, liquids)
Gross alpha	Gas flow proportional counting	USEPA 900.0	1 pCi/g, 1 pCi/L
Gross beta	Gas flow proportional counting	USEPA 900.0	2 pCi/g, 4 pCi/L
Gamma spectroscopy	Gamma spectroscopy	USEPA 600/901.1	0.2 pCi/g Cs-137, 20 pCi/L Cs-137
Total radioactive strontium	Radiochemical separation followed by gas flow proportional counting	USEPA 600/905	0.5 pCi/g, 5 pCi/L
Plutonium isotopics (^{238}Pu, $^{239/240}Pu$)	Radiochemical separation followed by alpha spectroscopy	EML Pu-02	0.6 pCi/g, 1 pCi/L
Thorium isotopics (^{228}Th, ^{230}Th, ^{232}Th)	Radiochemical separation followed by alpha spectroscopy	LANL ER200	0.6 pCi/g, 1 pCi/L
Uranium isotopics (^{232}U, $^{233/234}U$, ^{235}U, ^{238}U)	Radiochemical separation followed by alpha spectroscopy	EML U-02	0.6 pCi/g, 1 pCi/L

Sources: Bechtel National, "Technical Specification for Analytical Laboratory Services," Specification 19118-99-SP-03, Rev. 4, 1993; EPA, *Index to EPA Test Methods*, EPA 901/3-88-001; EPA, *Contract Laboratory Program Statements of Work for Organics and Inorganics Analysis*, Documents OLM01.8 and ILM02.1, 1991; DOE, *EML Procedures Manual*, HASL-300, 1992; and LANL, *Health and Environmental Chemistry: Analytical Techniques, Data Management, and Quality Assurance Manual*, LA-10300M/UC907, 1986.

[a] Abbreviations are: EML-Environmental Measurements Laboratory; LANL-Los Alamos National Laboratory; CLP-Contract Laboratory Program; and SOW-Statement of Work.

[b] Detection limits for radiological parameters are expressed as "detection limit goals."

Table 5.2. Radiological analysis results for Building 3515

Sample ID	04131 (Concrete)			04130 (Concrete, 0.8 ft)			04279 (Concrete, 0.8–1.5 ft)			03932 (Soil)			04243 (Paint Chip[a])		
Location ID	73.SB001			73.SB002			73.SB002			73.SB002					
	Concentration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concentration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concentration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concentration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concentration (pCi/g)	Uncertainty (±)	Review qualifier /MDL
Gross Alpha	-1.40	9.50	U/9.72	7.60	4.50	–	10.70	4.20	–	7260.00	1460.00	–	78.00	17.00	
^{241}Am										382.00	101.00	–			
$^{239/240}Pu$	0.05	0.07	U/0.12	0.02	0.06	U/0.14	0.16	0.15	R	95.40	20.40	–			
^{238}Pu	0.06	0.09	U/0.15	0.03	0.09	U/0.22	0.05	0.10	U/0.20	5.70	1.60	–			
^{228}Th	0.44	0.23	–	0.34	0.23	J	0.68	0.37	–	5.51	1.97	–			
^{230}Th	0.89	0.34	–	0.85	0.39	–	0.85	0.42	–	5.57	1.88	J			
^{232}Th	0.36	0.19	–	0.55	0.30	–	0.28	0.22	–	1.09	0.76	J			
^{234}U	0.76	0.32	–	1.30	0.53	J	0.82	0.41	–	1.81	0.95	–			
^{235}U	0.00	0.00	U/0.06	0.03	0.06	UJ/0.08	0.03	0.07	U/0.09	0.04	0.22	U/0.59			
^{238}U	0.68	0.30	–	1.40	0.56	–	1.37	0.59	–	2.40	1.01	–			
^{228}Ac				0.29	0.19	–									
Gross Beta	39.90	7.10	–	18.80	6.30	–	10386.70	69.80	–	1390000.00	149000.00	–	110000.00	1200.00	
^{137}Cs	27.74	0.28	–	9.20	0.31	–	2404.00	6.00	–	1300000.00	150000.00	–	431000.00	753.00	
^{40}K	8.95	0.73	–	9.43	1.31	–	3.87	1.82	–						
^{226}Ra	0.20	0.07	–												
^{90}Sr	0.77	0.86	UJ/0.44	0.23	0.63	UJ/0.47	1370.00	16.10	–	254000.00	28100.00	–			
^{60}Co				0.00	0.00	U/0.08	0.00	0.00	U/0.27						
^{14}C													0.20		<0.198 /MDL
Tritium	-2.37	1.38	U/0.68	0.10	1.15	UJ/0.62	0.62	0.59	J	-0.05	0.25	U/0.45	0.18		<0.177 /MDL

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Table 5.2 (continued)

Source: Eisenbud, M. 1987. *Environmental Radioactivity from Natural, Industrial, and Military Sources*, Academic Press, Inc., 3rd edition.

* This sample was analyzed by the CSL only (rad screen).

Notes:

(1) Blanks indicate that no data were reported by the laboratory.

(2) Most of the concrete aggregate is composed of sandstones with the following natural background concentrations:
radium - 226, 0.71 pCi/g;
uranium - 228, 0.4 pCi/g;
thorium - 232, 0.65 pCi/g; and
potassium - 40, 8.8 pCi/g.

(3) Concentrations are as reported from the laboratory and are background-subtracted. Review qualifiers of U indicate that the reported MDL value should be used for most purposes.

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Deficiencies and uncertainties in the results include the following.

- One of the concrete core plutonium-239/240 results (location ID 73.SB002, sample 04279) was rejected because of a problem with spike recovery.

Documentation provided by the laboratories met RI/FS Project QC level III requirements as described in Sect. 4. Validation of the data packages met RI/FS Project QC level II requirements: analytical results were reviewed in accordance with RI/FS validation procedures for radiological data, but the raw data were not checked by the validator to the same degree that they would have been checked in a QC level III validation protocol.

5.3 ASL RESULTS

Two concrete core samples collected from outside the building were crushed and sent to the ASL, where they were ground to a homogenized powder before radiological analysis. One of the concrete cores was collected in two pieces, which were analyzed separately (location 73.SB002, samples 04130 and 04279). The soil sample was also composited before radiological analysis. In addition, one paint chip sample was collected and analyzed at the Close Support Laboratory (CSL).

5.3.1 Concrete Core 3 ft from South Outside Wall (73.SB001, Sample 04131)

Gross alpha and beta activities were 0.0 (MDL) and 39.9 pCi/g. All of the alpha emitting radionuclides analyzed for were detected in concentrations <1 pCi/g. Plutonium-239/240/238 and uranium-235 levels were less than or equal to their MDLs, and cesium-137 and strontium-90 concentrations were approximately 27.7 and 0.44 (MDL) pCi/g.

5.3.2 Concrete Core 8 ft from South Outside Wall (73.SB002, Sample 04130)

Gross alpha and beta activities were 7.6 and 18.8 pCi/g. All of the alpha emitting radionuclides analyzed for were detected in concentrations <1 pCi/g. Plutonium-239/240/238, uranium-235, and strontium-90 results were less than or equal to their MDLs, and the cesium-137 concentration was 9.2 pCi/g.

5.3.3 Concrete Core 8 ft from South Outside Wall (73.SB002, Sample 04279)

Gross alpha and beta activities were 10.7 and 10386.7 pCi/g. All of the alpha emitting radionuclides analyzed for were detected in concentrations <1 pCi/g. The plutonium-239/240 result was rejected because of a problem with spike recovery. Plutonium-238 and uranium-235 results were less than or equal to their MDLs, and cesium-137 and strontium-90 concentrations were 2404.0 and 1370.0 pCi/g.

5.3.4 Outside Soil Under the Concrete Pad (73.SB002, Sample 03932)

Gross alpha and beta activities were 7260.0 and 1,390,000.0 pCi/g. Concentrations of most alpha emitters analyzed for were >1 pCi/g and <6 pCi/g, with the following exceptions: uranium-235 was <1 pCi/g (MDL of 0.59 pCi/g), americium-241 was 382.0

pCi/g, and plutonium-239/240 was 95.4 pCi/g. Cesium-137 and strontium-90 concentrations were 1,300,000.0 and 254,000.0 pCi/g.

5.3.5 Paint Chip from South Cell Wall (72.SB004, Sample 04045)

This sample was analyzed (rad screen) at the CSL for gross alpha and gross beta by gas-filled counters, cesium-137/barium-137m by gamma spectroscopy, and tritium and carbon-14 by liquid scintillation. Gross alpha and beta activities were 78.0 and 110,000.0 pCi/g. The cesium-137 concentration was 431,000.0 pCi/g, and both carbon-14 and tritium results were less than or equal to their MDLs (0.198 and 0.177 pCi/g, respectively).

5.4 HISTORICAL SOIL SAMPLING EXTERIOR TO BUILDING 3515

Soil borings 01.SB182 and 01.SB183 were hand-augered near Building 3515 in July 1991 during Phase I of the WAG 1 RI (Bechtel 1992). These 4-in.-diam borings yielded five soil samples, two of which were sent to the CSL only. Figure 4.1 shows the locations of the borings; Table 5.3 summarizes radiological sampling information for the three samples sent to the ASL.

Table 5.3. Radiological sampling summary for WAG 1 soil borings near Building 3515

Location	Distance from Bldg. 3515[a]	Total Depth (ft BGS[b])	Interval (ft)	Sample No.
01.SB182	Approximately 14 ft (3 ft from the southwest corner of the slab)	5.4	0–2	2206
01.SB183	Approximately 12 ft (8 ft from the southeast corner of the slab)	4.1	0–2	2338
			2–4	2342

[a] For location 01.SB182, the ORNL grid coordinates are 21935 (northing) and 31021 (easting); for location 01.SB183, the coordinates are 21942 (northing) and 31048 (easting).

[b] BGS, below ground surface.

