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DATA SUMMARY PACKAGE FOR THE BETHEL VALLEY AREA DQO WORKSHOP

WASTE AREA GROUPING 17

FINAL

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WASTE AREA GROUPING 17 DQO Data Package

I. Introduction

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IV. Conceptual Site Model

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I. Introduction

1.0 INTRODUCTION

PURPOSE

This data package provides a summary of waste management and environmental data associated with waste burial activities in the White Oak Creek Watershed (WOCW) at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. The intent of this data package is to support the Data Quality Objectives (DQO) process for the proposed WOCW Remedial Investigation/Feasibility Study (RI/FS).

The seven primary steps of the DQO development process, as defined by the Environmental Protection Agency (EPA), are:

- state the problem,
- *identify decisions to be made,*
- identify inputs to the decision (data uses).
- define the study boundaries,
- develop the decision rule (if/then),
- specify limits on uncertainty, and
- optimize design for obtaining data.

In the DQO process, the *decisions to be made* and documented in a WOCW Record of Decision (ROD) will set the stage for evaluating the completeness of the available data. Identification of these decisions will occur at a scoping meeting prior to a DQO workshop, or at the start of the DQO workshop. The information in this package is meant to be used during the last step of the DQO process to determine if available data are sufficient for making target decisions on WOCW waste sources or if additional data must be obtained.

A premise of the proposed WOCW project is that available data likely are sufficient for decision-making at a level of detail agreed upon by the Department of Energy (DOE), the EPA and the Tennessee Department of Environment and Conservation (TDEC). It is recognized that additional data may be required at a later date for designing a remedial action. This data summary package provides available data to project managers, scientists, engineers, and regulators for critical review so that interested parties can determine if the available data are sufficient, or if not, what additional data are required before a ROD can be developed.

OBJECTIVES OF THE WHITE OAK CREEK WATERSHED RI/FS

The primary objective of the proposed WOCW RI/FS is to document the watershed-wide approach for remediating waste sources, in-effect, tearing down the "Waste Area Grouping (WAG) walls" that have been an integral part of the environmental restoration strategy at ORNL. In doing so, decisions can be made on discreet waste sources or D&D facilities in the context of what is best for the entire watershed, which in turn, should lead to more timely and effective remediation projects.

The RI/FS will attempt to accomplish the following tasks:

- Clearly document the problems (waste sources and releases) in the WOCW;

- Estimate the risks associated with current and potential future releases from the waste units and compare the release concentrations to ARARs;

- Estimate the risk reduction benefit and cost associated with representative process options that could be implemented to reduce risks;

- Balance benefits and costs from a watershed-wide perspective to help determine the optimal set and sequence of actions in WOCW and the possible need to obtain waivers from complying with existing regulations.

WAG 17 INFORMATION SUMMARY

- Contaminants known or suspected to have been released from WAG 17 are: Cs^{137}, Cr, Cu, Cd, Zn, solvents, and fuel-derived hydrocarbons.

- The only documented releases have been from petroleum underground storage tanks (USTs), plus waste oil tank 7002A which leaked in the 1988/89 timeframe. (Underground storage tanks are not managed by ORNL ER). Several USTs have been excavated and remain under assessment; remediation has been completed on tank 7002A.

- There have been no report releases of rad contamination, although data from stream gravel analyses suggest that there may have been a release in the past.

- Data characterizing the nature and extent of soil contamination at WAG 17 are virtually nonexistent. Perimeter wells monitor groundwater. There are some surface water monitoring data.

- Organics exceed MCLs in some perimeter wells, and contribute to a maximum risk per well of 6.46E-3.

- In 1994, WAG 17 was ranked 3rd (behind WAGs 4 and 5) based on total carcinogenic risk to human health from groundwater (total risk = 8.0E-4; attributed primarily to chlorinated hydrocarbons.)

- There are no current remediation activities at WAG 17.

- Tank 7002A has been excavated, cut into pieces and is awaiting smelting as scrap metal.

- Tank 7002W is currently in use as a waste oil storage tank. The tank is emptied approximately once per year at which time the contents are sampled and analyzed.

- Groundwater monitoring wells at the UST 7069 Site were plugged and abandoned on December 18, 1996 after the State of Tennessee agreed to clean closure of the site due to contaminant concentrations falling below UST action levels.

- Deactivation activities have been completed at the Tritium Target Facility (7025). This facility is awaiting transition to EM-40.

- No activity has occurred or is planned for the Thorium Storage Wells (east of Building 7019).

- Many facilities are still active at WAG 17 eg., Paint Shop, Carpenter Shop, etc. The possibility of hazardous chemical releases exists, however, none has been reported. (See "Other" section for currently available information.)

DATA SUMMARY SHEET FOR WASTE AREA GROUPING 17
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
Waste Oil Tank 7002W	T	A	2500 gal	Materials	L					X	NA	NA	NA	NA	◒	◒	◒	O	◒	O
Waste Oil Tank 7002A	T	I	2000gal	WMRAD	NA			X			NA	NA	◒	NA	◒	◒	◒	NA	◒	NA
Thorium Storage Wells	T	I	3' x 10'	RR Div	Sf	X					NA	NA	NA	NA	◒	◒	◒	O	◒	O
Tritium Target Facility	B	T	6000 cu ft	EM-60	Sf						NA	NA	NA	NA	◒	◒	◒	O	◒	O
Active Facilities (See "Other" section)	T/B	A	various	Materials	Various					X	NA	NA	NA	NA	◒	◒	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
Sf = Surface Contamination

* Other:
VOA
Metals

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

DOCUMENTS REVIEWED

Remedial Investigation Work Plan for the Groundwater Operable Unit at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-1252&D1, March 1994.

Site Descriptions of the Environmental Restoration Units at Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL/ER-391, February 1997.

Environmental Data Package for ORNL Services Area (WAG 17), ER011242, 1988

Annual Summary Report on the Surveillance and Maintenance Activities for the Oak Ridge National Laboratory Environmental Restoration Program for Fiscal Year 1995, ORNL/ER-345, November 1995.

Environmental Assessment Report for Underground Storage Tank Sites 7069B, 7069E, and 7069F at the Oak Ridge National Laboratory, Ogden No. 245140000, April 1993.

Addendum to the Environmental Assessment Report for Underground Storage Tank Sites 7069B, 7069E, and 7069F at the Oak Ridge National Laboratory, Ogden No. 2-4514-0100, August 1993.

Site-Specific Standard Request for Underground Storage Tank Sites 7069B, 7069E, and 7069F at the Oak Ridge National Laboratory, Ogden No. 2-4514-0100-0000, January 1994.

DOCUMENTS REVIEWED

Remedial Investigation Plan for WAG 17. ORNL/RAP/Sub-87/99053/20. December 1988.

Groundwater Quality Monitoring Well Installation for WAG 17. ORNL/ER-74. September 1994.

Third Annual Environmental Restoration Monitoring and Assessment at Oak Ridge National Laboratory. DOE/OR/01-1290&D1. September, 1994.

Fourth Annual Environmental Restoration Monitoring and Assessment at Oak Ridge National Laboratory. DOE/OR/01-1413&D1. September, 1995.

(Environmental Assessment Report for the Building 7069 area — "Executive Summary" provided; report not reviewed.)

White Oak Creek DQO Data Summary Worksheet

Form Completed by: J Chason
Date: 12/10/95

Document Reviewed: Remedial Investigation Plan for WAG 17
Doc ID: ORNL/RAP/Sub-87/99053/20
Author/Date: MMES, Dec. 1988

Comments:

WAG	Description of Study	Waste Unit	Sampling Dates	Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Analytical Protocol	Questions Addressed	Quality or Confidence
17	piezometer data	all	1987	GW	23 piez.				1D; 1E	H
17	Environ. assessment	Tank 7069d	1986	Sub	6 @ 7069d	G	BTEX,		2C	M
		"			"		Gasoline			M
		~~tank~~ "	1987	Sub	4 down-gradient	G	"		2C	M
		"	1988	Sub	3	Soil gun	Benzene		2C	M
17	SW monitoring	all	1986	SW	OSA-1	G	Cs, Co, Sr, H3		2A	M
17	Gravel sampling	all	1986	Sed	OSA-1, ~~USGS~~	G	R, I	Cs, Co, Sr, H3 + 5 metals	2D	M
		all	1986	Sed	tar-coated sample (1)		O		2D	M
17	USGS monitoring	all	1961-64	SW	(1)		I, G		2A	M-H
17	NPDES monitoring	all		SW	1234		pH, TSS, oil/grease		2A	M-H
17	Env. assessment	Tank 7069d	1986-88	GW	3 piez. (794-796)	G	BTEX		2B	M

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

Confidence:
H – High
M – Medium
L – Low

Media:
SURF – surface soil
SUB – subsurface soil
SW – surface water
GW – groundwater
Seep
SED – sediment

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

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

Analytical Fraction:
I – Inorganics
O – Organics
R – Radionuclides
P – PCBs/Pesticides/Herbicides
G – General Chemistry
BTEX = Benzene, Toluene, Xylene, Ethylbenzene

Analytical Protocol:
CLP – CLP level 3 or 4
Screen – Screening level
ESD – ESD project-specific
FM – Field measurement
Gross – Gross alpha, beta, gamma
Iso – Isotopic
Sr/H3 – Strontium/Tritium

Question / Hypothesis
1 = Source characteristics
1A – design/operation
1B – leachate
1C – waste inventory
1D – waste unit hydrology/hydrogeology
1E – other FS information
2 = Nature/Extent of Current releases
2A – surface water, seeps
2B – groundwater
2C – soil around waste units
2D – sediment
2E – cummulative at integration point
3 = Current risk
4 = Modeling for future risk
3A/4A – human health risk
3B/4B – ecological risk

iv

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White Oak Creek DQO Data Summary Worksheet

Form Completed by: J. Chason
Date: 12/8/95

Document Reviewed: Groundwater Quality Mon. Well. Installation for WAG 17
Doc ID: ORNL/ER-74
Author/Date: MMES, Sept. 1994

Comments: Contains drilling logs, etc.

WAG	Description of Study	Waste Unit	Sampling Dates	Media	Sampling Locations	Sampling Protocol	Analytical Fraction	Analytical Protocol	Questions Addressed	Quality or Confidence
17	Gw mon wells	all	1990	GW, Sub	1196-1203	(Wells were sampled and soils but no results are reported in this document)			2B; 1D;	M-H

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

Confidence:
H – High
M – Medium
L – Low

Media:
SURF – surface soil
SUB – subsurface soil
SW – surface water
GW – groundwater
Seep
SED – sediment

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

Sampling Protocol:
G – grab
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BG – baseflow grab
FC – flow composite
SC – spatial composite
V – vertical profile
S – site survey
WL – water level

Analytical Fraction:
I – Inorganics
O – Organics
R – Radionuclides
P – PCBs/Pesticides/Herbicides
G – General Chemistry

Analytical Protocol:
CLP – CLP level 3 or 4
Screen – Screening level
ESD – ESD project-specific
FM – Field measurement
Gross – Gross alpha, beta, gamma
Iso – Isotopic
Sr/H3 – Strontium/Tritium

Question / Hypothesis
1 = Source characteristics
1A – design/operation
1B – leachate
1C – waste inventory
1D – waste unit hydrology/hydrogeology
1E – other FS information
2 = Nature/Extent of Current releases
2A – surface water, seeps
2B – groundwater
2C – soil around waste units
2D – sediment
2E – cummulative at integration point
3 = Current risk
4 = Modeling for future risk
3A/4A – human health risk
3B/4B – ecological risk

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Bethel Valley RI/FS Historical Data Review

Form Completed by: M Collins Lagrand
Date: 3/31/97

Document Reviewed: Environmental Assessment Rept. for UST Sites 7069S, 7069E & 7069F
Doc ID: Ogden No 24514000
Author/Date: Ogden April '93

Comments: Presented field investigation findings - identified nature and extent of soil and groundwater contamination at 7069 site - Contains boring logs, analytical results & cross section diagr

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
17	Env. Assess.	7069B	tank leak site	92-93	GW	3 PIEZ		BTEX	2A	M-H
		7069E	leak site	"	"	7 MW				
		7069F	valve leak site	"	"					
						"	WL			
17	Env. Assess.	7069S	leak sites	92-93	Soil	G		BTEX	2C	M-H
		7069E				18 Soil borings				
		7069F								

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
WL = water level

Analytical Fraction:
I = Inorganics
O = Organics
P = PCBs/Pesticides/Herbicides
GR = grass 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

Bethel Valley RI/FS Historical Data Review

Form Completed by: M. Collins-Shepard
Date: 3/31/97

Document Reviewed: Addendum to EA Report for UST Sites 7069D 7069E & 7069F
Doc ID: 2-4514-0100
Author/Date: Ogden 8/93

Comments: Additional groundwater and soil sampling for further identification of nature and extent of contamination

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
17	Environ. Assessm.	7069D		93	GW	MW(4)		O/BTEX, TPH		
		7069E	LEAK SITES							
		7069F								
						3 PIZ, 11 MW	WL			
"	"		"	93	SOIL	21 SOIL BORINGS		BTX, TPH	FC	M-H

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
WL = W Atte level

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
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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

Bethel Valley RI/FS Historical Data Review

Form Completed by: M Collins / Shepard
Date: 3/31/97

Document Reviewed: Site-Specific Stand. Request for UST Sites 7069B 7069E & 7069F
Doc ID: 2-4514-0100-000
Author/Date: Ogden / 1/94

Comments: Additional soil and gw. data to support SSS Request

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
17	GW	7069B	leak/spill site	1/93	GW	Wells (11)		BTX, TPH, OVA	2A	M/H
		7069E								
		7069F								
		7069B	leak site		SOIL	SB (16)		TPH, BTX, OVA	2C	
		7069E/F	leak site		SOIL	SB (17)				

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

Bethel Valley RI/FS Historical Data Review

Form Completed by: N. Collins Lyford
Date: 4/8/92

Document Reviewed: Environmental Data Package for ORNL Services Area (WAG 17)
Doc ID: TEC 01242
Author/Date: Boeing, Moore 1988

Comments: Detailed description of WAG-17 geology, hydrology, flow contours data sheets for WAG-17 units. (Maps)

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

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

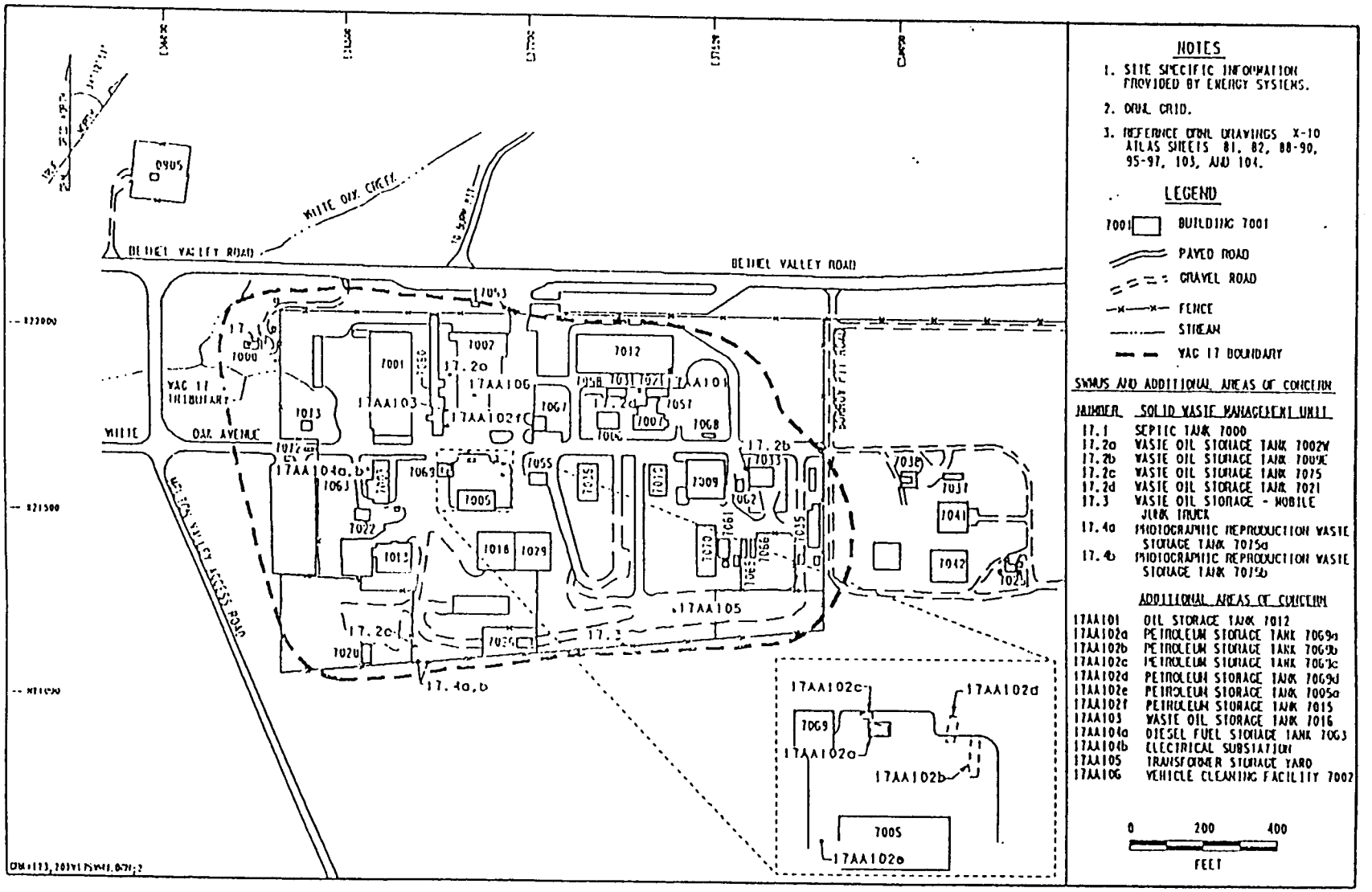

FIGURE 3-8
LOCATION OF WAG 17 SWMUs AND
ADDITIONAL AREAS OF CONCERN

WAG 17

WAG 17 is about 1.6 km (1.0 mile) east of the main plant area, south of Bethel Valley Road (Fig 1.1). This area is the major craft and machine shop area for ORNL. WAG 17

drains into WOC just south of Bethel Valley Road. WAG 17 effluents, entering WOC approximately 5 km (3 miles) upstream from WOL, may ultimately reach WOL and the Clinch River. There are no reports of releases of radionuclides or hazardous materials from WAG 17; however, stream gravel surveys show that ^{137}Cs may have been released in the past. The surveys also suggest the presence of cadmium, chromium, copper, and zinc. In addition, semivolatile organics were found to be present as tar-like grains on the gravels.

FY 1992 ER4

Table 1.1. Contaminants known or suspected to have been released from each WAG

WAG	Contaminants[a]
1	^{60}Co, ^{90}Sr, ^{137}Cs, ^{152}Eu, ^{232}Th, ^{238}U, ^{239}Pu, ^{241}Am, ^{244}Cm, other radionuclides, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Zn, TRE, PCBs, chlordane
2	^{3}H, ^{60}Co, ^{90}Sr, ^{99}Tc, ^{137}Cs, ^{152}Eu, ^{238}U, ^{239}Pu, ^{241}Am, ^{244}Cm, Ag, Cd, Cr, Cu, Hg, Pb, Se, TRE, PCBs, chlordane, VOCs, nitrates
3	^{3}H, ^{90}Sr, ^{137}Cs, TRE
4	^{3}H, Co, ^{3}H, ^{60}Co, ^{90}Sr, ^{106}Ru, ^{137}Cs, ^{239}Pu, other radionuclides, TRE
5	^{3}H, ^{60}Co, ^{90}Sr, ^{137}Cs, ^{233}U, ^{239}Pu, ^{241}Am, ^{244}Cm, other radionuclides, Cr, Hg, PCBs, Ni, Pb, Zn, PCBs
6	^{3}H, ^{14}C, ^{60}Co, ^{90}Sr, ^{137}Cs, ^{152}Eu, ^{238}U, Cr, Cu, Hg, Mo, Ni, Pb, Zn, VOCs, nitrates
7	^{3}H, ^{60}Co, ^{90}Sr, ^{99}Tc, ^{106}Ru, ^{137}Cs, ^{233}U, Cr, Ni, Zn, nitrates
8	^{60}Co, ^{90}Sr, ^{137}Cs, Cr, Cu, Zn
9	^{60}Co, ^{90}Sr, ^{137}Cs, Cr, Zn
10	^{90}Sr, ^{137}Cs, ^{244}Cm, TRU isotopes
11	^{238}U, Cd, Cu, Zn, Cr, organics
13	^{137}Cs
17	^{137}Cs, Cd, Cr, Cu, Zn, fuel-derived hydrocarbons, and solvents

[a]Based primarily on data in ORNL RCRA Facility Investigation (unpublished and environmental data packages for each WAG. Ruthenium-106 and TRE have short half-lives (e.g., ~1 year) and should have decayed to trivial levels by this time.

[b]X represents the radioactive isotope series.

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WAG 17 Results. WAG 17 is located to the east of the main ORNL plant-area. The WAG includes support and transportation facilities. It is situated on a northwest-facing slope, with its upgradient wells on the eastern border and downgradient wells on the western border. While none of the wells had radiological levels above any drinking water standards, the data for the eastern and western boundaries show evidence of radioactive contamination, including gross beta activity and ^{3}H. In the past gross alpha activity has exceeded the drinking water standard at two wells; however, this did not occur in 1993.

The data for the southeastern and southwestern boundaries show evidence of volatile organic contamination. The contamination has consistently been located primarily in one well. The pollutants include trichloroethene, vinyl chloride, benzene, 1,2-dichloroethene, 1,1-dichloroethene, and tetrachloroethene.

Environmental Data Package for ORNL WAG 1

Quarter	Percent of annual runoff
Oct.-Dec.	17
Jan.-Mar.	49
Apr.-June	23
July-Sept.	11

A comparison of seasonal differences in precipitation and runoff shows that about 5 in. of water represent both the increase of evapotranspiration in the summer months over that in the winter months and the decrease in groundwater storage during the summer and fall.

The WAG 17 area is about 50% impervious because of parking lots, roads, and buildings; storm sewers carry runoff from the impervious areas to White Oak Creek. The other 50% of this WAG is covered by grass, which is mowed during the growing season. The grass areas are relatively flat, but some overland flow onto paved areas probably occurs during intense storms. An exact water budget for WAG 17 cannot be determined, but an estimated budget can be based on conditions in the area and on parameters measured in nearby areas, as follows.

		Inches
INFLOW		
Mean annual precipitation		52
Total inflow		52
OUTFLOW		
Streamflow		34
Overland flow (storm sewers)	28	
Base flow (discharge from aquifers)	6	
Evapotranspiration		18
Total outflow		52

UNIT NAME: Waste Oil Storage Tank (7002W)

Unit Number: 17.02A

Project Status: No activity planned.

Unit Location: The tank is located on the west side of Building 7002. ORNL grid coordinates are N 21,800 ft and E 36,800 ft. (Boegly and Moore, 1987)

Approximate Dimensions and Capacity: The tank is 5 ft 4 in (1.7 m) diameter by 15 ft (4.6 m) long, horizontal, steel, and located above ground. Tank capacity is 2,500 gal (9,463 L). (ORNL 1990)

Dates Operated: The tank was installed in 1984. It is still in service. (ORNL 1990)

Present Function: The tank is used to store waste oil. (ORNL 1990)

Life Cycle Operation:

Waste Characteristics: The tank contains waste oil. No records exist of hazardous materials or radionuclides being present. The oil has not been analyzed. (ORNL 1990)

Release Data: No releases reported. (ORNL 1990)

Site Status: Clean Water Act/CERCLA (ORNL 1990)

Media of Concern:

Comments: Contaminated Site Summary Sheet (CSSS) 1990 lists the grid coordinate at N 21,840.

References:

Boegly W.J. Jr., and G.K. Moore, January 1987. *Environmental Data Package For the ORNL Services Area (WAG 17)*, Oak Ridge National Laboratory, 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.

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

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Abandoned Underground Waste Oil Storage Tank 7002A

Unit Number:

Project Status: Removal completed. (Kuhaida 1996)

Unit Location: The tank was located near the southwest corner of Building 7002 in the 7000 area east of the ORNL main complex. Approximate ORNL grid coordinates are N 21,700 ft and E 36,780 ft. (ORNL 1990)

Approximate Dimensions and Capacity: The underground steel tank is approximately 27 inches wide, 4 feet tall and 5 feet long. Its capacity is estimated at 275 gallons. (ORNL 1990)

Dates Operated: Existing records suggest the tank was installed around 1948 and that it was abandoned in place in 1977. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: The tank was used to store waste oil from the ORNL Garage. The tank was believed to store only waste oil; however, records have not been located. (ORNL 1990) The tank was removed in 1989 and stored in a diked Toxic Substance Control Act (TSCA) Storage Area in the 7000 area of ORNL. (Finger 1994a)

Waste Characteristics: Analytical results indicated the tank contents were contaminated with 1,1,1-trichloroethane (a common degreaser) and polychlorinated biphenyls. PCB levels ranged up to 209 ppm. PCB concentrations found in residual material in the tank were less than 30 ppm. (Finger 1994a)

Release Data: The tank was uncovered during October 1989 in an attempt to determine whether it had been permanently closed. It was then discovered that the tank contained an oily/sludge water mixture. However, visual observations of the tank suggested that the level of material fluctuated which, in turn, suggested that the tank was not tight and that the contents could have been a source of continuing release to the environment. During an attempt to remove the UST, all material (estimated at 148 gallons) in the tank was released through existing corrosion holes on the sides of the tank into the pit. (Finger 1994b) Cleanup of the site has been completed. Notifications of a release of PCB-contaminated material were made to DOE/ORO, DOE/HG, EPA Region IV, and the National Response Center. The tank was wrapped in plastic and moved to a secured, diked location. (Nix 1989)

This tank had been listed on ORNL's Underground Storage Tank (UST) Notification Forms as a tank regulated under Subtitle I of the Resource Conservation and Recovery Act. (ORNL 1990)

Site Status: CERCLA/RCRA (ORNL 1990)

Media of Concern:

Comments: Finger (1994a) indicated the tank has a capacity of 2000 gallons. The tank was decontaminated and cut up in 1994 and is being stored as PCB waste until the U.S. EPA's approval for salvage. (Smith 1994).

References:

Finger, J.M., February 4, 1994a. Memorandum to J.A. Mayo, Subject: GSX98 Project - Clean Tanks 7002A and 7009E. Martin Marietta Energy Systems, Oak Ridge National Laboratory, Oak Ridge,Tennessee.

Finger, J.M., February 8, 1994b. Memorandum to David Scott Zill. Subject: Tank 7002A. Martin MariettaEnergy Systems, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Kuhaida, Jerry, November 1996. LMES Project Manager, review comments.

Nix, C.E., November 9, 1989. Letter to D.A. Underwood, Laboratory Waste Management Division withattached report, "Report of Release of Polychlorinated Biphenyls from an Abandoned Underground Storage Tank (UST) at Oak Ridge National Laboratory Garage, Building 7002," Oak Ridge, Tennessee.

Oak Ridge National Laboratory, September 1990. Contaminated Site Summary Sheet, Oak Ridge, Tennessee.
Smith, Winston, December 10, 1994. U.S. EPA, Letter to Ronald Hultgren U.S. DOE, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Tritium Target Preparation Facility (7025)

Unit Number:

Project Status:

Unit Location: This facility is located east of WAG 17 (ORNL Services Area). Approximate ORNL grid coordinates are N 21,370 ft and E 38,285 ft.(ORNL 1990)

Approximate Dimensions and Capacity: Floor area of building is 55 m2. The tritium equipment for target fabrication is housed in a 26 by 5 ft stainless-steel hood.(ORNL 1990) The structure is a prefabricated, metal-sided building with a total free space volume of approximately 6000 ft^3. (ORNL 1995)

Dates Operated: The building was installed in 1968. Operations involving tritium were halted in October of 1989; bulk tritium and uranium storage traps have been removed. Operation of the ThO_2/UO_2 high vacuum system ended in January of 1990. (ORNL 1995)

Present Function: Not in operation.

Life Cycle Operation: The building is designed primarily for the purpose of producing tritium-containing accelerator targets as well as loading tritium by absorption into other types of metal specimens. The accelerator targets are used by other laboratories to produce neutrons for experimental purposes. Other operations included preparing metallurgical samples for helium embrittlement studies by diffusing tritium into the samples and allowing it to decay to helium, and for preparing thin films of ThO_2/UO_2 by vacuum evaporation. No aqueous wastes were generated by these processes. (ORNL 1995)

Waste Characteristics: Major constituent is tritium. The ThO_2/UO_2 system is being disassembled and disposed of as waste. (ORNL 1995)

Release Data: Tritium off-gas is exhausted by a 0.94 m3/s fan through a 4 m stainless steel stack. (ORNL 1990) The background well for the WAG 1 remedial investigation is located downgradient from Building 7025 and showed elevated tritium levels. (Bechtel 1992)

Site Status: CERCLA (ORNL 1990)

Media of Concern: Groundwater

Comments: Building 7025 is a Tennessee Valley Authority Surplus building. (ORNL 1995) The FFA Appendix C (1996) refers to the facility as the Tritium Target Preparation Facility, but the ORNL 1995 Work Plan for The Isotopes Facility Deactivation Project (IFDP) lists it as a Fabrication Facility.