Table 5.4 lists the concentrations of radionuclides detected in WAG 1 soil samples. Cesium concentrations (approximately 100 to 1400 pCi/g) in WAG 1 borings are lower than those in Building 3515 by approximately 3 to 4 orders of magnitude. Strontium concentrations (approximately 5.0 to 2200 pCi/g) are also lower in the WAG 1 borings than in the soil sample obtained from outside Building 3515 during D&D characterization (by 3 to 6 orders of magnitude). The higher concentrations of cesium and strontium in the soil

Table 5.4. Radionuclide concentrations in WAG 1 soil samples taken near Building 3515

Sample ID	2206			2338			2342		
Location ID	01.SB182			01.SB183			01.SB183		
	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier
Gross Alpha	216	55		47.2	16.7		180	46	
Gross Beta	17047	2558		1615	244		34381	5159	
Total Strontium	2180	240		5.2	0.8		169	30	
^{3}H	0.10	0.02		0.16	0.02		0.15	0.02	
^{137}Cs	429	25		103	6		1389	81	
^{40}K	5.9	1.40		12.50	2.00		15.8	2.6	
^{212}Pb				0.70	0.30				
^{228}Ra	0.77	0.19	J	0.91	0.18	J	0.55	0.19	J
^{226}Ra	0.32	0.22	J	0.81	0.20	J	0.29	0.2	J
^{238}U	38.5	4.30	J	9.11	1.05	J	3.47	0.77	J
^{235}U	0.76	0.32	J	0.16	0.06	J	0.10	0.12	UJ
^{234}U	7.63	1.22	J	2.09	0.31	J	3.78	0.81	J
^{99}Tc	1.5	3.5	UJ	0.5	0.4	J	8.0	4.2	J
^{232}Th	0.7	0.18	J	.84	0.22	J	1.04	0.25	J
^{230}Th	0.63	0.17	J	2.03	0.58	J	0.77	0.21	J
^{228}Th	0.75	0.19	J			J	1.26	0.28	J
^{55}Fe	66.70	50.70	J	6.40	10.10	UJ	1.1	5.0	UJ
^{147}Pm	1762	185	J	95	11	J	2286	241	J
$^{239-240}Pu$	10.86	1.84	J	2.28	0.7	J	8.01	0.93	J
^{238}Pu	0.38	0.37	J	0.13	0.13	UJ	0.43	0.09	J
^{63}Ni	11940	854	J				33010	2369	J
^{45}Ca	28.3	2	J	17.8	1.7	J	87.3	6.8	J
^{154}Eu	3.1	1.1					6.9	1.6	
^{155}Eu	1.9	1.2					5.9	2.4	
^{241}Am	3.7	1.5					8.4	2.5	
^{60}Co							.41	.17	

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under the building were expected because mixed fission product solutions were processed in the building and there was some leakage from the drainage lines (see Sect. 2.3). The concentrations of alpha emitters are not similar to those in Building 3515 and vary by isotope. The following differences were observed: (1) uranium concentrations are higher in the WAG 1 samples than in the sample obtained in the current study; (2) thorium, plutonium, and americium concentrations are higher in the Building 3515 sample than those collected during the WAG 1 RI.

5.5 SUMMARY

By far the highest radiological contaminant concentrations were found in soil (location 72.SB002, sample 03932), followed by the lower section of concrete core obtained from location 73.SB002 (sample 04279). Contaminant concentrations in the other samples seem to be similar.

Curium-242 was not detected in any sample. Americium-241 was detected only in soil sample 03932 at a relatively high concentration (approximately 382 pCi/g). Cobalt-60 was not detected in any sample and was <MDL. Actinium-228 was reported only for sample 04130 at a concentration of 0.29 pCi/g.

The concentrations of cesium and strontium in the soil sample are higher than those in concrete cores by approximately 3 to 5 orders of magnitude.

In general, the concentrations of radionuclides in the soil sample from Building 3515 are higher than those in WAG 1 soil samples, and it may be expected that levels of cesium and strontium activity in underlying soil increase with proximity to the building. Exceptions are uranium isotopes, present at lower concentrations in Building 3515 samples than in WAG 1 soil samples.

6.4 OTHER OBSERVATIONS

A health physics survey conducted at the beginning of the investigation of Building 3515 showed that the general area exposure rate was approximately 20 R/h in the north cell and 450 mR/h in the south cell.

Air filter samples from personnel monitoring devices [breathing zone apparatus (BZAs)] outside Building 3515 were collected and analyzed at the CSL. Results from all BZA air filters collected were below the derived air concentration limits reported in Federal Guidance Report No. 11 (ORNL 1988).

6.5 SUMMARY

Teletector measurements ranged from approximately 11 to 23,000 mR/h in the north cell and from 4 to 450 mR/h in the south cell. Microshield (Negin and Worku 1992) was used to estimate the reduction in general area radiation exposure in the north cell if a 1-ft layer of concrete were added to the cell floor. Assuming that all the radiation is emitted from the floor, the measured general area exposure rate of 23 R/h would be reduced to approximately 185 mR/h.

HP-290 directional measurements ranged from approximately 400 to 6000 mR/h in the north cell and from 17 to 460 mR/h in the south cell. HP-220A measurements in the south cell (three locations) ranged from approximately 130 to 380 mR/h.

The gross smears were measured by HP-210T and AC-3-7 field instruments for gross alpha and beta activities. Results ranged from approximately 4400 to 1,000,000 dpm/smear beta/gamma and less than 20 dpm/smear alpha.

Gamma spectroscopy slit scanning results for the concrete cores all indicated that the primary isotope present is cesium-137/barium-137m.

North cell TLD results ranged from approximately 5 to 23,400 mrem/h for deep dose rate and 0.0 to 23,600 mrem/h for shallow dose rate; south cell results were approximately 20 to 576 mrem/h for deep dose rate and 4 to 6900 mrem/h for shallow dose rate.

In general, the north cell seems to be highly contaminated with cesium-137/barium-137m and some alpha emitters. The south cell also seems to be highly contaminated with cesium-137/barium-137m; however, most of the dose rate is caused by beta particles and some alpha emitters. The level of contamination is fairly high, and D&D of the structure will probably need to be done remotely.

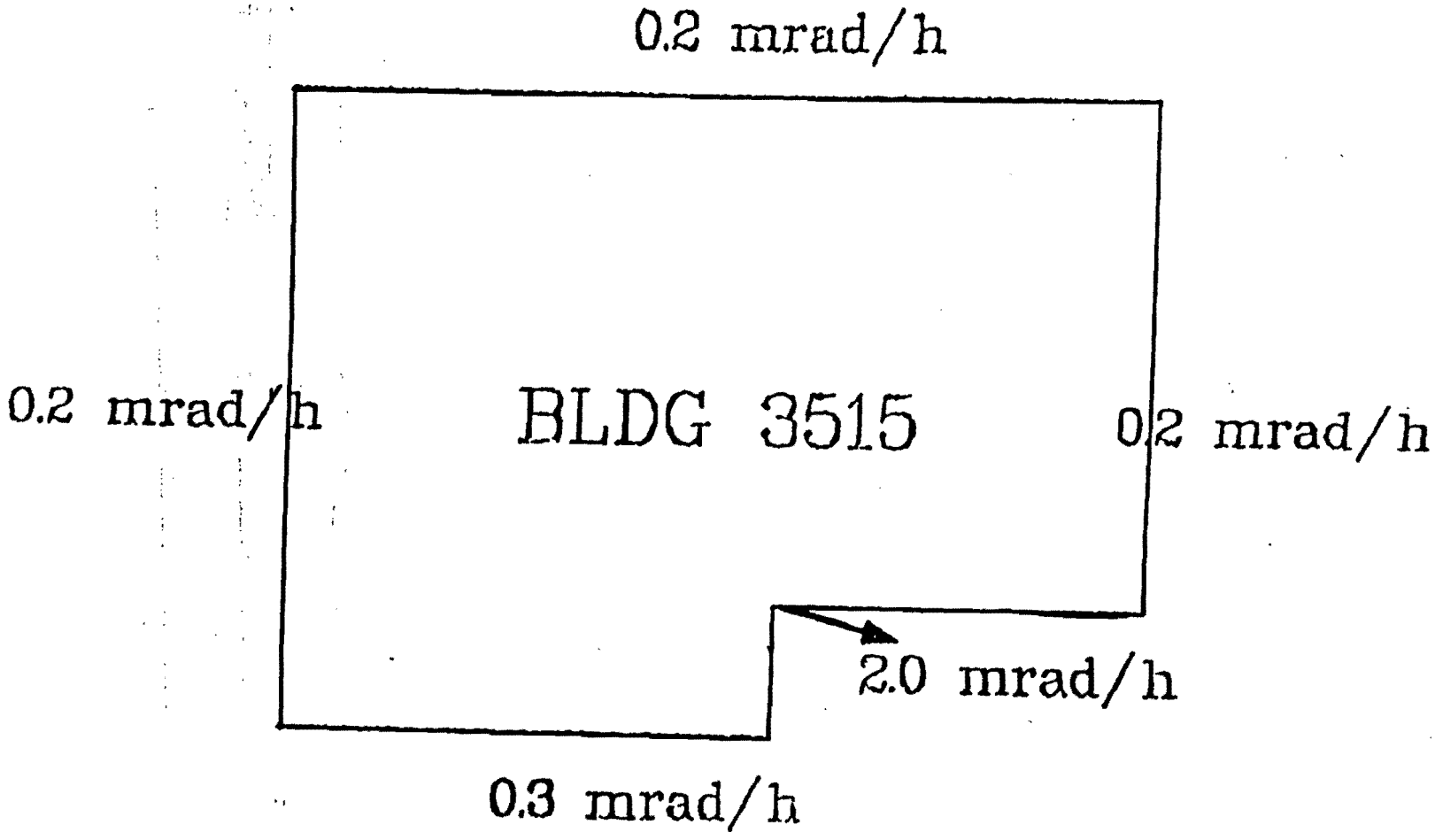

Fig. 2.3. Results of a radiation survey around the exterior of Building 3515.

SEE CONCEPTUAL SITE MODEL
VOLUME 3, SECTION 5, CONTAMINATED MEDIA

Health Risk Assessment for the 3001 Storage Canal ORNL/EA-51

5. CONTAMINANT CHARACTERIZATION

Appendix A lists concentrations of metals and radionuclides found in the canal water. The radionuclides—^{137}Cs, ^{60}Co, and ^{90}Sr—were identified as primary contaminants and were selected based on their concentrations (or activities) in the medium of concern, the canal water, and their relative toxic characteristics. The source of contaminant migration is the canal water because it has a much higher tendency to migrate by way of the leakage than does the sediment. Although the concentrations of metals in the canal water are below the Maximum Contaminant Levels (MCLs) for drinking water (see Appendix A), the sediment at the canal bottom does contain significant concentrations of radionuclides and metals. The sampling results for the canal water, the sediment, and the groundwater sump at the Oak Ridge Research Reactor Building (3042) are presented in Appendix B. The maximum possible contaminant concentrations in the canal water (Appendix B) are presented below.