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.

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 Isotopes Facilities Deactivation Project, Environmental Restoration Division, ORNL, Oak Ridge, Tennessee.

Date Prepared: December 1996

Photo: No photo available.

UNIT NAME: Thorium Storage Wells

Unit Number:

Project Status: No activity planned.

Unit Location: Storage wells are located in the High Flux Isotope Reactor Area east of 7019 (Thorium Handling Facility) in Melton Valley. Approximate ORNL grid coordinates are N 21,320 ft and E 38,920 ft. (ORNL 1990)

Approximate Dimensions and Capacity: Wells are 3 ft in diameter and 10 ft deep. There are 10 wells and all are covered with metal lids. (ORNL 1990)

Dates Operated: Mid 1960s to mid 1970s. (ORNL 1990)

Present Function: Not in operation.

Life Cycle Operation: Initially used to store zirconium sponge which is explosive when wet or overheated. Later the wells were used to store thorium. Wells are empty at this time. (ORNL 1990)

Waste Characteristics: Zirconium and thorium. (ORNL 1990)

Release Data: No reported releases. (ORNL 1990)

Site Status: CERCLA (ORNL 1990)

Media of Concern:

Comments: No additional information was obtained.

References:

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

Date Prepared: December 1996

Photo: No photo available.

storage tanks, a vehicle cleaning facility, a transformer storage yard, underground pipelines, and contaminated areas (leak sites) resulting from operational spills and/or releases. These additional areas of concern are also discussed in detail in Section 3.2.

1.2 PROJECT OBJECTIVES

The project objectives of this RI Plan are to evaluate the adequacy of existing data, and consequently, to specify the means for collecting additional data as appropriate (EPA, 1987a). Based on the evaluation of existing data for WAG 17, the following additional data needs have been identified:

- Nature of Contaminants - Inadequate data exist on the nature and quantity of radiological and chemical contamination. No data are available for assessing radiological contamination. With the exception of environmental assessment data for a leaking petroleum tank, no data are available for assessing chemical contamination.

- Extent of Contamination - Studies at the leaking petroleum tank indicate that soil and groundwater contain chemical contamination. The vertical and horizontal extents of this contamination are unknown.

- Evaluation of Migration Pathways - In addition to the movement of contaminants through the groundwater system, the contributions of surface water runoff, sediments, and surface soils to potential movement of materials off-site require evaluation. Studies by Morrison and Cerling (1987) have shown that semi-volatile organics and metals have left the site via the surface water pathway and that these contaminants have been retained by streambed gravels.

The project objectives will be accomplished by implementing a sampling program to collect the data needed to refine the human and environmental risk assessment and to develop the remedial action alternatives. Data quality objectives (DQOs) (EPA, 1987a) have been established for each element of the sampling program based on the intended use of data in meeting the project objectives. The development of DQOs is discussed in the ORNL RI/FS Quality Assurance Plan (BNI, 1988a) and the Environmental Surveillance Procedures Quality Control Program (Energy Systems, 1988a). The general types

- No Suspected Releases

  - SWMU 17.2a, Waste Oil Storage Tank 7002W
  - SWMU 17.3, Waste Oil Storage-Mobile Junk Truck

- Known Releases

  - SWMU 17.1, Septic Tank
  - SWMU 17.2c, Waste Oil Storage Tank 7075
  - 17AA102d, Petroleum Storage Tank 7069d
  - 17AA102e, Petroleum Storage Tank 7005a
  - 17AA106, Vehicle Cleaning Facility

- Potential for Releases

  - SWMU 17.2b, Waste Oil Storage Tank 7009E
  - SWMU 17.2d, Waste Oil Storage Tank 7021
  - SWMU 17.4a, Photographic Reproduction Waste Storage Tank 7075a
  - SWMU 17.4b, Photographic Reproduction Waste Storage Tank 7075b
  - 17AA101, Oil Storage Tank 7012
  - 17AA102a, Petroleum Storage Tank 7069a
  - 17AA102b, Petroleum Storage Tank 7069b

- Potential for Releases (cont'd)

  - 17AA102c, Petroleum Storage Tank 7069c
  - 17AA102f, Petroleum Storage Tank 7015
  - 17AA103, Waste Oil Storage Tank 7015
  - 17AA104, Diesel Fuel Storage Tank 7063 and Electrical Substation
  - 17AA105, Transformer Storage Yard

4.3.4 Contamination of the Environment

Release of contaminants from the WAG 17 SWMUs and additional areas of concern has resulted in the known or suspected contamination of soils, sediments, groundwater, and surface water within WAG 17. A known contamination situation must be supported by analytical data. Suspected contamination is arrived at by site visits, information from ORNL staff, and professional judgment. This is presented in the following listing:

SOILS: SURFACE AND SUBSURFACE

- Known Contamination
  - Area adjacent to Septic Tank 7000 outlet pipe.
  - Area adjacent to Waste Oil Storage Tank 7075
  - Area adjacent to Petroleum Storage Tank 7069d
  - Area adjacent to Petroleum Storage Tank 7005a
- Suspected Contamination
  - Area adjacent to Waste Oil Storage Tank 7009E
  - Area adjacent to Photographic Reproduction Waste Storage Tanks 7075a and 7075b
  - Area adjacent to Petroleum Storage Tank 7069a
  - Area adjacent to Petroleum Storage Tank 7069b.
  - Area adjacent to Petroleum Storage Tank 7069c
  - Area adjacent to Petroleum Storage Tank 7015
  - Area adjacent to Waste Oil Storage Tank 7015
  - Area adjacent to Diesel Fuel Storage Tank 7015
  - Area within and adjacent to Transformer Storage Yard

SEDIMENTS

- Known Contamination
  - WAG 17 Tributary
  - WOC
- Suspected Contamination
  - Storm drains within WAG 17

SURFACE WATER

- Known Contamination
  - WAG 17 Tributary
- Suspected Contamination
  - WOC
  - Surface runoff storm drains within WAG 17
  - Surface runoff from Transformer Storage Yard

GROUNDWATER

- Known Contamination
  - Area adjacent to Petroleum Storage Tank 7069d

00013

GROUNDWATER - (cont'd)

o Suspected Contamination

- Area adjacent to Waste Oil Storage Tank 7009E
- Area adjacent to Petroleum Storage Tank 7069a
- Area adjacent to Petroleum Storage Tank 7069b
- Area adjacent to Petroleum Storage Tank 7069c
- Area adjacent to Petroleum Storage Tank 7005a
- Area adjacent to Petroleum Storage Tank 7015
- Area adjacent to Waste Oil Storage Tank 7015
- Area adjacent to Diesel Fuel Storage Tank 7063

The resolution of suspected releases and/or environmental contamination will require the collection of additional data pertaining to surface water, sediment, soil, and groundwater. The rationale and logistic plans for obtaining these data are discussed in Section 5.0 and the WAG 17 Field Sampling Plan (Appendix A).

TABLE 4-5
INFORMATION STATUS
OF KEY ASSESSMENT FACTORS

● WELL-DEFINED, ADEQUATE, OR LOW UNCERTAINTY

◐ PARTIALLY DEFINED, ADEQUATE FOR SOME PURPOSES, OR MODERATE UNCERTAINTY

○ POORLY DEFINED, INADEQUATE, OR HIGH UNCERTAINTY

17.X = SWMU

17AA00X = ADDITIONAL AREA OF CONCERN

AREA	DESCRIPTION	LOCATION	DESIGN/OPERATION	WASTE CONTENT	WASTE CHARACTERISTICS/RADIOLOGICAL	WASTE CHARACTERISTICS/CHEMICAL	SOIL PROPERTIES	HYDROGEOLOGIC SETTING	GROUNDWATER MONITORING SYSTEMS	GROUNDWATER MONITORING DATA	SURFACE HYDROLOGIC SETTING	SURFACE WATER MONITORING SYSTEMS	SURFACE WATER MONITORING DATA
17.1	SEPTIC TANK 7000	◐	◐	◐	○	◐	◐	◐	○	○	◐	◐	◐
17.2a	WASTE OIL STORAGE TANK 7002W	●	◐	◐	●	●	◐	◐	○	○	◐	◐	◐
17.2b	WASTE OIL STORAGE TANK 7009E	◐	◐	◐	◐	◐	◐	◐	○	○	◐	◐	◐
17.2c	WASTE OIL STORAGE TANK 7075	◐	◐	◐	◐	◐	◐	◐	○	○	◐	◐	◐
17.2d	WASTE OIL STORAGE TANK 7021	●	◐	◐	◐	◐	◐	◐	○	○	◐	◐	◐
17.3	WASTE OIL STORAGE MOBILE TANK TRUCK	●	◐	◐	◐	◐	◐	○	○	○	◐	◐	◐
17.4a	PHOTOGRAPHIC REPRODUCTION WASTE STORAGE TANK 7075a	●	◐	◐	●	◐	◐	◐	○	○	◐	◐	◐
17.4b	PHOTOGRAPHIC REPRODUCTION WASTE STORAGE TANK 7075b	●	◐	◐	●	◐	◐	◐	○	○	◐	◐	◐
17AA101	OIL STORAGE TANK 7012	●	◐	◐	◐	◐	◐	◐	○	○	◐	◐	◐
17AA102a	PETROLEUM STORAGE 7063a	◐	◐	◐	●	◐	◐	◐	○	○	◐	◐	◐
17AA102b	PETROLEUM STORAGE 7063b	◐	◐	◐	●	◐	◐	◐	○	○	◐	◐	◐
17AA102c	PETROLEUM STORAGE 7063c	◐	◐	◐	●	◐	◐	◐	○	○	◐	◐	◐
17AA102d	PETROLEUM STORAGE 7063d	◐	◐	◐	●	◐	◐	◐	○	○	◐	◐	◐
17AA102e	PETROLEUM STORAGE 7063e	◐	●	◐	●	◐	◐	◐	○	○	◐	◐	◐
17AA102f	PETROLEUM STORAGE 7015	◐	○	◐	○	○	◐	◐	○	○	◐	◐	◐
17AA103	WASTE OIL STORAGE TANK 7016	◐	○	○	○	○	◐	◐	○	○	◐	◐	◐
17AA104a	DIESEL FUEL STORAGE TANK 7063	◐	◐	○	●	◐	◐	◐	○	○	◐	◐	◐
17AA104b	ELECTRICAL SUBSTATION	◐	◐	○	●	◐	◐	◐	○	○	◐	◐	◐
17AA105	TRANSFORMER STORAGE YARD	●	◐	◐	●	◐	◐	○	○	○	◐	◐	◐
17AA106	VEHICLE CLEANING FACILITY 7002	◐	◐	◐	○	◐	◐	◐	○	○	◐	◐	◐

4.2 0106.2A WAG 17

3.3.3 History of Corrective Action

The only corrective action that has been performed within WAG 17 is clean-up of a small release from Tank 7005a (17AA102e), a new gasoline tank near Building 7005. Less than 100 gal of gasoline were spilled following a tightness test of the tank in June 1988 (Weaver, 1988). At present, the soil around the spill is being vented to remove the spilled gasoline. Four wells, 8.5 ft deep, have been installed around the tank. These vent wells are slotted at the bottom 2 ft, and air is passed through the wells to strip gas from the soil (Depaoli, 1988).

3.4 SUMMARY OF FINDINGS

The evaluation of existing data associated with each of the WAG 17 SWMUs and additional areas of concern indicates that many of these facilities have the potential to release chemical contaminants to the environment. Additionally, one facility has the potential to release radiological contaminants to the environment.

The WAG 17 Area has been used for storage of materials since the early 1940s, and some SWMUs and additional areas of concern have been in service since that time. Two releases of hazardous materials within WAG 17 have been reported. In June 1986, an underground storage tank (17AA102d) was found to be leaking (Wiltshire, 1986a) and reportedly may have lost up to 800 gal of unleaded gasoline (Boegly and Moore, 1988). In June 1988, less than 100 gal of unleaded gasoline were released following leak testing of a newly installed underground storage tank (17AA102e) (Weaver, 1988). Undocumented spills or releases from SWMUs and additional areas of concern also may have occurred over the operational history of this site. During a recent site visit, stains were observed in soil near the northwest corner of a containment berm which collects overflow from SWMU 17.2c, which is an underground tank known to be receiving surface water infiltration and contains waste oil contaminated with tritium (Edgemon, 1988). The secondary containment system for this SWMU and many other SWMUs and additional

areas of concern has not been evaluated for tightness. Many other SWMUs and additional areas of concern do not have secondary containment, nor have these units been evaluated for tightness.

Based on these findings, it is possible that RI activities could identify contamination from previous releases at both underground storage tanks and SWMUs. The only documented releases within WAG 17 have been from underground storage tanks; 7 of the 12 additional areas of concern identified as having potential for continuing contribution of contaminants to the environment are underground storage tanks. These underground storage tanks, located in geologic and hydrologic proximity to SWMUs, contained materials which are similar to materials contained in many SWMUs. Although underground storage tanks are not SWMUs and cleanup of releases from underground storage tanks will be funded separately from RCRA 3004(u) SWMUs, it will be necessary to conduct minimal sampling at underground storage tanks during the RI in order to distinguish between contaminant plumes from these two sources (BNI, 1988c).

Existing data relating to soil and groundwater contamination are derived from an environmental assessment (Rohwer, 1987) at the leaking underground storage tank. The environmental assessment identified above-background BTX levels in soil and groundwater. Reported values for BTX in soil samples taken within 50 to 200 ft of the tank at 5- and 10-ft depths and along nearby utility pipelines at 4- to 8-ft depths did not exceed the TDHE action level of 10 ppm. Reported values for benzene in groundwater samples taken from piezometers within 6 ft of the tank were found to exceed the TDHE action level of 5 μg/L in all instances (Rohwer, 1987).

No radiological analyses of WAG 17 soils or groundwater have been performed. An aerial radiological survey conducted in 1987 which did not detect any elevated levels of radioactivity (Fritzsche, 1987) reinforces qualitative data which indicate that WAG 17 does not have significant potential as a source of radionuclide contamination. However, some radiological soil and/or shallow

groundwater contamination may exist in proximity to SWMU 17.2c and/or other SWMUs and additional areas of concern.