Contaminant	Concentration (Bq/L)
^{137}Cs	840 (750 + 90)
^{60}Co	290 (260 + 30)
^{90}Sr	310 (240 + 70)

Health Risk Assessment for the 3001 Canal ORNL/ER-51

4. SITE CHARACTERIZATION

The Building 3001 Storage Canal is located beneath Buildings 3001 and 3019 (Fig. 2). The depth of water ranges from 10.5 ft at the head of the canal to 11.5 ft at the other end. A pit, approximately 22 ft deep, at the head of the canal connects the canal to the vertical chute from the reactor. It is believed that the canal leaks at the junction of the side walls and the bottom slab (V. Chidambariah, personal communication with M. Ford, ORNL, June 1990). The total volume of water is maintained at about 62,000 gal, and any volume lost due to the leak and evaporation is automatically replaced.

The primary contaminants of the canal water are the radionuclides ^{137}Cs, ^{60}Co, and ^{90}Sr. Although metal concentrations in the canal water are very low (Appendix A), a layer of sediment (about 1/2 in. thick) on the canal floor also contains radionuclides and metals. Some of the metals are regulated under RCRA. The canal water is passed through an ion exchange column periodically, which removes radionuclides in addition to other ions. Liquid wastes from regeneration of the ion exchange column are sent to the liquid low-level waste system.

6. ENVIRONMENTAL PATHWAYS

The following section evaluates the possible pathways by which the contaminants in the canal water can migrate and reach potential receptors in the surrounding environment. The pathways that are possibly contaminated and potentially carry contaminants to receptors are the groundwater, surface water, and regolith in the vicinity of the canal. Evaluation of these pathways will include descriptions of the groundwater and surface-water flows, soil characteristics, and contaminant-specific characteristics that might affect the migration of the contaminants. Additionally, the likelihood that contaminants may be transported through the air and foodchain will be examined.

6.1 GROUNDWATER

Primarily, groundwater transports the leak and its contaminants. The groundwater table in the vicinity of the canal is at roughly the same elevation as the bottom of the canal. Since the canal is believed to be leaking at the junction of the side walls and the bottom slab, it is likely that the leak reaches the groundwater table without much percolation through the soil.

Dye tracer studies (D. D. Huff, ORNL, personal communications to T. E. Myrick, ORNL, Oct. 7, 1985, and June 27, 1986) have shown that when a pulse dose is injected near Building 3019, it takes a relatively short time to travel the distance to the groundwater sump in Building 3042. The dye concentration was also the highest in the groundwater sump at Building 3042, which indicates that most of the dye had travelled in that particular direction. Therefore, it can be concluded that the groundwater flows eastward in the vicinity of the canal (Fig. 3). An examination of the potentiometric surfaces in the region supports this observation. The selective flowpath is also believed to include a solution cavity along geologic strike in that region. The observed groundwater flow velocity at the sump in Building 3042 is higher than what could be expected because it assumes a pure granular flow, which indicates the presence of preferred flow in the region.

Groundwater movement has also been indicated in more permeable backfill along the various trench lines and pipeline cavities in the Building 3001 region. The steepest water table gradients are generally south toward White Oak Creek. However, the dye tracer studies have shown that this pathway is minor when compared with the pathway to the groundwater sump at Building 3042.

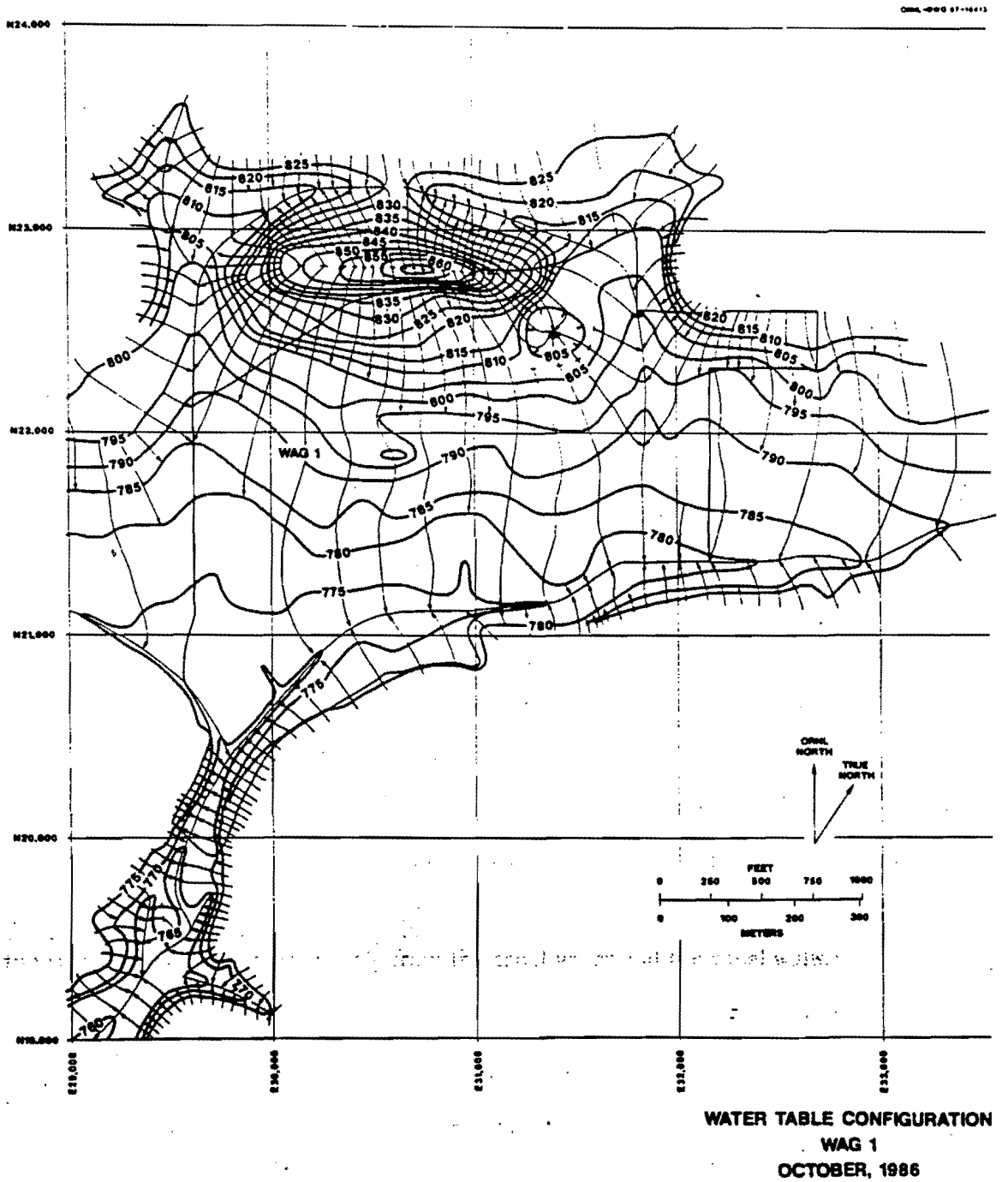

Fig. 3. Water table configuration in the Building 3001 area.

6.2 SURFACE WATER

The groundwater collected in the sump at Building 3042 is pumped to Fifth Creek through the storm drains in that region, which also collect water from other outfalls in the region. Further, these storm drains collect waste water from other buildings as the water heads southward to join White Oak Creek, which drains into White Oak Lake. Eventually, White Oak Lake empties into Clinch River by way of White Oak Dam.

6.3 REGOLITH

As the contents of the leak are transported by the groundwater flow to the groundwater sump at Building 3042, the regolith between Buildings 3001 and 3042 probably become contaminated. Because the regolith may be expected to contain significant concentrations of radionuclides and metals, the contaminant concentrations need to be monitored in the event of future excavation.

6.4 AIR

In the event of excavation of the soil between Buildings 3001 and 3042, the contaminants in the regolith could be resuspended into the air. Then the air in the immediate vicinity of the excavation site can become a pathway to transport the contaminants to the receptors at the site. The potential receptors would include the working personnel at the site and in the surrounding buildings, as well as, the transient worker population in the vicinity of the site.

6.5 FOOD CHAIN

Under some circumstances, the food chain can provide an indirect route for contaminants to reach the public by way of the biological uptake by agricultural products such as grain, milk products, beef, and game animals. Bioaccumulation of contaminants through the food chain would be a significant migration pathway for the contaminants coming from a source like the ORNL plant in its entirety. But since the canal is one small unit of the ORNL complex, this pathway will not be considered.

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2. DATA COLLECTION AND EVALUATION

The purpose of data collection and evaluation is to acquire chemical, radionuclide, facility structure, and receptor population data; assess the available data for data quality; and estimate the ability of the sampling and analytical methods used to meet the needs of a quantitative risk assessment. Chemicals of potential concern are determined after the data collection and evaluation activities have been completed.

The results of the data analysis are presented in this Level 3 BRA and provide quantitative and qualitative estimates of the identities, concentrations, volumes, and forms of chemical and/or radiological contaminants of concern at the facility.

This data evaluation chapter is organized into the following four sections: Data Collection (Sect. 2.1), Data Evaluation (Sect. 2.2), Selection of Contaminants of Potential Concern (Sect. 2.3), and Uncertainty (Sect. 2.4.)

2.1 DATA COLLECTION

The primary objective of data collection activities at D&D facilities such as Building 3515 is to provide the information necessary for estimating potential contaminant sources and inventories and the magnitude of potential future releases from the facility to the surrounding environment. To ensure that the data collected at a facility meet these objectives, the risk assessor must have some knowledge of past practices at the facility, potential contaminants present, and the potential current and future pathways for exposure at the facility. This will enable the risk assessor to target data collection activities to those contaminants and areas at the facility that represent a potential risk and determine when adequate data have been collected to fulfill the needs of the risk evaluation.

2.1.1 Characterization Data at Building 3515

A preliminary decommissioning study report of Building 3515 was prepared in 1984 (Horton 1984). Most of the information presented in this report was historical and qualitative in nature; however, a radiation survey around the exterior of the building was performed. The primary characterization data set for Building 3515 was collected during 1994. The 1994 efforts were conducted to plan D&D activities for this building. The characterization activities were conducted following the *Site Characterization Plan for Decontamination and Decommissioning of Buildings 3506 and 3515 at Oak Ridge National Laboratory, Oak Ridge, Tennessee* report (Bechtel 1993). Please refer to this site characterization plan for further information on sampling and analysis. The collected data fall into two categories: (1) engineering drawings/sketches/photographs from the 1950s and (2) sampling and survey data.

The engineering plans and sketches include various drawings and historical photographs taken over the lifetime of the building. The radiological surveys include data from the following: teletectors (a telescopic radiation measurement instrument, Geiger-Mueller tube), directional (shielded HP-290) detectors, thermoluminescent dosimeter (TLD) strings, and gross smear samples. Other data include limited core and soil samples from the outside of the building. A list of preliminary COPCs is presented in Table 2.1. A summary of the data is presented in Tables 2.2–2.8 and Figs 2.1–2.3. Finally, a summary of chemicals of potential concern (i.e., essential nutrients removed from Table 2.1) is presented in Table 2.9.

Table 2.1. Preliminary chemicals of potential concern

Radionuclides		Metals and Cyanide		
Americium-241	Uranium-238	Arsenic	Aluminum	Manganese
Plutonium-238	Actinium-228	Barium	Antimony	Nickel
Plutonium-239	Cesium-137	Cadmium	Beryllium	Potassium
Plutonium-240	Potassium-40	Chromium	Calcium	Sodium
Thorium-228	Radium-226	Lead	Cobalt	Thallium
Thorium-230	Strontium-90	Mercury	Copper	Vanadium
Thorium-232	Cobalt-60	Selenium	Iron	Zinc
Uranium-234	Carbon-14	Silver	Magnesium	Cyanide
Uranium-235	Tritium			

Table 2.2. Analytical results for metals and cyanide[a]

Location ID	73.SB001	73.SB002			South Cell
Sample ID	04131	04130	04279	03932	04243
Sample Type	Concrete Core	Concrete Core	Concrete Core	Soil	Paint Chips
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RCRA Metals					
Arsenic	<3.	4.5 J	4. J	5.5	2.4
Barium	57.5 J	55.9	23.6	54.5	4,300
Cadmium	<0.21	<0.36	0.94	2.3	<0.26
Chromium	10.1	9.4	20.4	21.9	<5.3
Lead	79.8	8.2 J	15.9 J	213	158
Mercury	<0.05	<0.05	<0.05	12.4 J	NA
Selenium	<2.	<0.82 R[b]	<4.2 R[b]	<0.17	<1.4
Silver	<0.84	<0.44	<0.44	1.5	<0.6
Zinc	29.4 J	29.8	151	56.4 J	103
Other TAL Metals					
Aluminum	5,710	6,220	5,740	12,200	14,300
Antimony	<2.8	<2.6	<2.6	12. J	<6.1
Beryllium	0.42	0.34	0.34	1.2	<0.15
Calcium	255,000	284,000	284,000	41,300. J	15,000
Cobalt	3.6 J	4.1	2.3	15.1	18.9
Copper	16.3	128. J	8.3 R	15.7	8.7 J
Iron	5,980	6,780	6,270	34,600	2,680
Magnesium	20,600	20,300	9,280	3,410	472
Manganese	273	284	216	731	34.6
Nickel	5.8	6.5	6	19.1	4.8
Potassium	1,280. J	1,250	731	<2,500	414
Sodium	<322	224. J	202. J	189	106
Thallium	<0.26	0.22 J	0.62 J	<0.32	<0.18

Table 2.2. (continued)

Location ID	73.SB001	73.SB002			South Cell
Sample ID	04131	04130	04279	03932	04243
Sample Type	Concrete Core	Concrete Core	Concrete Core	Soil	Paint Chips
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Vanadium	9.4	8.8	7.1	33.1	<2.8
TAL Cyanide					
Cyanide	<0.49	<0.53	<0.53	<0.03	NA

[a] Taken from: Bechtel, 1993
[b] Selenium nondetects were rejected because of zero percent recovery on the matrix spike analysis.
J = estimated value.
R = rejected value.

Note 1: Sample 04180 (trip blank) did not undergo metals and cyanide analyses.
Sample 04243 (paint chip) did not undergo mercury or cyanide analyses.
Note 2: Shaded values indicate that the total metal content is greater than RCRA toxicity characteristic equivalent limits.

Table 2.3. Radiological analysis results for Building 3515[a]

Sample ID	04131 (Concrete)			04130 (Concrete, 0.8 ft)			04279 (Concrete, 0.8–1.5 ft)			03932 (Soil)			04243 (Paint Chip[b])		
Location ID	73.SB001			73.SB002			73.SB002			73.SB002					
	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL
Gross Alpha	-1.40	9.50	U/9.72	7.60	4.50	--	10.70	4.20	--	7260.00	1460.00	--	78.00	17.00	
^{241}Am										382.00	101.00	--			
$^{239/240}$Pu	0.05	0.07	U/0.12	0.02	0.06	U/0.14	0.16	0.15	R	95.40	20.40	--			
^{238}Pu	0.06	0.09	U/0.15	0.03	0.09	U/0.22	0.05	0.10	U/0.20	5.70	1.60	--			
^{228}Th	0.44	0.23	--	0.34	0.23	J	0.68	0.37	--	5.51	1.97	--			
^{230}Th	0.89	0.34	--	0.85	0.39	--	0.85	0.42	--	5.57	1.88	J			
^{232}Th	0.36	0.19	--	0.55	0.30	--	0.28	0.22	--	1.09	0.76	J			
^{234}U	0.76	0.32	--	1.30	0.53	J	0.82	0.41	--	1.81	0.95	--			
^{235}U	0.00	0.00	U/0.06	0.03	0.06	UJ/0.08	0.03	0.07	U/0.09	0.04	0.22	U/0.59			
^{238}U	0.68	0.30	--	1.40	0.56	--	1.37	0.59	--	2.40	1.01	--			
^{228}Ac				0.29	0.19	--									
Gross Beta	39.90	7.10	--	18.80	6.30	--	10386.70	69.80	--	1390000.00	149000.00	--	110000.00	1200.00	
^{137}Cs	27.74	0.28	--	9.20	0.31	--	2404.00	6.00	--	1300000.00	150000.00	--	431000.00	753.00	
^{40}K	8.95	0.73	--	9.43	1.31	--	3.87	1.82	--						
^{226}Ra	0.20	0.07	--												
^{90}Sr	0.77	0.86	UJ/0.44	0.23	0.63	UJ/0.47	1370.00	16.10	--	254000.00	28100.00	--			
^{60}Co				0.00	0.00	U/0.08	0.00	0.00	U/0.27						
^{14}C													0.20		<0.198 /MDL

000297

000298

Table 2.3. (continued)

Sample ID	04131 (Concrete)			04130 (Concrete, 0.8 ft)			04279 (Concrete, 0.8–1.5 ft)			03932 (Soil)			04243 (Paint Chip[b])		
Location ID	73.SB001			73.SB002			73.SB002			73.SB002					
	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL	Concen-tration (pCi/g)	Uncertainty (±)	Review qualifier /MDL
Tritium	-2.37	1.38	U/0.68	0.10	1.15	UJ/0.62	0.62	0.59	J	-0.05	0.25	U/0.45	0.18		<0.177 /MDL

[a] Taken from: Bechtel 1993.
[b] This sample was analyzed by the CSL only (rad screen).

Notes:

(1) Blanks indicate that no data were reported by the laboratory.
(2) Concentrations are as reported from the laboratory and are background-subtracted. Review qualifiers of U indicate that the reported MDL value should be used for most purposes.

000299

000300

Table 2.4. TLD string results for north cell, shallow dose (H_s)[a]

Penetration into cell (ft)	Shallow dose rate, H_s (mrem/h)			
	up	down	south	north
10.0	18886.2	21401.2	18305.4	21371.3
9.0	17143.7	23634.7	18706.6	21197.6
8.0	9958.1	12401.2	8796.4	10167.7
7.0	3425.1	5335.3	4437.1	3736.5
6.0	2604.8	2604.8	2658.7	2802.4
5.0	724.6	712.6	652.7	497.0
4.0	47.9	65.9	29.9	29.9
3.0	29.9	29.9	0.0	6.0
2.0	0.0	18.0	12.0	53.9
1.0	0.0	18.0	0.0	0.0

[a] Taken from: Bechtel 1993

Table 2.5. TLD string results for north cell, deep dose (H_d)[a]

Penetration into cell (ft)	Deep dose rate, H_d (mrem/h)			
	up	down	south	north
10.0	19167.7	21419.2	19820.4	20964.1
9.0	18263.5	23485.0	18113.8	20670.7
8.0	8994.0	8047.9	6407.2	11491.0
7.0	3329.3	3610.8	3652.7	3706.6
6.0	2610.8	2586.8	2485.0	2730.5
5.0	652.7	419.2	431.1	491.0
4.0	24.0	35.9	24.0	24.0
3.0	6.0	18.0	12.0	6.0
2.0	6.0	12.0	12.0	6.0
1.0	12.0	12.0	12.0	6.0

[a] Taken from: Bechtel 1993

Table 2.6. TLD string results for south cell, shallow dose (H_s)[a]

Penetration into cell (ft)	Shallow dose rate, H_s (mrem/h)			
	Up	Down	South	North
9.5	568.0	988.0	800.0	828.0
9.0	764.0	1300.0	1024.0	904.0
8.0	792.0	2136.0	896.0	1220.0
7.0	1404.0	4376.0	3164.0	1404.0
6.0	1208.0	2988.0	6952.0	1408.0
5.0	988.0	2580.0	2660.0	788.0
4.0	488.0	2616.0	1004.0	792.0
3.0	148.0	504.0	124.0	300.0
2.0	44.0	108.0	204.0	36.0
1.0	4.0	4.0	4.0	24.0

[a] Taken from: Bechtel 1993

Table 2.7. TLD string results for south cell, deep dose (H_d)[a]

Penetration into cell (ft)	Deep dose rate, H_d (mrem/h)			
	Up	Down	South	North
9.5	448.0	584.0	576.0	516.0
9.0	516.0	576.0	544.0	540.0
8.0	396.0	412.0	468.0	384.0
7.0	332.0	324.0	404.0	332.0
6.0	464.0	396.0	544.0	412.0
5.0	388.0	396.0	444.0	348.0
4.0	272.0	268.0	312.0	260.0
3.0	104.0	128.0	96.0	104.0
2.0	48.0	36.0	56.0	36.0
1.0	24.0	24.0	20.0	36.0

[a] Taken from: Bechtel 1993

Table 2.8. Smear analysis data[a]

Radionuclide	North Cell (µCi/smear)	South Cell (µCi/smear)
Gross Alpha	5.39E-5	3.00E-5
Gross Beta/Gamma	7.76E-3	2.04E-1
$^{137}Cs/^{137}Ba$	6.53E-3	2.59E-2
Gross ^{90}Sr		3.13E-2

[a] Taken from: Bechtel, 1993

Table 2.9. Chemicals of potential concern[a]

Radionuclides		Metals and Cyanide	
Americium-241	Uranium-238	Arsenic	Beryllium
Plutonium-238	Actinium-228	Barium	Cobalt
Plutonium-239	Cesium-137	Cadmium	Manganese
Plutonium-240	Potassium-40	Chromium	Nickel
Thorium-228	Radium-226	Selenium	Thallium
Thorium-230	Strontium-90	Silver	Vanadium
Thorium-232	Cobalt-60	Aluminum	Zinc
Uranium-234	Carbon-14	Antimony	Cyanide
Uranium-235	Tritium		

[a] Representative concentrations can be found in Tables 2.2 and 2.3.