Existing data relating to surface water and sediment contamination are derived from a single set of surface water/sediment samples taken at a monitoring station within the WAG 17 drainage area. Gravels at this station were found to contain some of the highest cadmium values observed during the preliminary survey for the RFA (Boegly and Moore, 1988). The gravels also contained above-background levels of chromium, copper, and zinc. Both mud and gravel samples were found to contain above-background concentrations of 11 SVOCs. Surface water and gravels were also analyzed for radionuclides, which were at background levels in both media, with the exception of one gravel sample, which had an elevated cesium-137 concentration.

To assess the environmental affect of releases from WAG 17 SWMUs and additional areas of concern and to separate affects resulting from SWMUs from those resulting from underground storage tanks, additional data pertaining to the nature of contaminants, the extent of contamination, transport mechanisms, and migration pathways will need to be collected. The development of WAG 17 risk assessment scenarios, as discussed in Section 4.0, requires information on the extent and location of critical contaminants. Additional data are needed from many of the SWMUs and additional areas of concern before a more definitive assessment of overall risk can be developed. Additional data are also needed to support evaluation of remedial action alternatives for WAG 17.

II. Source Information

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
4th Floor, L & C Tower
401 Church Street
Nashville, Tennessee 37243-1541

January 23, 1997

CERTIFIED MAIL Z 061 039 137
RETURN RECEIPT REQUIRED

Mr. J. H. Swanks, Associate Director
Operations, Environment, Safety, and Health
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, Tennessee 37831-6260

RE: Case Closure
Oak Ridge National Laboratory Site 7069B, E, and F
Facility ID #0-730089, Roane County

Dear Mr. Swanks:

The Division of Underground Storage Tanks has reviewed the Monitoring Well Abandonment Report dated December 27, 1996 for the above referenced facility. Based on the information available, this case is considered closed. However, the Division reserves the right to require additional action if necessary.

If you have any questions concerning this correspondence, call (615)532-0979.

Sincerely,

Deborah J. Mann
Division of Underground Storage Tanks

c: Jack Wheat, TDEC/DOE-O
Ernest Ryan, ORNL
Knoxville UST Field Office

fo-010f

TOTAL P.05

OAK RIDGE NATIONAL LABORATORY
MANAGED BY LOCKHEED MARTIN ENERGY RESEARCH CORPORATION
FOR THE U.S. DEPARTMENT OF ENERGY

POST OFFICE BOX 2008
OAK RIDGE, TN 37831-6260

PHONE: (423)574-8447
FAX: (423)574-8225
INTERNET: jqs@ornl.gov

December 27, 1996

Ms. Deborah J. Mann
Division of Underground Storage Tanks
Technical Review Section
Tennessee Department of Environment and Conservation
401 Church Street, 4th Floor, L & C Tower
Nashville, Tennessee 37243-1541

Dear Ms. Mann:

Monitoring Well Abandonment Report for the Underground Storage Tank (UST) 7069 Site, Oak Ridge National Laboratory (ORNL), Facility Identification Number 0-730089, Roane County

Reference: Letter, Deborah J. Mann to J. H. Swanks, "Petition for a Site-Specific-Standard Request, Oak Ridge National Laboratory Site 2026, Facility ID 0-730089, Roane Co.," Certified Mail Z 061 037 983, November 27, 1996.

As directed in the above-referenced letter, the groundwater monitoring wells at the UST 7069 site were plugged and abandoned on December 18, 1996, in accordance with Section II.N. of the Environmental Assessment Guidelines.

If you have questions or comments, please contact E. L. Ryan at (423) 576-1409 or C. E. Mulkey at (423) 574-2923.

Sincerely,

J. H. Swanks, Associate Director
Operations, Environment, Safety, and Health

JHS:ELR:vmm

c: W. M. Belvin, DOE-ORO
T. M. Bonine
J. M. Brown
P. Chambers, TDEC/DUST
D. W. Frazier
J. D. Harless, TDEC/DOE-O
C. Head, TDEC/DUST
R. O. Hultgren, DOE-ORO
E. H. Krieg
R. C. Mason
J. A. Mayo, Jr.
C. E. Mulkey
J. B. Murphy
E. L. Ryan
R. C. Stewart
A. W. Trivelpiece - RC
J. D. Wheat, TDEC/DOE-O

Table 1. Scheduled shutdown facilities

Krypton-85 Enrichment Facility	Building 3026-C
Metal Segmenting Facility	Building 3026-D
Alpha Powder Facility	Building 3028
Source Development Laboratory	Building 3029
Radioisotope Production Laboratory—C	Building 3030
Radioisotope Production Laboratory—D	Building 3031
Radioisotope Production Laboratory—H	Building 3118
Radioactive Gas Processing Facility	Building 3033
Radioactive Production Laboratory Annex	Building 3033-A
Alpha Handling Facility	Building 3038-AHF
Radioisotope Packaging and Shipping Facility	Building 3038-M
Isotope Materials Laboratory	Building 3038-E
Isotope Technology Building	Building 3047
Fission Products Development Laboratory	Building 3517
Tritium Target Preparation Facility	Building 7025
Radioisotopes Production Laboratory—E	Building 3032
Radioisotopes Area Services	Building 3034
*Storage Cubicle	Building 3093
*Storage Pad	Building 3099

* Ancillary Facility

IPPD

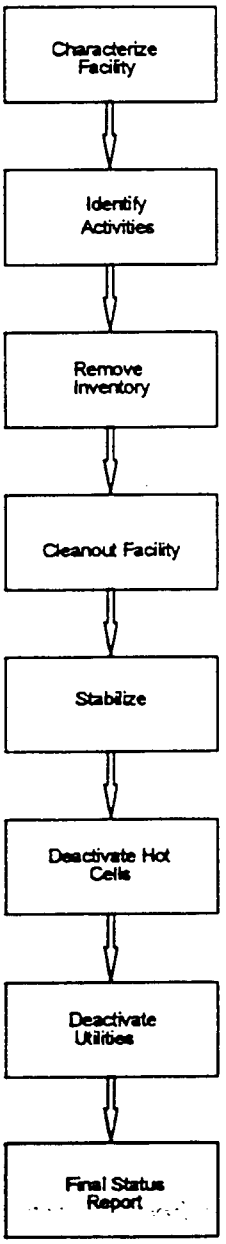

Fig. 1. Deactivation process for surplus facilities.

IFPD

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 ^3H system. The ^3H 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.

2.3.1.4 Piping, utility, and alarm deactivation

All water, air, steam (if practical), and gas piping will be disconnected at the supply header coming to the facility. All lines will be drained. All electrical service not essential to the basic S&M requirements of the deactivated facility will be disconnected at the main breaker box. All radiation protection (RP) instruments and alarms will be removed.

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.

IPPD

Table 3. Isotopes Facilities Deactivation Project Milestones

Building 3026-C Deactivation Complete	10/01/98
Building 3026-D Deactivation Complete	07/0799
Building 3028 Deactivation Complete	01/30/96
Building 3029 Deactivation Complete	08/06/96
Building 3033-A Deactivation Complete	09/29/95
Building 3031 Deactivation Complete	11/14/95
Building 3034 Deactivation Complete	03/04/96
Building 3118 Deactivation Complete	03/19/96
Building 3033 Deactivation Complete	06/24/96
Building 3030 Deactivation Complete	07/17/96
Building 3032 Deactivation Complete	02/14/97
Building 3038-M Deactivation Complete	01/08/97
Building 3038-E Deactivation Complete	02/19/97
Building 3038-AHF Deactivation Complete	04/23/97
Building 3047 Deactivation Complete	10/16/98
Building 3517 Deactivation Complete	06/14/99
Building 7025 Deactivation Complete	07/18/96

A.2.13 BUILDING 7025—TRITIUM TARGET FABRICATION

A.2.13.1. Description

Building 7025 is located about 1.4 miles northeast of the central ORNL site. It is within the perimeter fence of the ORNL 7000 area but isolated from other buildings.
The structure is a prefabricated, metal-sided building with a total floor area of 590 ft^2 and a total free space volume of approximately 6000 ft^3.

The building was used for fabricating titanium tritide targets, for preparing metallurgical samples for helium embrittlement studies by diffusing tritium into the samples and allowing it to decay to helium, and for preparing thin films of ThO_2/UO_2 by vacuum evaporation. No aqueous wastes were generated by these processes.

The building layout is shown in Fig. A.18. The tritium equipment is housed in a 26-ft-long stainless steel hood which is exhausted by a 2000-ft^3/min fan. The tritium hood exhaust is not filtered because there are no solid radioactive species to be filtered. A high-vacuum evaporator system was used in the building for the preparation of uranium and thorium targets. The vacuum evaporator was operated in a HEPA-filtered hood for contamination control. Bench-top quantities were handled.

A forced-air exhaust system that runs continuously is located at the rear of the building. A forced-air input system for heating and cooling is located on the opposite side of the building. The two systems maintain a continuous, high-volume air flow through the building, preventing the buildup of any concentration of tritium gas in the occupied areas of the building in the event of any leakage or spill.

A.2.13.2 History

Building 7025, which is a Tennessee Valley Authority surplus building, was installed in the late 1960s to house a tritium target fabrication system. It was programmatically funded into the early 1980s by the Lawrence Livermore National Laboratory (LLNL) to produce titanium tritide accelerator targets for the Rotating Target Neutron Source facilities at LLNL. Since that time, tritium targets have been prepared for customers on a custom-order basis through the Isotopes Distribution Office. The tritium system has also been used to prepare metallurgical samples for helium embrittlement studies related to fusion energy materials research. Samples were prepared, primarily for ORNL's Metals and Ceramics Division, by diffusing ^3H into metallurgical samples and allowing it to decay to helium. After the desired helium loading was achieved, the remaining ^3H was removed from the samples. This process, known as the tritium trick process, was last performed for two groups of researchers in Germany and California during the fall of 1989.

As a result of overcrowding in Building 3550, the ThO_2/UO_2 evaporator was moved to Building 7025 in the late 1970s and has been used to prepare hundreds of oxide thin films for a variety of customers around the world.

Table A.16. Building 7025—general status of facility

Facility/area	Comments
Building	
Type	Prefabricated metal.
Roof and exterior walls	Fair condition.
Building ventilation	Forced-air exhaust system that runs continuously; local stack at rear of building; forced air input system for heating and cooling is located on opposite side of building and operates continuously as a backup for ventilation (at reduced flow) in the event the exhaust fan should fail.
	HEPA filter on alpha hood. No filter on tritium hood because no solid radioactive particulates that could be filtered were handled (i.e., only gases).
Liquid waste systems	No liquid wastes generated by process. Lavatory sink bottled for disposal. Sanitary facilities at the 7000 Area.
	Hot drain in east end of tritium hood. Drains to underground tank (inactive) outside. The tank has been emptied.
Monitoring	Stack monitor for tritium operated by ORNL Environmental Monitoring Group. Smoke detectors monitored by ORNL fire department. No sprinkler system.
Hoods	
Tritium hood	The equipment and hood are highly contaminated with tritium. There will be a residual release of tritium, as the tritium imbedded in the equipment slowly diffuses from the metal.
Alpha hood	Contaminated with uranium and thorium; HEPA filter on hood.
Stored Materials	None

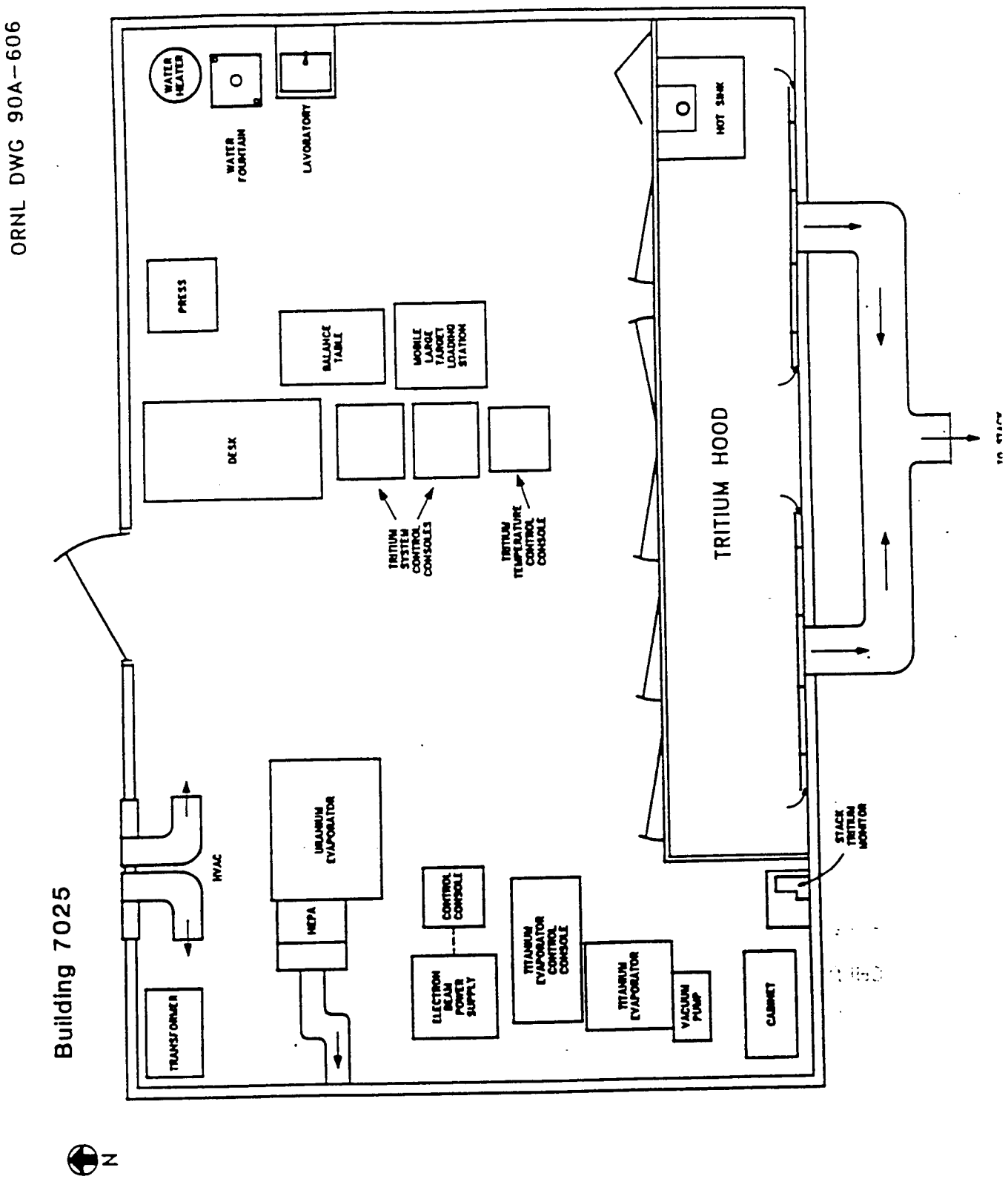

Fig. A.18. Floor plan of Building 7025—Tritium Rarget Fabrication.