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7. EXPOSURE PATHWAYS

This section will evaluate the current and potential environmental pathways of exposure to the contaminants in the canal water and will identify potential receptors. Also, assumptions and calculations will be made for the exposure assessment and the probability of exposure to receptors.

7.1 EXPOSURE ANALYSIS

The principal pathway of worker exposure—radiation from the stored slugs in the canal, the canal water, and the walls of the canal—is external. (Since the slugs have been removed, the exposure will be from the canal water and the canal walls.) Exposure to contaminants in the canal sediment is unlikely because of effective shielding provided by the canal water. Inhalation, another potential environmental pathway, which is dependent upon excavation of the regolith in the area between Buildings 3001 and 3042, will also be considered because of public exposure at the Clinch River to the contaminants.

The existence of an exposure pathway (i.e., a link between the contaminated medium and the receptor) establishes the probability of exposure, regardless of the contaminant concentrations in the medium. However, the presence of a completed exposure pathway does not necessarily imply adverse health effects, which are also dependent upon exposure factors and the concentrations and toxicological properties of the contaminants involved. (The likelihood of the occurrence of adverse health effects will be discussed in the Risk Characterization section.)

Following are descriptions of human exposure routes for each environmental pathway identified in the previous section. Each exposure route is delineated with regard to current or potential exposures that may result from each of these environmental pathways.

7.2 BUILDING 3001 CANAL

The canal is a potential source of occupational exposure, which could occur through direct radiation from the stored slugs in the canal, the canal water, and the canal walls. (With the slugs removed, exposure is only from the canal water and the canal walls.)

7.3 BUILDING 3042 SUMP

Maintenance personnel are the potential receptors of external radiation exposure that could occur at the groundwater sump in Building 3042. The principal sources of radiation would be the groundwater collected in the sump and the walls of the sump.

7.4 SURFACE WATER

The groundwater from the sump in Building 3042 is pumped to Fifth Creek through the storm drains, which carry water from other sources in the Building 3001 area. Although it is unlikely that external exposure could occur at any point along the line of travel—Building 3042 to Fifth Creek, into White Oak Creek and White Oak Lake, and finally draining into the Clinch River—exposure could possibly occur through ingestion of contaminated fish in the Clinch River and through external exposure to contaminated sediment on the shoreline.

7.5 REGOLITH

If the area between Buildings 3001 and 3042 is excavated, exposure could occur through inhalation of resuspended dust and through direct radiation from the excavated soil. To assess the exposure to potential receptors (i.e., excavation personnel, the working population in the immediate vicinity, and the transient worker population), contaminant concentrations in the soil will have to be determined. Currently, concrete pavement makes this scenario irrelevant; however, this potential for exposure should be evaluted before any future soil-disturbing activities are initiated.

9.3 RISK ESTIMATION

For occupational exposures at the canal, the annual dose to an average worker would be considerably less than 2000 mrem because of considerably smaller exposure periods. Also, ALARA (As Low As Reasonably Achievable) practices at DOE facilities would keep the dose rates to workers considerably lower than the dose limits.

For public exposures, it can be seen that the total dose due to external exposure to the sediments dominates the dose received through the drinking water and fish ingestion pathways. Therefore, the lifetime excess fatal cancer risk due to external exposure to contaminated sediments will also dominate the risk from other pathways. The lifetime excess fatal cancer risk for all pathways is presented below.

Pathway	Total dose (mrem)	Risk factor ($mrem^{-1}$)		Lifetime risk
Drinking water	4.6E-03	5.0E-07		2.3E-09
Fish ingestion	1.4E-02	5.0E-07		7.3E-09
External exposure	15	5.0E-07		7.3E-06
			Total Risk	7.3E-06

COMPARISON OF CONTAMINANT CONCENTRATIONS WITH THEIR MCLs FOR DRINKING WATER

Contaminant	Canal water surface concentration (mg/L)	ORR groundwater sump concentration (mg/L)	Drinking Water MCL (mg/L)[a]
Ag	< 5.0E-03	<5.0E-03	5.0E-02
As	< 5.0E-02	<5.0E-02	5.0E-02
Ba	< 2.0E-03	4.9E-02	1.0E+00
Cd	< 7.0E-03	<7.0E-03	1.0E-02
Cr	< 4.0E-03	1.1E-02	5.0E-02
Pb	< 5.0E-02	<5.0E-02	5.0E-02
Se	< 4.0E-02	<4.0E-02	1.0E-02
Hg	2.4E-04		2.0E-03
^{137}Cs	680±60 Bq/L	< 2 Bq/L	100 pCi/L[b]
^{60}Co	260±30 Bq/L	< 1 Bq/L	200 pCi/L
^{90}Sr			50 pCi/L

[a]*Superfund Health Effects Assessment Summary Tables and User's Guide*, Office of Emergency and Remedial Response, USEPA, Washington, D.C., October 1989.

[b]Based on 4 mrem annual dose for drinking water pathway. *Federal Register*, vol. 51, pp. 34836–34862.

Current Samples

Analyses	Surface H_2O	7' depth H_2O	ORR process sump	ORR ground-water sump	Bldg. 3026 sump	Units
3/27/90						
Gross alpha	13 ± 3	15 ± 3	<2	<2	.7 ± 2	Bq/l
Gross beta	1120 ± 30	1170 ± 30	10 ± 4	6 ± 4	.9 ± 8	Bq/l
Gross gamma			3	2	<10	cpm/ml
Cs-137	680 ± 60	750 ± 90	<1	<2	6 ± 3	Bq/l
Co-60	260 ± 30	250 ± 30	2.5 ± 0.5	<1	<3	Bq/l
Sr-90	190 ± 70	240 ± 70			0.08 ± 0.51	Bq/l
Ag	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	mg/l
As	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	mg/l
Ba	$<2.0 \times 10^{-3}$	7.3×10^{-3}	5.6×10^{-2}	4.9×10^{-2}	1.5×10^{-2}	mg/l
Cd	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	mg/l
Cr	$<4.0 \times 10^{-3}$	$<4.0 \times 10^{-3}$	$<7.8 \times 10^{-3}$	1.1×10^{-2}	1.1×10^{-2}	mg/l
Pb	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	mg/l
Se	$<4.0 \times 10^{-2}$	$<4.0 \times 10^{-2}$	$<5.1 \times 10^{-2}$	$<4.0 \times 10^{-2}$	$<4.0 \times 10^{-2}$	ug/ml
Hg	2.4×10^{-4}	2.4×10^{-4}				
3/29/90						
Gross alpha	12 ± 5	12 ± 4	<2	<2	0.7 ± 2	Bq/l
Gross beta	682 ± 40	695 ± 40	10 ± 4	6 ± 4	0.9 ± 8	Bq/l
Gross gamma	<10	15	3	2	<10	cpm/ml
Cs-137	360 ± 10	350 ± 10	<1	<1	6 ± 3	Bq/l
Co-60	31 ± 2	30 ± 2	2.5 ± 0.5	<2	<3	Bq/l
Sr-90	140 ± 10	130 ± 10				Bq/l
Ag	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	$<5.0 \times 10^{-3}$	mg/l
As	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	mg/l
Ba	$<2.0 \times 10^{-3}$	$<2.0 \times 10^{-3}$	5.6×10^{-2}	4.9×10^{-2}	1.5×10^{-2}	mg/l
Cd	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	$<7.0 \times 10^{-3}$	mg/l
Cr	$<4.0 \times 10^{-3}$	$<4.0 \times 10^{-3}$	7.8×10^{-3}	1.1×10^{-2}	1.1×10^{-2}	mg/l
Pb	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	$<5.0 \times 10^{-2}$	mg/l
Se	$<4.0 \times 10^{-2}$	$<4.0 \times 10^{-2}$	5.1×10^{-2}	$<4.0 \times 10^{-2}$	$<4.0 \times 10^{-2}$	mg/l
Hg	2.3×10^{-4}	2.4×10^{-4}	$<5.0 \times 10^{-5}$	$<5.0 \times 10^{-5}$	3.6×10^{-4}	mg/l
2/22/89	Sludge*	Sludge**				
Gross alpha	3.61×10^{4}	0.2				Bq/g
Gross beta	8.57×10^{5}	23.13				Bq/g
Cs-137	2.16×10^{7}	26.15				Bq/g
Co-60	7.21×10^{6}	0.2				Bq/g
Eu-152	1.51×10^{5}	0.5				
Eu-154	2.29×10^{5}	0.1				
Eu-155	1.35×10^{5}	0.4				
Ag	4.88					
As	7.98					
Ba						
Cd	270					
Cr	415					
Pb	6.1×10^{3}					
Se	0.96					

*Averaged from residue.
**Averaged from filtrate.

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Health Risk Assessment for the Building 3001 Storage Canal at ORNL ORNL/ER-51

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ORNL/TM-11684

RCRA FINAL CLOSURE PLAN FOR 3001 STORAGE CANAL

November 1990

Prepared By:
International Technology Corporation
312 Directors Drive
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For
Environmental Compliance and Documentation
Oak Ridge National Laboratory
Oak Ridge, TN 37831

Managed By:
Martin Marietta Energy Systems, Inc.
for the
U. S. Department of Energy
Under
Contract No. DE-AC05-840R21400

The International Technology Corporation assisted in or contributed to the preparation of this Closure Plan.

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Action Memorandum for the Waste Area Grouping 1 Corehole 8 Removal Action at Oak Ridge National Laboratory, Oak Ridge, Tennessee

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Action Memorandum for Building 3001 Canal, Oak Ridge National Laboratory, Oak Ridge, Tennessee

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Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Site Characterization Report for Building 3506 at Oak Ridge National Laboratory, Oak Ridge, Tennessee

Date Issued—July 1994

Prepared by
Bechtel National, Inc.
Oak Ridge, Tennessee
under subcontract 12B-99053C

Prepared for
U.S. Department of Energy
Office of Environmental Restoration and Waste Management
under budget and reporting code EW 20

Environmental Restoration and Waste Management Programs
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MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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ENVIRONMENTAL
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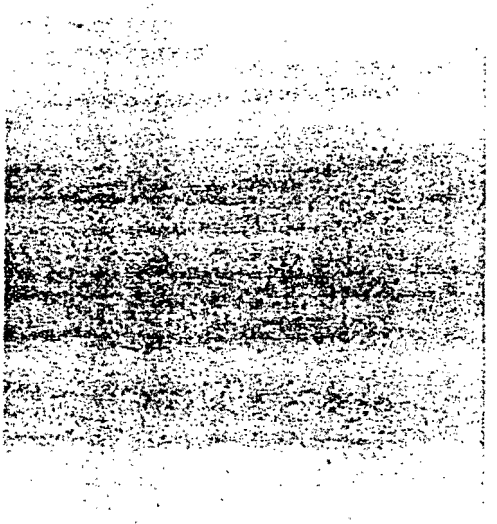
Health Risk Assessment for the Building 3001 Storage Canal at Oak Ridge National Laboratory, Oak Ridge, Tennessee

V. Chidambariah
R. K. White



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FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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ORNL/ER/Sub/87-99053/72

Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Site Characterization Report for Building 3506 at Oak Ridge National Laboratory, Oak Ridge, Tennessee

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Action Memorandum for Building 3001 Canal, Oak Ridge National Laboratory, Oak Ridge, Tennessee

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RCRA FINAL CLOSURE PLAN
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Energy Systems Environmental Restoration Program
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Site Characterization Report for Building 3515 at Oak Ridge National Laboratory, Oak Ridge, Tennessee

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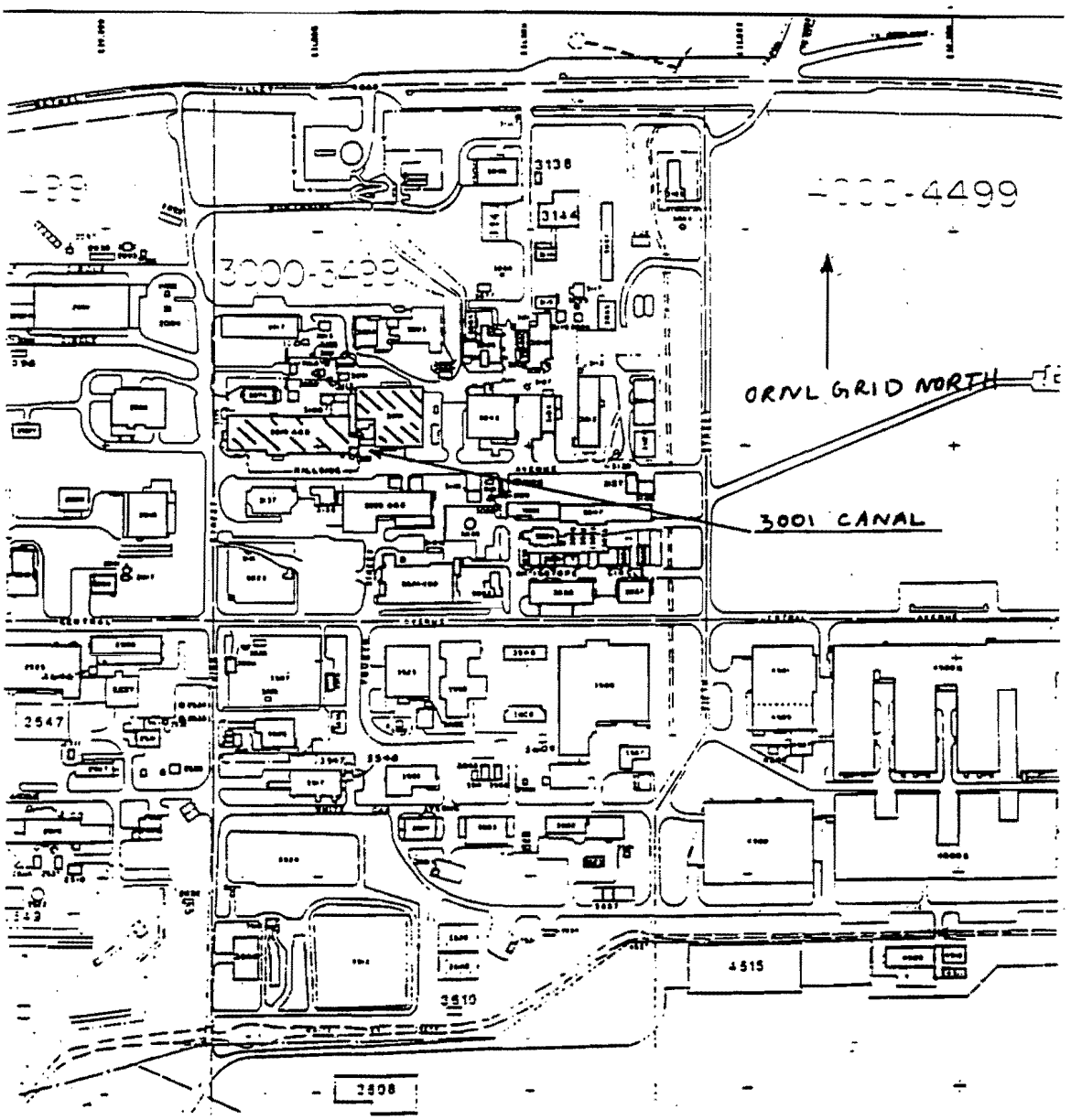

Fig. 1. Location of the Building 3001 Storage Canal.

Health Risk Assessment for the 3001 Canal ORNL/ER-51

ORNL-DWG 76-12387R

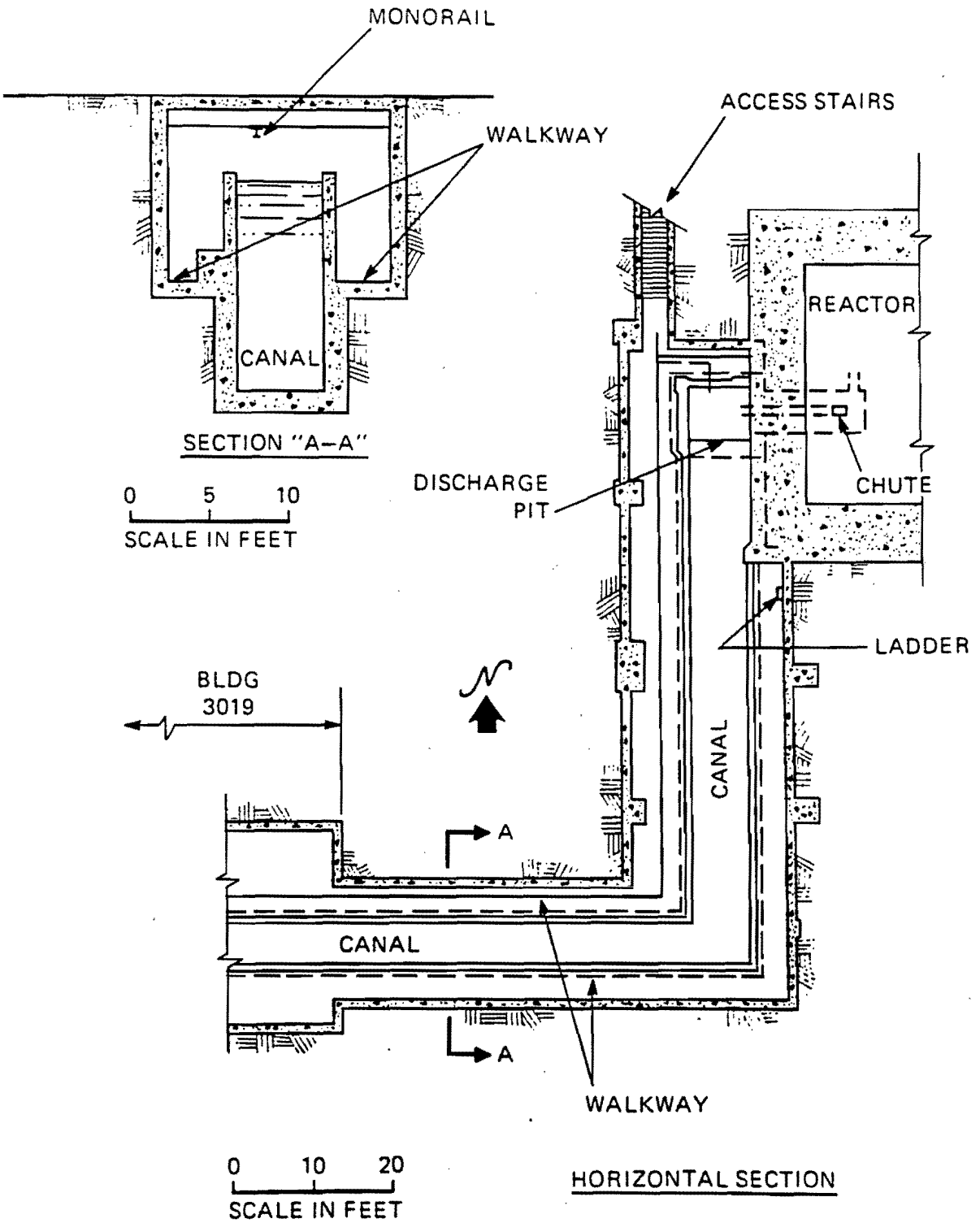

Fig. 2. The Building 3001 Storage Canal.

ORNL/ER-249/R2

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ENVIRONMENTAL RESTORATION PROGRAM

Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory

MANAGED BY
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Oak Ridge, Tennessee

Date Issued—August 1995

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2.3.1.6 Final facility status report

A final report will be prepared which will document the history of the building and the physical and radiological condition of the facilities, provide as-is drawings of essential facility support systems, and provide S&M requirements and procedures.

2.3.2 Facility-Specific Deactivation Work Plan Activities

2.3.2.1 Building 3026-C

Building 3026 is a large (14,000 ft^2) wood frame structure with no secondary containment. The building is divided into two facilities, 3026-C (west half of the building) and 3026-D (east end). Building 3026-C contains four manipulator hot cells, four process hot cells, and several laboratories with high air-flow hoods. Deactivation of this facility is in progress and the following activities remain:

- Transfer Inventory - Approximately 3800 Ci of ^{3}H and 100 Ci of ^{85}Kr are to be packaged and removed from the facility.

- Dispose of cylinders. Numerous gas cylinders used in the ^{85}Kr program remain at ORNL. These are to be vented in accordance with allowable release limits, valve assemblies dismantled, and packaged as waste.

- Residual ^{3}H contamination is to be removed from Labs 7 and 16.