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Since the TTFF is an active, operational facility, on-site tritium concentrations (i.e., atmospheric, soil, soil water) are subject to significant fluctuations. Therefore, the survey data presented in this report represent a "snapshot" assessment on the date of the survey.

THORIUM STORAGE FACILITY (7019)

History of the Site

The Thorium Storage Facility (7019) was constructed in the early 1960s[10] for storage of normal uranium, depleted uranium, ^{6}Li, ^{232}Th, and other source materials with exposure rates less than 10 mR/h.[11] The facility retains its original name although all stored nuclear materials were removed from the building in August 1984.[11] Currently, the building contains shipping containers for radioactive material and equipment, such as a drum handler and a hydraulic lift, to move the containers. The building also houses discarded security cabinets, radioisotope vaults, filing cabinets, and other former storage containers that no longer meet General Services Administration (GSA) approval standards for classified material storage.[11]

The building has metal sides and a steel frame and sits on a concrete slab (Fig. 5). Gross floor area is about 89 m^2 (960 ft^2).[12] The building was never environmentally controlled. Around 1980, the bottom of a storage drum rotted and contamination spilled in a small spot on the concrete floor. After cleanup, the area was painted to cover residual contamination.[11] Elevated exposure rates are still evident at this spot.

The building is surrounded by a fence with a locked gate; the entrance door to the building is also locked. Keys controlled by Laboratory Protection Division personnel and Plant and Equipment Division personnel strictly limit access to the area.[11]

Ten dry storage wells (Fig. 6) east of the Thorium Storage Facility were constructed in the mid-1960s to provide safe storage for zirconium sponge belonging to the Y-12 plant. The porous zirconium was a potential explosive if it got wet or overheated. At that time, wells were sometimes used as a means of minimizing the danger of storing explosives, since presumably, the explosion could only go up and would cause less horizontal damage. Later, the wells were also used to store thorium. The wells were taken out of service in the mid-1970s.[10]

The cylindrical wells are about 0.9 m (3 ft) in diameter by 3 m (10 ft) deep with heavy-gage, corrugated culvert metal on the outside and an inner metal lining. They are covered with heavy metal lids (Fig. 7). Some of these lids are fastened with security seals and others can be opened. The wells are outside the locked fence that surrounds the Thorium Storage Facility.

Discussion of Survey Results

Outdoor surface gamma exposure rate measurements at the Thorium Storage Facility site are shown in Fig. 8. With the exception of one contaminated "hot" spot, surface gamma levels are representative of typical background values ranging from 6 to 12 $\mu R/h$. The highest outdoor gamma level (400 $\mu R/h$) was identified at a small spot (<1 m^2) on the ground at a metal fence post ~35 ft east of Building 7019.

ORNL-PHOTO 4608-89

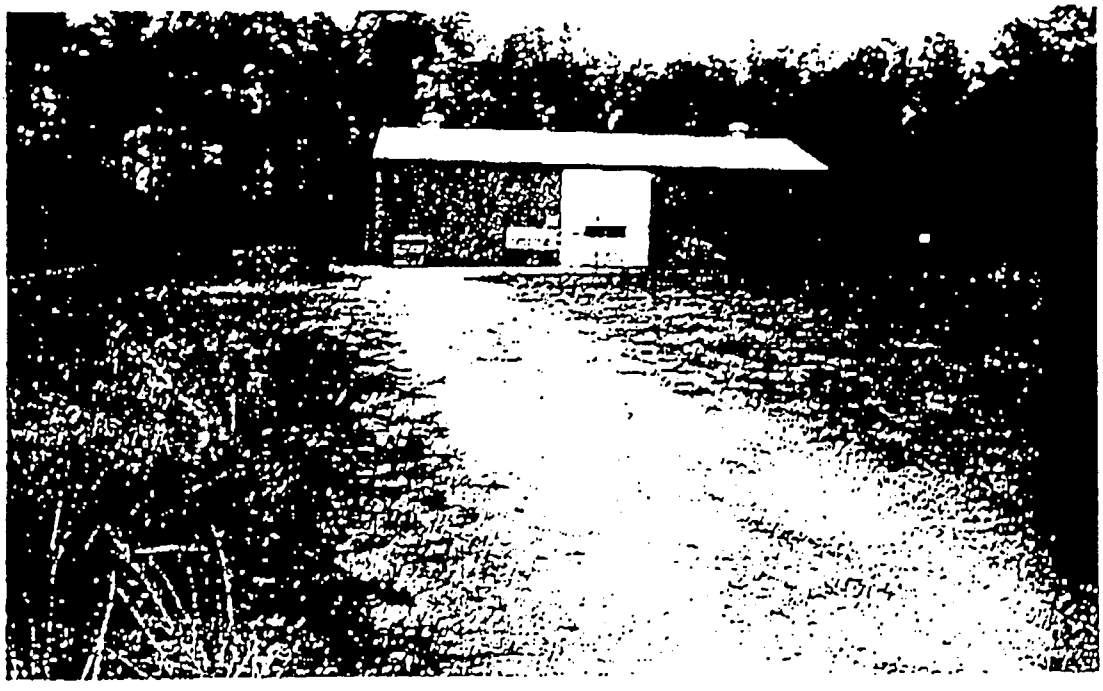


Fig. 5. View looking east at the Thorium Storage Facility (7019) site (September 1989).

ORNL-PHOTO 3039-89

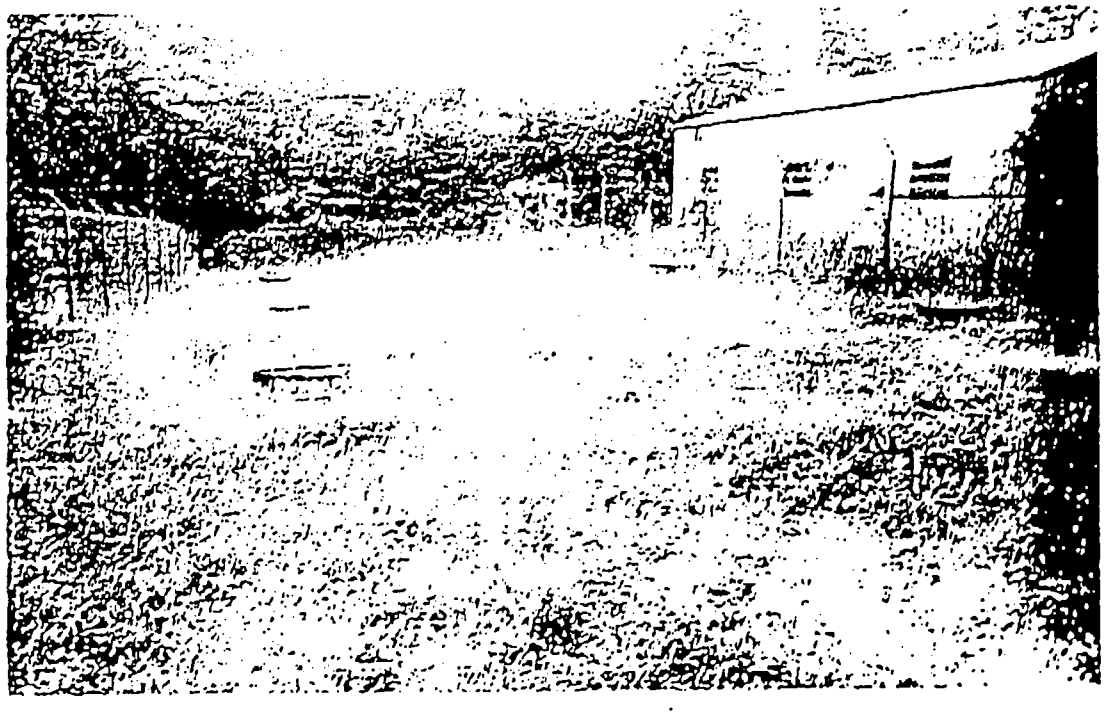


Fig. 6. Dry storage wells at the Thorium Storage Facility site (September 1989).

ORNL-PHOTO 3040-89

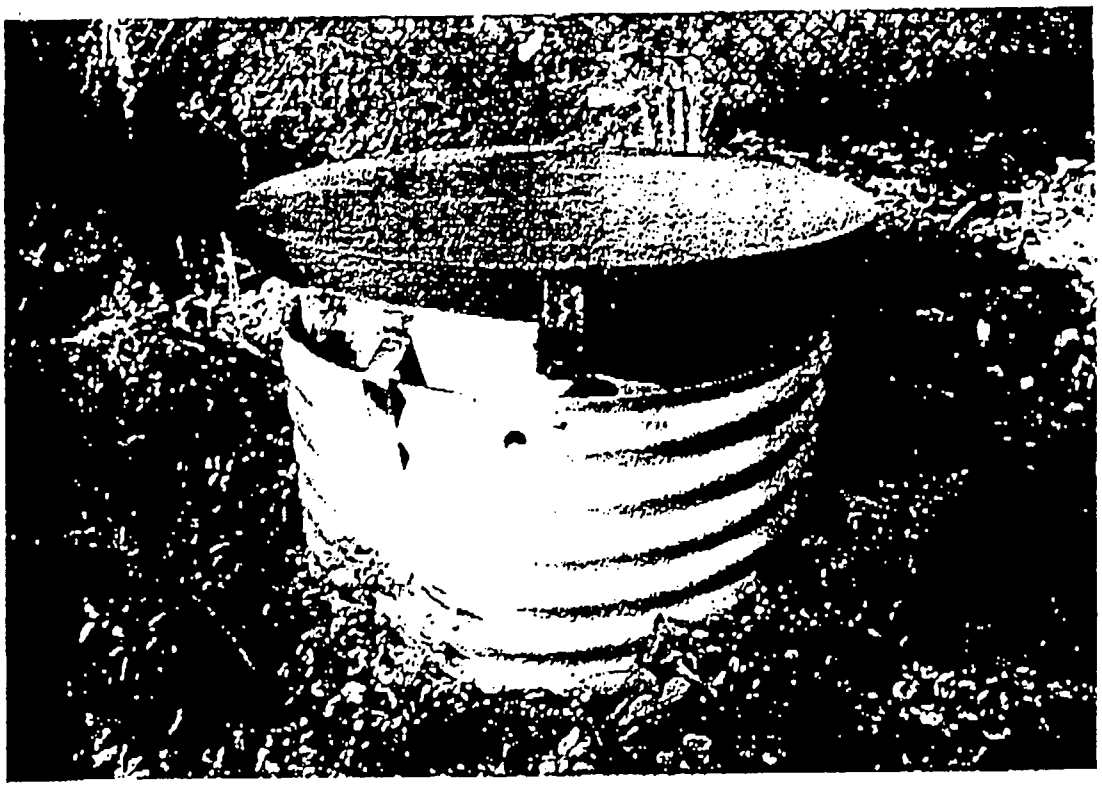


Fig. 7. A dry storage well at the Thorium Storage Facility site (September 1989).

Results of radionuclide analysis of two soil samples taken at the spot show ^{232}Th concentrations of 950 and 390 pCi/g in surface (0-15 cm) and subsurface (15-30 cm) samples, respectively (see Table 3). This residual contamination may be the result of improper disposal of rinsate used in the decontamination process of a previously reported ^{232}Th spill in Building 7019. If DOE "hot spot" guidelines[13] were applicable for this site, the maximum surface ^{232}Th concentration (950 pCi/g) would exceed the guideline value (50 pCi/g) for "hot spots" <1 m^2 by a factor of 19.

Gamma exposure rate measurements taken inside each well ranged from 4 to 10 $\mu R/h$ (see Table 4). Smears were also obtained from selected locations inside the wells and analyzed for removable alpha and/or beta-gamma contamination. In general, the wells were found to be free of significant alpha contamination. Only one well was found to have removable beta-gamma activity levels in excess of the ORNL health physics guideline limit of 1000 dpm/100 cm^2 for establishing a Contamination Area. Analysis of smears disclosed transferable beta-gamma activities of 1200 dpm/100 cm^2 in Storage Well 5.

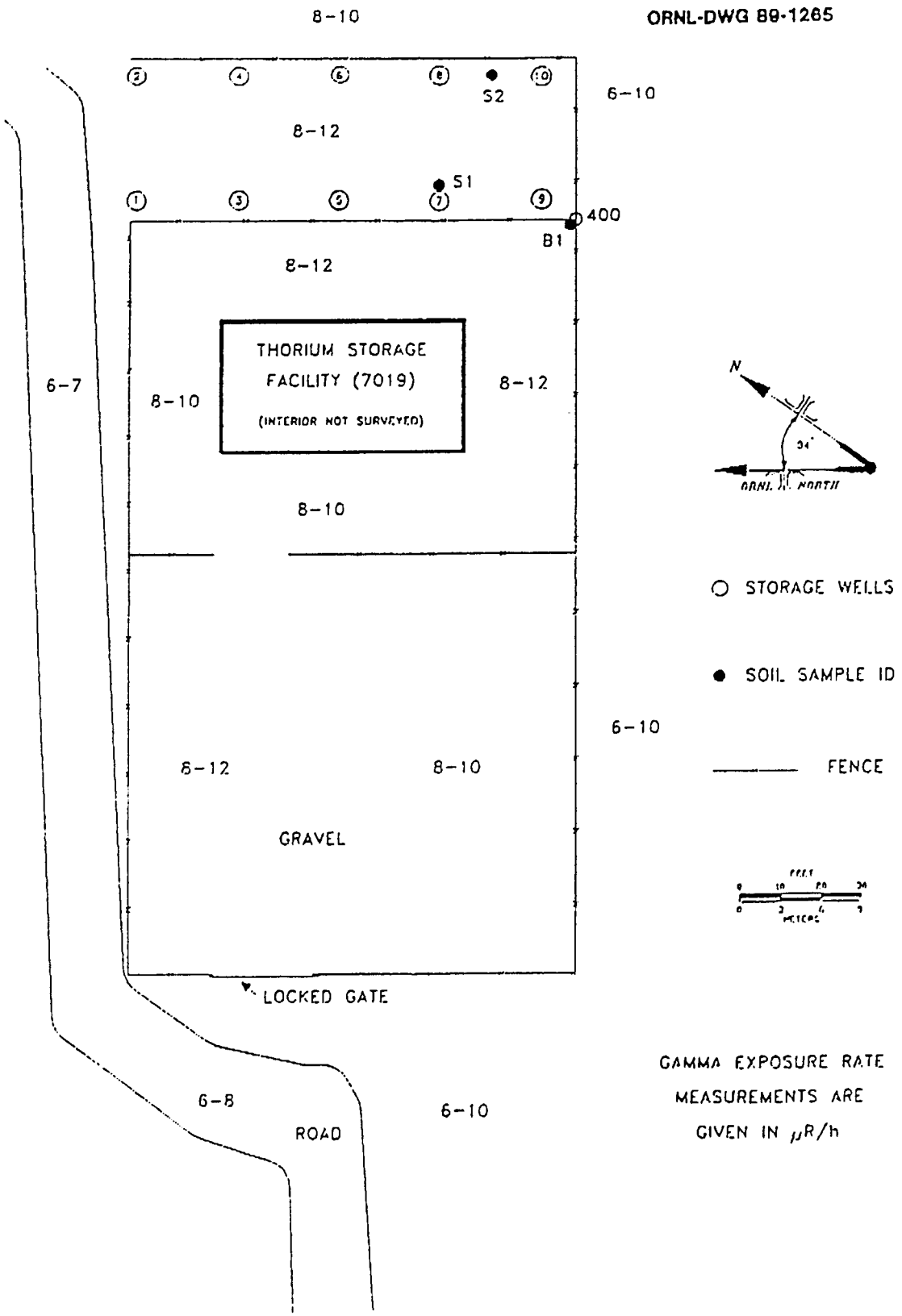


Fig. 8. Diagram showing results of outdoor gamma exposure rate measurements and locations of soil samples taken at the Thorium Storage Facility site. The dry storage wells located east of Building 7019 are numbered 1 to 10.

10. Determine the hydrology of the site and the surrounding area.

The 7000 area lies in the Bethel Valley sub-basin of the upper White Oak Creek (WOC) watershed. Surface water runoff from this area flows predominantly westward into an unnamed tributary to WOC (Figure 8). The confluence of this tributary with WOC occurs approximately one mile upstream of the ORNL Main Plant Area. The 7000 Area is approximately 50 percent impervious due to parking lots, roads, and buildings (Figure 8). A network of storm sewers carries runoff from these impervious areas to WOC, discharging at the four National Pollutant Discharge Elimination System (NPDES) shown on Figure 8. The NPDES station D4 captures the runoff from the impervious area at the UST 7069 Site. The following water budget for the 7000 Area was estimated by Bogely and Moore, as reported in *Environmental Data Package for the ORNL Service Area (WAG 17)*, in 1988:

Inflow

- Mean annual precipitation = 52 inches/year

Outflow

- Stream flow = 34 inches/year
  (overland flow via storm sewers = 28 inches/year)
  (base flow via aquifer discharge = 6 inches/year)
- Evapotranspiration = 18 inches/year
- Total outflow = 52 inches/year

The UST 7069 Site makes up about two percent of the total surface area in the 7000 Area and is also approximately 50 percent impervious. Therefore, the large impervious areas (e.g., pavement and buildings) and the presence of low permeability clay overburden at the site serve to minimize infiltration. Because of this, the runoff rate at the site is relatively high as indicated above. The surface runoff from the site drains into the WOC. As a result of the high runoff rate, the potential for large fluctuations in the groundwater level from the wet to dry seasons of the year is reduced. Groundwater level measurements were recorded for January 1993 (high groundwater table) and August 1993 (low groundwater) at the UST 7069 Site. The fluctuation observed between these two measurements was only 0.1 in most wells with up to 1.1 feet in other wells.

Investigations have determined that groundwater is not encountered until just above the bedrock surface. Groundwater flow occurs at the soil/bedrock interface and within the bedrock. Surface water has little influence on the groundwater due to the high surface runoff rate.

11. Determine the proximity, quality, and current and projected future uses of surface waters in the vicinity of the petroleum site.

The three nearest down gradient surface water bodies are WOC, White Oak Lake, and the Clinch River (previously depicted in Figure 4). Runoff from the site flows into White

Oak Creek approximately one quarter mile from the site. WOC flows southwestward for approximately 2.5 miles until it empties into White Oak Lake.

The waters of WOC and White Oak Lake are not used for human consumption or other activities due to the poor water quality created by industrial and research activities conducted at the site. Future human use of the waters is not anticipated. The White Oak Lake flows into the Clinch River at approximately river mile 21. This is located about 3.5 miles from the UST 7069 Site. The waters of the Clinch River are used for recreation. In addition, the United States Geologic Survey 7.5 minute Topographic Quadrangle for Elverton, Tennessee, shows a pumping station at approximately river mile 14.5. As a result, the nearest surface water consumptive user is located approximately 10 miles downstream of the UST 7069 Site. No other surface water uses are anticipated in the future.

There are two mechanisms for the transport of soil contaminants from the UST 7069 Site: 1) transport by surface runoff and 2) transport by groundwater. As discussed in the response to Question 14, neither of these mechanisms are probable. Therefore, surface water quality will not be impacted from the UST 7069 Site should a site-specific standard be granted.

14. Perform an Exposure Assessment to determine the effect of the petroleum contamination on all potential receptors (e.g., humans, aquatic species, animals, and plants).

The purpose of an exposure assessment is to identify the pathways by which human and ecological receptors may be exposed to contaminants and then quantify the potential exposures resulting, both currently and in the future. The format of an exposure assessment consists of the characterization of the exposure setting, identification of exposure pathways, and quantification of actual or potential exposures. Characterization of the exposure setting has been provided in previous responses to Questions 1 through 13.

An exposure pathway consists of a source of contaminants, an environmental medium through which the contaminants may reasonably travel to the receptor, and a point of contact at which the receptor may come in contact with the contaminants. In order for a pathway to be considered complete, each of these components must be present.

A source of contamination has been demonstrated. This source consists of petroleum hydrocarbons present in the soil and groundwater at the UST 7069 Site. The following paragraphs examine each of the potential exposure pathways in detail. This is an industrial area,

therefore, most of the area is paved or covered with buildings. No impact on flora or fauna is expected at the site.

Therefore, primary exposure pathways for a human receptor include direct contact, air transport, groundwater transport, and surface water transport as described below.

Direct Contact

The contaminated soil at the 7069E/7069F Site is capped by approximately eight inches of concrete, eight inches of gravel, and two and one-half feet of low permeability clay. The contaminated soil at the 7069B Site is capped with six feet of low permeability soil and gravel backfill. This eliminates the possibility of casual contact with contaminated soil. The only scenario under which direct contact would be made with the contamination would be that of workers performing excavation activities which penetrate the area of contamination.

ORNL has instituted a program in which an Excavation/Penetration Permit must be obtained before excavation of any type can be conducted. This permit must be obtained through the Energy Systems Engineering Department and must be approved by several key people before excavation may begin. Through this permitting procedure, any person allowed to excavate at the site would be warned of the contamination and required to wear the appropriate personal protective equipment.

Air Transport

Two potential air transport pathways exist: 1) the emission of fugitive dust particles which are contaminated with hydrocarbons, and 2) the volatilization of contaminants directly into the atmosphere. The emission of fugitive dust particles is not possible in this instance since the contaminated soil is covered by approximately eight inches of concrete, eight inches of gravel and two and one-half feet of low permeability clay at the 7069E/7069F Site and six feet of low permeability soil and gravel backfill at the 7069B Site.

Volatilization of the contaminants is not considered viable for two main reasons. First, the contamination is covered with several feet of low permeability soil material and several inches of concrete at temperatures of approximately 55°F, thereby impeding the vapor from volatilizing to the surface. Second, as can be seen in the soil analytical data (previously depicted in Table 2), xylene concentrations are two orders of magnitude greater than benzene concentrations which would indicate that the contamination is not very recent. The difference in concentrations of benzene and xylene in gasoline ranges anywhere from zero to one order of magnitude. In the only area where BTX contamination above the proposed cleanup level was found, the concentration of xylene is two orders of magnitude greater than that of benzene. Since benzene is much more volatile than xylene, benzene would volatilize more quickly. This indicates that the contamination has been in place for several years. Due to the age of the contamination most of the contaminants that are going to volatilize have already done so and what is left should stay in place.

Groundwater Transport

Two potential pathways exist within groundwater transport; the movement of contamination via groundwater transport to a point of outcrop into surface waters, and the direct use of contaminated groundwater for potable water. As previously stated, the contamination of the surface water is such that the groundwater would have no additional adverse impact on it. Furthermore, the TPH and benzene concentration in the groundwater would be below the TDEC TPH clean-up level standards before it reached the Clinch River. Also as discussed in the response to Question 2, the nearest well is located over three miles away. By the time contaminated groundwater could reach this point, TPH concentrations would be well below detection limits. For further discussion see the response to Question 18.

Also, WOC is extensively monitored under the Biological Monitoring and Abatement Program (BMAP), which is required by the NPDES permit. The BMAP has been ongoing since 1986.

Surface Water Transport

Two possible avenues of contaminated soil contributing to surface water contamination are the outcropping of contaminated groundwater into surface water, and the direct contamination of overland flow by contaminated soil. Neither of these two avenues are possible at this site. As previously discussed, groundwater contamination would have no additional adverse effect on surface water. In addition, the depth of the contaminated material below the ground surface eliminates the possibility of direct contact of contaminated soil with surface water runoff.

Evaluation Summary

Based on the preceding analyses, complete pathways of exposure are highly unlikely at this site. Each of the primary exposure pathways has been shown to be lacking at least one of the necessary components. Therefore, no exposure of human or ecological receptors are expected now or in the future.

15. Determine the potential for petroleum vapors entering a building if the petroleum contamination was not remediated to the appropriate clean-up levels in the regulations.

The potential for petroleum vapors entering a building is relatively low. The two scenarios that exist for vapors entering a building are the migration of vapors from the soil or from the groundwater. These scenarios are unlikely because of the depth of the contamination below concrete and low permeability soil and the fact that there are no basements in the buildings to come in direct contact with the contaminated soil. Also, the low temperatures below the subsurface and age of the spill will inhibit the volatilization of the contaminants.

TABLE 3-3

INVENTORIES OF RADIONUCLIDE CONSTITUENTS IN WAG 17 SWMUs
AND ADDITIONAL AREAS OF CONCERN

Area	Major Radionuclides	Inventory (Ci)	Waste Form[a]	As Specified Volume (gal)
SWMUs				
SWMU 17.1	Unknown	Unknown	Liquid, Sludge	39,000[c]
SWMU 17.2a	None Suspected	NA	Liquid	2,500[c]
SWMU 17.2b	Unknown	Unknown	Liquid	Empty[d]
SWMU 17.2c	Tritium[b]	Unknown	Liquid	4,200[c]
SWMU 17.2d	Unknown	Unknown	Liquid	480[c]
SWMU 17.3	Unknown	Unknown	Liquid	Empty[b]
SWMU 17.4a	None Suspected	NA	Liquid	Empty[b]
SWMU 17.4b	None Suspected	NA	Liquid	Empty[b]
Additional Areas of Concern				
17AA101	None Suspected	NA	Liquid, Metal Shavings	4,000[c]
17AA102a	None Suspected	NA	Liquid	8,500[c]
17AA102b	None Suspected	NA	Liquid	10,000[c]
17AA102c	None Suspected	NA	Liquid	4,000[c]
17AA102d	None Suspected	NA	Liquid	Empty[d]
17AA102e	None Suspected	NA	Liquid	15,000[a]
17AA102f	Unknown	Unknown	Liquid	Unknown
17AA103	Unknown	Unknown	Liquid, Metal Shavings	Unknown
17AA104a	None Suspected	NA	Liquid	Unknown
17AA104b	None Suspected	NA	Liquid	Unknown
17AA105	None Suspected	NA	Liquid	Unknown
17AA106	Unknown	Unknown	Liquid, Sludge	Unknown

(a) Waste form contained in SWMU or additional area of concern.
(b) ORNL (1987a).
(c) Maximum capacity. Source: Boegly and Moore (1988).
(d) Reported to be empty. Source: Boegly and Moore (1988).

NA = Not Applicable

TABLE 3-4

INVENTORIES OF CHEMICAL CONSTITUENTS IN WAG 17 SWMUS
AND ADDITIONAL AREAS OF CONCERN

Area	Major Radionuclides	Inventory (Kg)	Waste Form[a]	As Specified Volume (gal)
SWMUs				
SWMU 17.1	Sulfates, nitrates, phosphates, ammonia	Unknown	Liquid, Sludge	39,000[c]
SWMU 17.2a	Petroleum Hydrocarbons	Unknown	Liquid	2,500[c]
SWMU 17.2b	Petroleum Hydrocarbons, PCBs	Unknown	Liquid	Empty[d]
SWMU 17.2c	Petroleum Hydrocarbons	Unknown	Liquid	4,200[c]
SWMU 17.2d	Petroleum Hydrocarbons	Unknown	Liquid	480[c]
SWMU 17.3	Petroleum Hydrocarbons, PCBs	Unknown	Liquid	Empty[d]
SWMU 17.4a	Ag, NaOH, Sodium Hydrosulfite, Sulfuric Acid[b]	Unknown	Liquid	Empty[d]
SWMU 17.4b	Ag, NaOH, Sodium Hydrosulfite, Sulfuric Acid[b]	Unknown	Liquid	Empty[d]
Additional Areas of Concern				
17AA101	Petroleum Hydrocarbons, Various SVOCs, VOCs	Unknown	Liquid, Metal Shavings	4,000[c]
17AA102a	Petroleum Hydrocarbons, BTX, Various SVOCs, VOCs	Unknown	Liquid	8,500[c]
17AA102b	Petroleum Hydrocarbons, BTX, Various SVOCs, VOCs	Unknown	Liquid	10,000[c]
17AA102c	Petroleum Hydrocarbons, BTX, Various SVOCs, VOCs	Unknown	Liquid	4,000[c]
17AA102d	Petroleum Hydrocarbons, BTX, Various SVOCs, VOCs	Unknown	Liquid	Empty[e]
17AA102e	Petroleum Hydrocarbons, BTX, Various SVOCs, VOCs	Unknown	Liquid	15,000[f]
17AA102f	Petroleum Hydrocarbons, Various SVOCs, VOCs	Unknown	Liquid	Unknown
17AA103	Petroleum Hydrocarbons, Various SVOCs, VOCs	Unknown	Liquid, Metal Shavings	Unknown
17AA104a	Petroleum Hydrocarbons, Various SVOCs, VOCs	Unknown	Liquid	Unknown

TABLE 3-4 (continued)

Area	Major Radionuclides	Inventory (Kg)	Waste Form[a]	As Specified Volume (gal)
Additional Areas of Concern (cont'd)				
17AA104b	Petroleum Hydrocarbons, PCBs, Various SVOCs, VOCs	Unknown	Liquid	Unknown
17AA105	Petroleum Hydrocarbons, PCBs, Various SVOCs, VOCs	Unknown	Liquid	Unknown
17AA106	Petroleum Hydrocarbons, Various SVOCs, VOCs	Unknown	Liquid, Sludge	Unknown

(a) Waste form contained in SWMU/Additional Area of Concern.
(b) Source: Edgemon (1988).
(c) Maximum capacity; Source: Boegly and Moore (1988).
(d) Source: ORNL (1987a).
(e) Reported to be empty. Source: Boegly and Moore (1988).
(f) Source: Weaver (1988).