- Deactivate ^{85}Kr Columns 1 through 4. This activity involves the following: (1) deactivate all services to the ^{85}Kr thermal diffusion columns; (2) deactivate cooling tower servicing columns; (3) dispose of ^{85}Kr contaminated waste; and (4) deactivate all services to storage system.

- Deactivate the chilled water system. The chilled water system is to be drained, pipes and electrical service disconnected, and the compressor salvaged.

- Deactivate hot cells. In addition to the activities described in Sect. 2.3.1.1, Zn-Br-filled shield windows are to be drained and the Zn-Br disposed of as waste.

- Deactivate the piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Disconnect ductwork. The ductwork that ventilates Labs 7 and 16 from the central plant ventilation system is to be disconnected and blanked.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. This building is of wood frame construction and must be protected by an automated sprinkler system. The existing wet system will be retained and the facility will remain heated.

- Warning signs. Place a warning sign at the entry to the 3026C 2nd level South storage area to signal workers that the condition of the floor is poor and that there is to be no entry.

- Gauges and filters. Leave the differential pressure gauges and High Efficiency Particulate Air(HEPA) filters in place in the cell ventilation system.

- Abandon cell fire alarm system. Notify the Oak Ridge National Laboratory (ORNL) fire department that the cylinders are to be removed from the 3026D cell fire alarm system.

- Exempt hot drains from plugging. Seek exemption from FFA requirements to plug the drains and instead leave them in place.

2.3.2.2 Building 3026-D

Building 3026-D contains six manipulator hot cells currently used to store steel specimens remaining from metallurgical testing. The estimated 4000 lb of specimens are irradiated and contain approximately 150 Ci (Curies) of ^{60}Co. Deactivation of this facility will include the following activities:

- Deactivate hot cells. In addition to the activities described in Sect. 2.3.1.1, the irradiated metal specimens are to be removed from the hot cells and transferred to other ORNL facilities. The Zn-Br-filled shield windows are to be drained and the Zn-Br disposed of as waste.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. This building is of wood frame construction and must be protected by an automated sprinkler system. The existing wet system will be retained and the facility will remain heated.

2.3.2.3 Building 3028

Building 3028 is a three-story, steel-frame structure covered by metal siding and has a total floor area of approximately 4000 ft^2. The facility contains seven hot cells used primarily for the alpha powder [transuranics (TRU) isotopes in powder form] operations. All inventory has been removed, but six of the seven cells remain highly contaminated. Large areas of alpha contamination exist in the secondary containment area behind Cells 1 through 5. Deactivation of this facility is in progress and the following activities remain to be completed:

- Deactivate cells. In addition to the activities described in Sect. 2.3.1.1, the water-filled shielding tanks in front of Cells 1 through 5 will be drained. The chilled water system associated with these tanks will be deactivated. The charging area behind Cells 1 through 5 will be cleaned to remove potential airborne contamination.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. The building has an automated wet sprinkler system and will be converted to a dry manually actuated system.

2.3.2.4 Building 3029

Building 3029 is a single-story, steel-frame structure covered by corrugated metal siding with a total floor area of approximately 3000 ft^2. The facility contains four manipulator hot cells and four glove

boxes. The charging area behind Cell 3 is contaminated with ^{137}Cs from a spill during production operations. Deactivation of this facility will include the following activities.

- Deactivate cells as described in Sect. 2.3.1.1.
- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.
- ^{137}Cs contamination behind the cells must be cleaned up and lead shielding cleaned and removed.
- Deactivate glove boxes. The two ^{131}I glove boxes will be cleaned and sealed and left in the building. The ^{14}C and ^{99}Tc glove boxes will be removed and managed as SLLW.
- Prepare final facility status report as described in Sect. 2.3.1.6.
- The facility's automatic wet sprinkler system is to be converted to a manually activated dry system and the building's steam heating system deactivated.

2.3.2.5 Buildings 3030, 3118, and 3031

Buildings 3030 and 3031 were built as separate buildings. Building 3118 was constructed to enclose the area between the two facilities and to cover the access doors to the cells in the buildings; it has a floor area of 900 ft^2. Buildings 3030 and 3031 each contain a hot cell, a hood, and have a floor area of 825 ft^2. Building 3118 was used primarily as a storage shed and has areas of contamination on the floor. Deactivation of this facility is in progress and the following activities remain to be completed:

- Deactivate cells as described in Sect. 2.3.1.1.
- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.
- Repair roof. The built-up roof on the complex comprising Buildings 3030, 3118, and 3031 leaks and will be repaired.
- Prepare final facility status report as described in Sect. 2.3.1.6.
- Clean floors. The floors will be cleaned to remove transferable contamination.

2.3.2.6 Building 3032

Building 3032 is a steel framed structure covered with aluminum siding and has a total floor area of approximately 1000 ft^2. The facility houses 5 hoods in the laboratory on the north side of the building. Deactivation of the building will include the following activities. An ancillary facility, Building 3099, is located nearby.

- Deactivate Hoods - The hoods in this facility are in very poor condition with the steel enclosures being badly corroded. The hoods are to be dismantled and disposed of as solid low level radioactive waste.
- Deactivate piping , utilities, and alarms as described in Section 2.3.1.4
- Prepare final facility status report as described in Section 2.3.1.6.

2.3.2.7 Building 3033

Building 3033 is a steel-frame structure covered with aluminum siding and has a floor area of 1200 ft^2. The facility houses two separate radioisotopes processing systems for handling gaseous ^3H and ^{85}Kr. Deactivation of this facility will include the following activities.

- Deactivate ^3H system. The ^3H will be removed from the ^3H traps, the traps made inert, and packaged for disposal. The ^3H processing hood will be locked and sealed, and all hood support systems will be labeled and deactivated.

- Deactivate ^{85}Kr purification system. The charcoal traps and roughing pumps from the ^{85}Kr processing system will be removed, packaged, and disposed of as waste.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Maintain hot off gas system operational.

2.3.2.8 Building 3033-A

Building 3033-A is a steel-frame structure covered with aluminum siding and has a floor area of 242 ft^2. This facility has essentially been deactivated. Remaining tasks include:

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Repair roof. The roof on the building leaks and will be patched.

- Prepare final facility status report as described in Sect. 2.3.1.6.

2.3.2.9 Building 3034

Building 3034 is a steel framed structure covered with aluminum siding and has a total floor area of approximately 1000 ft^2. With the exception of deactivating utilities, all deactivation tasks in this facility are complete. However, the facility is to be used for office space for IFDP support personnel until the completion of the project. At that time the utilities will be deactivated.

2.3.2.10 Building 3038–Alpha Handling Facility

Building 3038 is a masonry structure with a total floor area of 7250 ft^2. It is divided by concrete block walls into three separate facilities: Building 3038-E, 3038-M, and 3038–Alpha Handling Facility (AHF). The 3038-AHF contains five hot cells in one operating area and seven glove boxes in an adjacent room. The operating area is contaminated with alpha contamination. Deactivation of this facility will include the following activities.

- Deactivate cells. In addition to the activities described in Sect. 2.3.1.1, the water-filled, shielding tanks in front of the hot cells will be drained. The chilled water system associated with these tanks will be deactivated. The operating area in front of the hot cells will be cleaned to remove potential airborne contamination.

- Deactivate glove boxes. The seven glove boxes in the facility will be disposed of as described in Sect. 2.3.1.2.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. Cost estimates have demonstrated that it is less expensive to convert to a manually activated dry system and deactivate the building's steam heating system.

- Shutdown steam heat. Turn off building steam heat but provide measures for supplying steam to building 3037 and other buildings.

2.3.2.11 Building 3038-E

Building 3038-E contains eight hoods, ten glove boxes, and one manipulator hot cell in three connected rooms. The hoods and glove boxes contain transferable uranium and TRU isotopes contamination. Deactivation of this facility will include the following activities.

- Deactivate cell. The yttrium hot cell will be deactivated as described in Sect. 2.3.1.1.

- Deactivate glove boxes. The eleven glove boxes in the facility will be disposed of as described in Sect. 2.3.1.2. The rolling mill box in the north lab and the two inert glove boxes in the south lab will remain in the facility as their size would require them to be cut up to be removed from the building.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Deactivate hood as described in Sect. 2.3.1.3.

- Provide fire protection. Cost estimates have demonstrated that it is less expensive to convert to a manually activated dry system and deactivate the building's steam heating system.

2.3.2.12 Building 3038-M

The 3038-M facility is a 1300-ft^2 area in the center of Building 3038. ORNL's Radioactive Materials Shipping and Packaging (RAMSPAC) operations are currently located in this area. The area has a barricade behind which radioisotopes in liquid form were handled and packaged. The barricade consists of a shadow-shield wall that is open at the top. Confinement of radioactive materials is provided by continuous airflow over the wall. All inventory has been removed from the barricade area, but the area behind the wall is highly contaminated with a variety of radioisotopes. Deactivation of this facility will include the following activities.

- Deactivate barricade. All waste from the barricade area will be removed. The barricade area will be cleaned, and all service lines to it will be deactivated. Access to the barricade will be secured.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. Cost estimates have demonstrated that it is less expensive to convert to a manually activated dry system and deactivate the building's steam heating system.

2.3.2.13 Building 3047

Building 3047 is a three-story, steel-frame building with concrete block exterior and interior walls. Building 3047 is structurally linked to Building 3047-A (an office building) but since they have separate ventilation systems, the buildings are considered separate. Building 3047-A is not in the IFDP. Building 3047 houses four high-level, beta-gamma hot cells, one alpha handling hot cell, seven laboratories for handling low-level materials, two glove boxes, and a decontamination room. Deactivation of this facility will include the following activities.

- Deactivate chilled water system. The chilled water system (air conditioning) will be drained, pipes and electrical services disconnected, and the pumps salvaged.

- Deactivate glove boxes. The gadolinium press box and the ^{14}C glove boxes in the facility will be disposed of as described in Sect. 2.3.1.2.

- Deactivate hoods. The hoods in Rooms 105, 109, 208, 209, and 210 will be deactivated as described in Sect. 2.3.1.3

- Clean up vacuum pit. Vacuum system's surge tank will be decontaminated.

- Clean up filter house. Pieces of contaminated, high-efficiency particulate air filter media that are lodged on the control damper to the filter house in the west airlock will be removed.

- Deactivate hot cells. Hot Cells A, B, C, D, and the alpha cell in Room 110 will be deactivated as described Sect. in 2.3.1.1. In addition, the hot cell entry box in Room 110 will have water-shielding tanks drained and the box cleaned and disposed of. The sludge in the sump under Cell D will be removed.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. Cost estimates have demonstrated that it is less expensive to convert to a manually activated dry system and deactivate the building's steam heating system.