3.2.2 Waste Oil Storage Tanks (SWMUs 17.2a-d)

3.2.2.1 Waste Oil Storage Tank 7002W (SWMU 17.2a). Waste Oil Storage Tank 7002W is a 2500-gal, aboveground horizontal steel tank. It is located adjacent to the west wall of Building 7002 (approximate ORNL coordinates N21800, E36600), as shown in Figure 3-8. Since its installation in 1984, the tank has been used to contain waste oil from vehicle and heavy equipment maintenance. The oil is periodically taken off-site by a vendor and incinerated (Weaver, 1988).

Waste oil from various ORNL locations is transported to the tank in 55-gal drums and other smaller containers. These containers are temporarily held on the pavement in front of the tank while awaiting testing for the presence of polychlorinated biphenols (PCBs) and other chlorinated hydrocarbons. After testing negative, the contents of the drums are transferred to the tank (Weaver, 1988). During a recent site visit by the BNI Team (BNI, 1988c), several 55-gal drums assumed to contain waste oil were observed on the pavement just outside the tank. Leaks or spills from these drums were evident, and absorbent material had been placed around them.

The tank has a diameter of 5.3 ft and is 15 ft long. Secondary containment is provided by a poured concrete slab with a 3-ft high concrete block wall, which is stuccoed and painted on the inside. The containment dike contains no drain and has no protective cover. Rainwater and other materials that accumulate are allowed to evaporate or are removed on an as-needed basis by maintenance personnel (Edgemon, 1988). The containment dike was recently hydro-tested for leaks by being filled with water to 60 percent capacity overnight. No leaks were observed (Sluder, 1988).

The tank and containment dike are surrounded by an asphalt paved parking lot, and any materials released would be expected to drain to a stormwater catch basin located about 25 ft west of Building 7002.

2.4.2 No Further Investigation Site Surveys

Many of the NFI candidate sites located throughout the ORR are areas of past ecological research that employed a variety of radionuclides. Some of the radionuclides used in these experiments had short half-lives and have since decayed. It is possible, however, for longer-lived radionuclides to remain as residual material at some of the locations. There is a compelling need to determine the current baseline radiological status of each of these sites. As a result of this need, ten NFI sites were surveyed for radiological contamination in FY 1995. The various site identification numbers and descriptions are as follows:

- Waste Oil Storage Tank 7002W (FFA 17.02). No evidence of radioactive contamination was discovered on the site, although two spots with elevated gamma exposure rates were identified at the periphery of the site;
- ^{197}Hg Tagged Stream (FFA ER.05). An investigation indicated that there is no radiological contamination above background levels in the area where the study was conducted;
- ^{203}Hg Tagged Stream (FFA ER.09). An investigation identified no areas of elevated radiation levels;
- ^{14}C Maintenance-Respiration Study (FFA ER.29). An investigation identified no areas of elevated gamma or beta-gamma radiation levels;
- ^{14}C Sucrose Inoculation of Oak & Pine Trees (FFA ER.30). An investigation identified no areas of elevated beta-gamma radiation levels were detected and two regions were identified with elevated gamma exposure rates in an area south of the study area;
- ^{14}C Allocation in White Oak Trees (FFA ER.31). An investigation identified no detectable residual ^{14}C at the site;
- ^{14}C Allocation in White Pine Trees (FFA ER.32). An investigation identified no areas of elevated gamma or beta-gamma radiation levels;
- ^{14}C Efflux in Yellow Poplar Stand (FFA ER.33). An investigation identified no areas of elevated gamma radiation levels; and
- ^{14}C Allocation in Woody Biomass Plantation Species (FFA ER.34). An investigation within the boundaries of the plantation were found to be within the usual background range with the exception of a small region located along the southeastern portion of the plantation where slightly elevated gamma exposure rates were detected. Further investigation has identified a larger area of contamination to the east of the plantation area. The Office of Radiation Protection was notified, and the area was identified as a contamination area.

2.4.3 Radiological Survey Results Data Management

During FY 1995, an effort was initiated to transfer the information that has been generated during radiological surveys throughout the last nine years into MapInfo, and ultimately distributed through the Shared Data Initiative. This data consists of gamma exposure rate measurements at various locations on the ORR. It includes the physical location and the isotope(s) exposure rate at each location.

ASR SHM

3.2.5.6 Vehicle Cleaning Facility 7002 (17AA106). The Vehicle Cleaning Facility is located inside Building 7002 and consists paved area sloping to a grated sump. An oil-water separator i. located in the sump. The separator is connected to a second separator located at the southwest corner of Building 7060. Vel wash water passes through these separators and into the storm drainage system, eventually discharging to the WAG 17 Tributary the National Pollutant Discharge Elimination System (NPDES) permitted outfall shown in Figure 3-1. The separators are clean occasionally, and the sludge is drummed for disposal (Sluder, 19

3.2.6 Inventories of Major Contaminants in WAG 17 SWMUs and Additional Areas of Concern

The different types of contaminants and the waste contents of WA SWMUs and additional areas of concern can be categorized accordi to radionuclide constituents and chemical constituents. Some SW and additional areas of concern can be listed in both categories because available data indicate the presence of both chemical anc radionuclide components.

For those facilities categorized by radionuclide constituents, th known major contaminants, inventory, waste form, and volume are presented in Table 3-3. For facilities categorized as having chemical contamination, the known TCL contaminants, inventory, wa form, and volume are presented in Table 3-4. When no contaminati was suspected, "none suspected" was entered into the appropriate column. When no information was available on the composition of waste, "unknown" was entered in the appropriate column. These tables show that for a number of facilities within WAG 17, no data are available on the specific contaminants or the concentration of these contaminants.

3.3 WAG 17 SITE DESCRIPTION AND CHARACTERIZATION

This section provides a description of the WAG 17 environmental setting (Section 3.3.1) and a discussion of pertinent environmenta

III. Data
Summary

northeast and southwest, and by remnant geologic structures in the weathered rock material above the competent rock (Baughn, 1987).

Hydraulic conductivity values have been determined for the piezometers in WAG 17 (Boegly and Moore, 1988). These values were obtained from slug tests in which a known volume of water was introduced into each piezometer and the subsequent decline in the water level was recorded with a Druck transducer. The water level data were evaluated by the Bower and Rice method for partially or completely penetrating wells (Baughn and Stanley, 1988), and resulting values for hydraulic conductivity are listed in Table 3-14.

The average hydraulic conductivity for all wells in WAG 17 is 1.28×10^{-4} cm/s, with a standard deviation of 2.33×10^{-4} cm/s. This value is in the upper range of hydraulic conductivities for limestones and is in the middle range for unconsolidated silt (Freeze and Cherry, 1979). Hydraulic conductivity values for the deep piezometers (42 to 74 ft) are three times higher than those for the shallow piezometers (11.5 to 36 ft), 2.00×10^{-4} cm/s and 7.42×10^{-5} cm/s, respectively. The difference between these values is insignificant. There is no significant difference for the values of piezometers screened in bedrock and those screened in soil or across the soil/bedrock interface, 1.29×10^{-4} cm/s and 1.25×10^{-4}, respectively.

Piezometers screened in Unit E have an average hydraulic conductivity of 1.16×10^{-4} cm/s. Those screened in Unit G have an average value of 1.53×10^{-4} cm/s, and those partially screened in Unit F have a hydraulic conductivity of 8.3×10^{-5} cm/s. The differences between the values for Units E and G are insignificant. The hydraulic conductivity value for Unit F is only slightly lower than those for Units E and G. The lower value for Unit F probably results from the predominant siltstone, which is less susceptible to dissolution than the limestone of Units E and G.

TABLE 3-14

HYDRAULIC CONDUCTIVITIES FOR PIEZOMETERS WITHIN WAG 17

Piezometer No.	Hydraulic Conductivity (cm/s)
574	2.4×10^{-5}
586	3.1×10^{-5}
609	2.3×10^{-4}
734	6.6×10^{-4}
752	1.5×10^{-6}
753	5.6×10^{-5}
754	3.6×10^{-5}
764	2.6×10^{-5}
765	4.3×10^{-5}
769	1.1×10^{-7}
794	8.0×10^{-6}
796	6.8×10^{-4}
895	5.5×10^{-6}
896	1.8×10^{-6}
897	3.5×10^{-5}
899	2.6×10^{-5}
900	4.1×10^{-5}
901	1.1×10^{-5}
902	3.3×10^{-6}
903	3.7×10^{-5}
904	7.4×10^{-4}
905	2.5×10^{-4}
906	6.5×10^{-3}

Source: Boegly and Moore (1988).

Surface Water

WAG 17 lies in the Bethel Valley sub-basin of the upper WOC watershed. Surface water runoff from WAG 17 flows predominantly westward and is borne principally by an unnamed tributary to WOC, hereinafter referred to as the WAG 17 Tributary (Figure 3-15). The confluence of the WAG 17 Tributary with WOC occurs approximately 200 ft northwest of the security fence that surrounds the WAG. The confluence of the WAG 17 Tributary with WOC is approximately 1 mi upstream of the Main Plant Area. WAG 17 is the first WAG-related drainage area which discharges to WOC, although an abandoned burn pit designated Other Site-1 (OS-1) in an addendum to the RFA (ORNL, 1987b) is located approximately 1500 ft upstream of WAG 17 (ORNL, 1987b). The pit was used for burning combustible trash and on at least two occasions may have been used to burn laundry materials contaminated with very low levels of radioactivity (ORNL, 1987b). The reach of WOC upstream of the burn pit area is believed to be uncontaminated (ORNL, 1987b).

The WAG 17 Area is approximately 50 percent impervious due to parking lots, roads, and buildings (Figure 3-15). A network of storm sewers carries runoff from these impervious areas to WOC, discharging at the four locations shown in Figure 3-15. The first location (D1) is on WOC, just downstream of the culvert that runs underneath Bethel Valley Road. This outfall receives drainage from the northeastern portion of WAG 17, which contains SWMU 17.2d and 17AA101. The second and third outfalls (D2 and D3) are located on WOC some 50 ft upstream of its confluence with the WAG 17 Tributary. These outfalls receive drainage solely from the abandoned septic tank and the pumphouse that serves Septic Tank 7000 (SWMU 17.1), respectively. The fourth outfall (D4) is located on the WAG 17 Tributary about 500-ft upstream of its confluence with WOC. This outfall receives drainage from the majority of WAG 17, which contains all other SWMUs and additional areas of concern. The remaining 50 percent of the WAG 17 area is pervious, being covered with gravel roads and grass that is mowed during the growing season.

Table 1. Actual completion for WAG 17

Well	Depth clean to (ft)[a]	SST casing diam(in.)	Well type	Screened interval (ft)	Water level (ft)[b]
1196	18.3	2	D	8.0–18.0	-3.6
1197	48.8	4	B	33.6–48.6	-13.6
1198	43.0	2	D	27.8–42.8	-25.4
1199	72.8	4	B	52.6–72.6	-30.9
1200	40.0	2	D	29.8–39.8	-6.3
1201	47.8	4	B	37.6–47.6	-4.5
1202	20.3	4	B	10.1–20.1	-5.2
1203	17.8	2	D	7.6–17.6	-2.8

[a]Total drilled depth may vary from clean-out depth. See data packages (Appendix A).

[b]Predevelopment water level; depth measured from ground surface. (Negative is below surface; positive, above surface.)

Table 6.2. Contaminants exceeding risk criteria in RCRA perimeter wells

WAG	Contaminants[a]		
	Radionuclides	Metals	Organics
1	^{90}Sr, ^{234}U	As, Ba, Be, Cd, Mn, Sb	Vinyl Chloride, N-Nitroso-Di-N-Propylamine, Carbon Disulfide, 1,2,3 Trichloropropane, 1,2 Dibromo-3-chloropropane, 1,2 Dibromomethane, 1,4 Dioxane, 2-Propenenitrile, 3,3'-Dimethylbenzidine
2	^{3}H, ^{90}Sr, ^{60}Co	Be, As, Mn	1,1 Dichloroethene, Chlorobenzene, Carbon Disulfide
3	^{90}Sr	Be, Mn	
4	^{3}H, ^{90}Sr	As, Mn	1,1 Dichloroethene, Vinyl Chloride, 1,2 Dichlorobenzene
5	^{3}H, ^{90}Sr, ^{226}Ra	Mn	Vinyl Chloride, Bis-2-ethylhexyl pthalate 1,2 Dichlorobenzene, Carbon Disulfide
6	^{3}H, ^{90}Sr, ^{60}Co	Be	1,2 Dichloroethane, Chloroform, Trichloroethene, Aroclor-1254, Vinyl Chloride, Carbon Tetrachloride, Carbon Tetrachloride, Carbon Disulfide, Acetone
7	^{3}H, ^{99}Tc, ^{60}Co	Be, Mn	
8	^{90}Sr	As, Mn	
11		Be, Mn	
17			Vinyl Chloride, 1,1 Dichloroethene, 1,2 Dichlorobenzene

[a]Underlined contaminants exceed the noncarcinogenic hazard index of 1, the remaining contaminants exceed a calculated carcinogenic risk of 1E-4.