2.3.2.14 Building 3517

Building 3517 is a three-story, braced, steel-frame structure with metal deck roofs and 12-in. nonreinforced concrete masonry walls on the lower two stories. The building has a total floor area of approximately 18,000 ft^2. The facility contains eight manipulator hot cells and 16 process cells. The facility currently stores the IFDP inventory of surplus radioisotopes, which primarily consist of approximately 150,000 Ci of ^{137}Cs and 100,000 Ci of ^{90}Sr. This material is to be repackaged to meet waste acceptance criteria to be issued by the Waste Encapsulation Storage Facility (WESF), located in Richland, Washington, and shipped to this facility. Small quantities of Co, Eu, Gd are also stored in the building. Approximately 450 g of ^{244}Cm belonging to the Transuranium Production Program is also stored in the building. Four radio-thermoelectric generators (RTGs), which contain in excess of

1,400,000 Ci of ^{90}Sr, are included in the facilities inventory. Deactivation of this facility will include the following activities.

- Justify resumption of limited repackaging operations. Upon receiving waste acceptance criteria from WESF, determine the repackaging requirements and the extent of process operation that must be resumed to perform repackaging operations. Once the requirements are established, the options of using Building 3517 or some other ORNL facility will be evaluated. If the use of Building 3517 proves to be the best option, a justification for resumption of repackaging operations will be prepared.

- Upgrade facility. After the needs are evaluated, all necessary physical upgrades to the facility required to resume source repackaging operations will be performed.

- Store casks in high bay area until a suitable disposition alternative can be developed during D&D.

- Perform Operational Readiness Review (ORR). An ORR will be performed in support of the resumption of repackaging operations.

- Transfer ^{244}Cm. Seventeen containers of ^{244}Cm will be transferred to the Chemical Engineering Development Center at ORNL.

- Package Eu and Gd for retrievable storage. Surplus Eu and Gd material will be repackaged for retrievable storage and transferred to the solid waste storage area.

- Repackage ^{137}Cs. All ^{137}Cs sources will be repackaged to meet WESF criteria and transferred to WESF.

- Repackage ^{90}Sr. All ^{90}Sr sources will be repackaged to meet WESF criteria and transferred to WESF.

- Deactivate hot cells. Manipulator Hot Cells 10, 11, 12, 13, 14, 15, 16, and 18 will be deactivated as described in Sect. 2.3.1.1.

- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.

- Prepare final facility status report as described in Sect. 2.3.1.6.

- Provide fire protection. Cost estimates have demonstrated that it is less expensive to convert to a manually activated dry system and deactivate the building's steam heating system.

- Evaluate removal of non-structural lead from cells.

- Evaluate steam system to ensure adequate requirements for Liquid Low-Level waste (LLLW) system.

2.3.2.15 Building 7025

Building 7025 is a prefabricated, metal-sided building with a total floor area of 590 ft^2. The building contains a large (26 ft long) stainless steel hood that houses a ^3H target fabrication system. The facility also houses a hood in which a thin film evaporator was once installed. Deactivation of this facility will include the following activities.

- Deactivate ^{3}H system. The ^{3}H Target Fabrication Facility hood will be deactivated, all waste removed, and the hood cleaned and sealed.
- Deactivate piping, utilities, and alarms as described in Sect. 2.3.1.4.
- Prepare final facility status report as described in Sect. 2.3.1.6.

2.3.2.16 Actinides Facility

The Actinides Facility is a small area within Building 9204-3 located a the Y-12 site. Per the Memorandum of Agreement executed on October 1, 1994, between the DOE Office of Environmental Management, Office of Energy Research and the Office of Nuclear Energy, the IFDP will support the annual inspection of the Actinides facility. The facility is essentially deactivated and no further deactivation tasks are required.

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T. W. Burwinkle

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OPERATIONS DIVISION

SURPLUS FACILITIES MANAGEMENT PROGRAM

(Activity GF 03 02 01, ONL-WD08)
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THE ORNL SURPLUS FACILITIES MANAGEMENT PROGRAM MAINTENANCE AND SURVEILLANCE PLAN FY 1988-1997

T. W. Burwinkle

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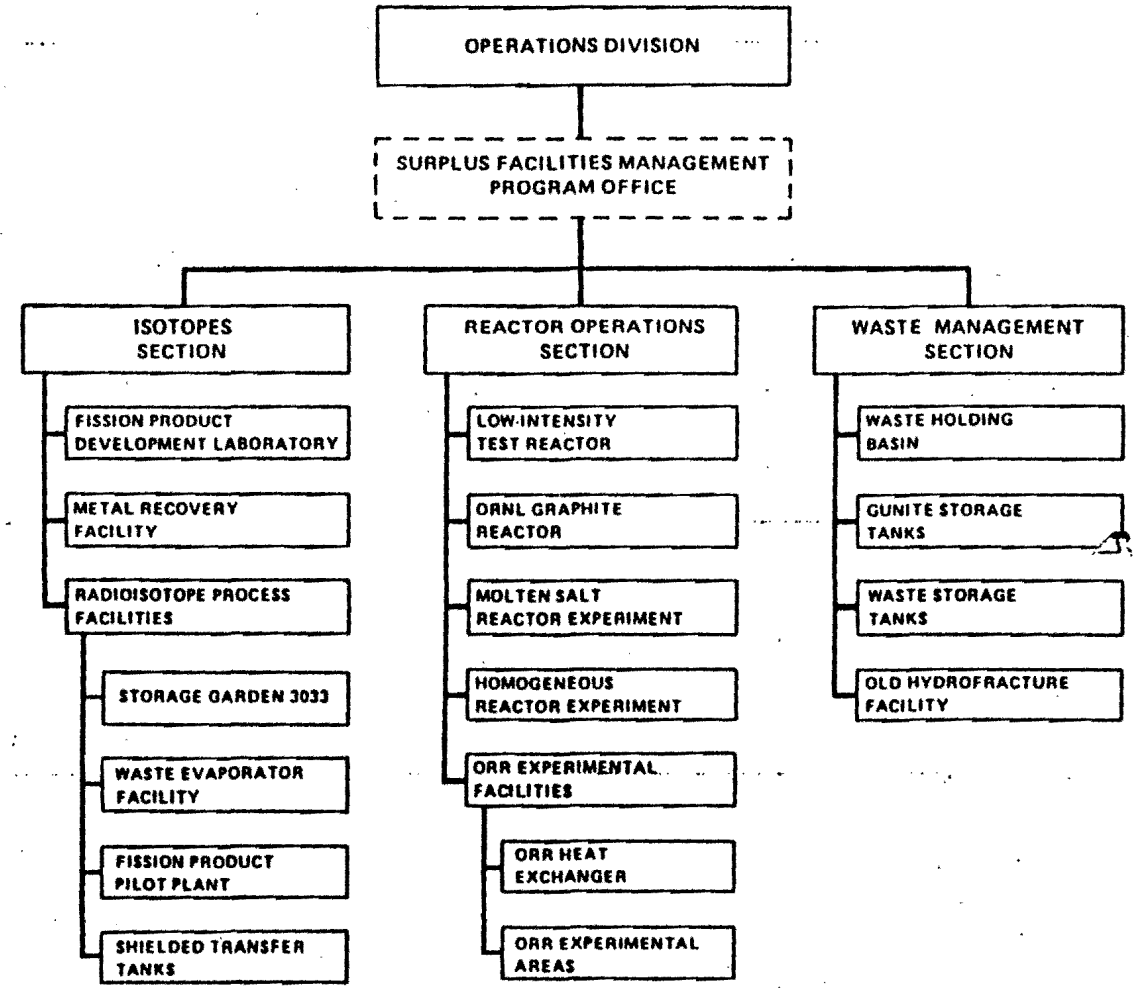

Fig. 4. SFMP project maintenance and surveillance responsibilities.

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Table 2. Facility groupings of M&S activity summaries

Appendix section	Program Category	Project grouping	Facility	Page No.
A.1	Defense Program	Isotope Group	Fission Product Development Laboratory	35
			Metal Recovery Facility	43
		Reactor Group	ORNL Graphite Reactor	49
		Radwaste Group	Waste Holding Basin	57
			Gunite Storage Tanks W-5 - W-10	63
			Waste Tank WC-1	69
			Waste Tanks WC-15, WC-17	73
			Waste Tanks W-1 - W-4, W-13 - W-15	75
			Waste Tank W-11	81
			Waste Tanks TH-1 - TH-3	83
			Waste Tank TH-4	85
			Old Hydrofracture Facility	89
A.2	Civilian Program	Isotope Group	Storage Garden 3033	97
			Waste Evaporator Facility	99
			Fission Product Pilot Plant	105
			Shielded Transfer Tanks	109
		Reactor Group	Molten Salt Reactor Experiment	113
			Low Intensity Test Reactor	119
			Homogeneous Reactor Experiment	125
			ORR Water-to-Air Heat Exchanger	133
			ORR Experimental Facilities	135

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	STORAGE GARDEN 3033	WASTE EVAPORATOR	FISSION PRODUCT PILOT PLANT	SHIELDED TRANSFER TANKS	MOLTEN SALT REACTOR EXPERIMENT	LOW INTENSITY TEST REACTOR	HOMOGENEOUS REACTOR EXPERIMENT	ORR EXPERIMENTAL FACILITIES	ORR-HEAT EXCHANGER
SURVEILLANCE ACTIVITIES									
ROUTINE INSPECTIONS	A	S	S	S	C, D, M, A	D	M	D	A
RADIOLOGICAL SURVEILLANCE		R	A	A	M, R	W, R	M, R	W, Q, R	
SAFETY INSPECTIONS		S	S		S	S	S		
FIRE SAFETY INSPECTIONS		Q			Q, A	Q, A	Q, A		
FILTER DOP TESTING					A, R	A	S, R		
CRANE INSPECTIONS					R	S, R	A		
SECURITY PATROL		D			D	D	D		
SPECIAL SURVEILLANCE					A	C	A		
MAINTENANCE ACTIVITIES									
ROUTINE MAINTENANCE	R	R	R	R	R	R	R	R	R
EXHAUST FILTER CHANGES					R		R		
HEATING/COOLING MAINTENANCE					Q, R	Q, R	Q, R		
SPECIAL MAINTENANCE					Q, S, A	Q, S	Q, S		

KEY

C – CONTINUOUS
D – DAILY
W – WEEKLY
M – MONTHLY
Q – QUARTERLY
S – SEMI ANNUAL
A – ANNUAL
R – AS REQUIRED

Fig. 7. Facility maintenance and surveillance schedules - Civilian Program.

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