1998

3rd ERMA

Table 3.2 Total carcinogenic risk associated with each well organized by the waste area grouping that the well monitors

Risk	WAO 1		WAO 2		WAO 3		WAO 4		WAO 5		WAO 6		WAO 7		WAO 8		WAO 11		WAO 17	
	Well	Risk	Well	Risk	Well	Risk	Well	Risk	Well	Risk	Well	Risk	Well	Risk	Well	Risk	Well	Risk	Well	Risk
1x10-1									973	2.8E-01										
									978	2.0E-01										
1x10-2	814	1.6E-02					958	6.4E-02	974	9.1E-02										
	818	1.2E-02					954	1.7E-02	900	2.2E-02										
	819	1.1E-02							975	1.1E-02										
1x10-3	812	6.7E-03					957	7.0E-03	977	8.7E-03	843	3.1E-03	1078	1.5E-03					1201	6.0E-03
	800	2.4E-03							976	6.0E-03	846	2.6E-03								
	825	1.0E-03							961	1.7E-03	837	2.6E-03								
									971	1.4E-03	1243	2.3E-03								
									970	1.3E-03	842	1.7E-03								
											831	1.5E-03								
											840	1.4E-03								
											841	1.3E-03								
											858	1.2E-03								
1x10-4	806	6.6E-04	1191	6.0E-04	904	8.5E-04	955	8.4E-04	972	5.3E-04	856	9.0E-04	1079	8.3E-04	1007	8.0E-04	1145	5.7E-04		
	807	5.5E-04	1190	7.2E-04	902	2.4E-04	956	7.4E-04	958	3.3E-04	857	9.0E-04	1078	6.2E-04	1006	7.0E-04				
	830	5.1E-04	1152	3.6E-04	903	1.6E-04	900	1.1E-04	964	1.2E-04	856	7.0E-04	1064	3.1E-04	1007	6.1E-04				
	808	4.7E-04	1150	3.2E-04	1248	1.6E-04			967	1.0E-04	847	4.7E-04	1071	1.2E-04						
	813	4.5E-04	1194	1.5E-04	906	1.3E-04					833	4.4E-04	1074	1.2E-04						
	820	4.4E-04	1195	1.2E-04							745	4.2E-04								
	824	4.0E-04									844	4.2E-04								
	828	3.6E-04									839	3.7E-04								
	827	3.4E-04									838	3.4E-04								
	811	3.2E-04									1244	2.0E-04								
	810	3.1E-04									832	2.6E-04								
	816	2.1E-04									836	2.2E-04								
	815	1.1E-04									850	2.2E-04								
	826	1.1E-04									835	1.8E-04								
	946	1.1E-04									860	1.6E-04								
	947	1.0E-04									1245	1.5E-04								
1x10-5	820	8.3E-05	1151	4.0E-05	907	8.9E-05	940	5.1E-05	962	9.3E-05			1077	8.8E-05	1068	8.0E-05	1246	8.0E-05	1198	4.9E-05
	822	8.9E-05	1192	3.7E-05	987	2.6E-05	952	4.3E-05	963	8.5E-05			1073	7.1E-05	1060	5.9E-05	1149	3.3E-05	1196	4.1E-05
	823	3.0E-05	1160	3.4E-05	966	2.5E-05	961	3.4E-05	979	7.1E-05			1075	6.1E-05	1090	3.6E-05	1146	3.0E-05	1199	2.4E-05
	821	2.7E-05	1154	3.0E-05	900	2.0E-05	950	2.7E-05	965	4.6E-05			1072	5.1E-05	1091	3.6E-05	1143	2.4E-05	1203	2.0E-05
			1193	2.7E-05	901	1.6E-05	962	2.1E-05	963	4.3E-05			1061	3.5E-05	1096	3.3E-05	1144	1.6E-05	1200	1.6E-05
			1153	2.6E-05	946	1.6E-05	951	1.5E-05	964	2.6E-05			1062	3.5E-05	1093	2.5E-05			1202	1.7E-05
			1163	1.6E-05	905	1.1E-05	950	1.1E-05	960	2.2E-05			1063	2.6E-05	1092	2.0E-05			1197	1.6E-05
			1166	1.2E-05					966	1.7E-05			1065	2.1E-05	1094	1.3E-05				
			1155	1.6E-05									1066	1.9E-05						
			1150	1.3E-05									1060	1.6E-05						
			1168	1.3E-05																
			1187	1.0E-05																
1x10-6					906	7.5E-06	953	8.7E-06									1140	8.8E-06		
					968	5.5E-06	948	5.7E-06									1130	8.5E-06		
																	1147	6.3E-06		
																	1148	6.1E-06		

1993

Table 3.1. Chemical carcinogens detected at least once in Oak Ridge National Laboratory waste area grouping perimeter monitoring well network

Chemical of concern	Number of wells	Well	WAG	Range of concentrations (mg/L; pCi/L)
1,1-Dichloroethene	4	954, 958, 1190, 1201	2, 4, 17	0.017-0.044
1,2,3-Trichloropropane	2	818, 819	1	0.005
1,2-Dibromo-3-chloropropane	2	818, 819	1	0.01
1,2-Dibromoethane	2	818, 819	1	0.005
1,4-Dioxane	2	818, 819	1	5.0
2-Propenenitrile	2	818, 819	1	0.01
3,3'-Dimethyl-benzidine	1	814	1	0.085
Aroclor-1254	1	854	6	0.001
Beryllium	58	745, 806, 807, 808, 809, 810, 811, 812, 813, 814, 816, 818, 824, 827, 828, 829, 830, 831, 832, 833, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 986, 992, 1071, 1074, 1076, 1079, 1084, 1145, 1194, 1195, 1245, 1248	1, 2, 3, 6, 7, 11	0.001-0.025
Bis(2-ethylhexyl)phthalate	1	977	1	3.1
Carbon tetrachloride	1	842	6	0.0614
^{60}Co	3	1078, 1243, 1244	2, 6, 7	432-915
N-Nitroso-di-n-propylamine	1	809	1	0.008
^{226}Ra	1	973	5	77.4
^{90}Sr	13	806, 812, 956, 969, 973, 975, 992, 993, 994, 1087, 1096, 1097, 1191	1, 2, 3, 4, 5, 8	140-7,900
^{99}Tc	1	1078	7	11,000
Tritium	31	841, 842, 843, 847, 848, 849, 854, 954, 955, 956, 957, 958, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 981, 1076, 1079, 1084, 1152, 1156, 1191, 1243	2, 4, 5, 6, 7	93,800-290,000,000
^{234}U	1	812	1	346
Vinyl chloride	16	818, 819, 825, 830, 849, 853, 854, 954, 955, 958, 969, 973, 975, 978, 981, 1201	1, 4, 5, 6, 17	0.005-5.5

00046

0001

side of Building 7015, just north of Petroleum Storage Tank 7015 (approximate ORNL coordinates N21775, E36778), as shown in Figure 3-8. The tank has been abandoned for several years, and no records of its installation date, previous use, or current condition have been found. An ORNL drawing (Atlas Sheet 89) shows a 1.5 in. steel pipe originating at the tank and running to Building 7002.

3.2.5.4 Diesel Fuel Storage Tank 7063 and Electrical Substation (17AA104a and b)

Diesel Fuel Storage Tank 7063 (17AA104a)

Diesel Fuel Storage Tank 7063 is a 200- to 300-gal, underground horizontal steel storage tank with no secondary containment. The tank is located north of Building 7063 (approximate ORNL coordinates N21604, E36560), as shown in Figure 3-8. The tank is reported to have been used solely to store diesel fuel for the emergency generator at Building 7003 (Miller, 1988). Access to the tank is from the top and the ground surface above the tank is grass covered. No releases from this tank or testing of its contents have been reported. The tank is not cathodically protected.

Electrical Substation (17AA104b)

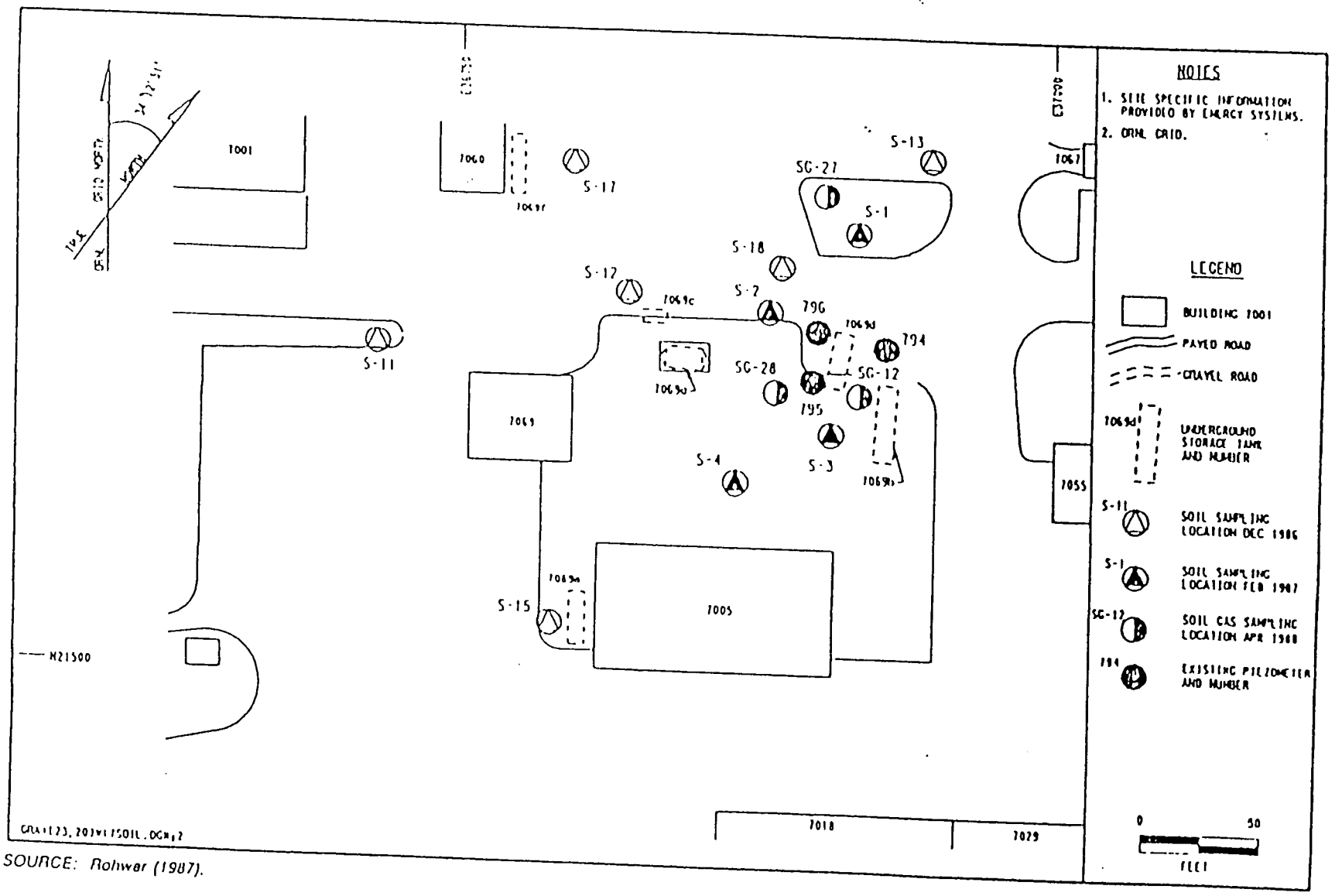
An electrical substation with several transformers is located just north of Diesel Fuel Storage Tank 7063. The transformers have been in use since the 1950s and may have contained PCBs (Miller, 1988).

3.2.5.5 Transformer Storage Yard (17AA105). The Transformer Storage Yard is located in the southeast corner of WAG 17, near the south fence, as shown in Figure 3-8. The storage yard is an asphalt-paved, fenced area approximately 200 by 200 ft. The area is used to store transformers that have been taken out of service. During a recent site visit by the BNI Team (BNI, 1988c), various sizes and types of transformers were observed sitting on the asphalt. Reportedly, some of these transformers contain residual PCBs (Edgemon, 1988).

3.3.2 Site Characterization

3.3.2.1 Soil. No information on radioactive soil contamination is available for WAG 17; however, with the exception of the area around SWMU 17.2c, radioactivity is not expected to be present within the WAG. Information pertaining to chemical soil contamination is available from an environmental assessment conducted at a leaking, underground storage tank, Tank 7069d (17AA102d) (Rohwer, 1987).

The environmental assessment was designed to determine the extent of contamination at the site. The proposed program included sampling at 19 soil sites in the vicinity of Tank 7069d. The proposed test sites were located to the west and northwest of the tank, in the assumed direction of shallow groundwater movement. In December 1986, sampling was initiated at six locations in close proximity (50 to 200 ft) to the tank (Figure 3-22). Split spoon samples were collected at 5- and 10-ft depths or to the point of refusal (Rohwer, 1987).



SOURCE: Rohwer (1987).

FIGURE 3-22
SOIL SAMPLING LOCATIONS

Analytical results for these soil samples, presented in Table 3-15, indicated that BTX contamination was below the TDHE action level of 10 ppm. Based on these data, the proposed sampling plan was modified by eliminating the more distant locations and adding four locations along underground utility pipelines that could serve as preferential pathways for contaminant migration (Rohwer, 1987).

In February 1987, a second series of soil samples was collected at these new locations, which were approximately 20 to 50 ft from the tank (Figure 3-22) (Rohwer, 1987). Results are summarized in Table 3-16. The highest observed concentration (4.96 ppm BTX) was at sampling site S-1 at a depth of 8 ft. This site, approximately 20 ft downgradient of the tank, was the closest of the four sites to the tank. With the exception of 0.180 ppm xylene at Site S-2, remaining observations were below detection limits. Data collected at these locations indicated that the migration of gasoline in soil was limited to the immediate area of the tank, even along utility pipelines (Rohwer, 1987).

Follow-up evaluations were conducted in April 1988, using soil gas sampling at three locations ranging from 15 to 40 ft from the tank (Figure 3-22) (Rohwer, 1987). Results are summarized in Table 3-17. Benzene levels were below detection limits (<0.007 ppb) in samples collected at 3-ft depths from these locations. The samples were not evaluated for toluene or xylene.

Based on the results of the environmental assessment, migration of contaminants from Tank 7069d was limited to points within 50 ft of the tank (ORNL, 1987b). No migration of gasoline along underground utility lines was observed, and a nearby stormwater ditch routinely sampled for NPDES compliance did not exceed its discharge limits. Because the tank had been emptied and taken out of service, no further impact on the environment was expected and thus, no further action was taken (Rohwer, 1987).

3.3.2.2 Air. Air quality information is not available specifically for WAG 17; however, air is not considered to be a significant pathway for current contaminant migration from WAG 17.

TABLE 3-15

RESULTS OF SOIL SAMPLING AT SIX SITES APPROXIMATELY 50 TO 200 FEET DOWNGRADIENT OF TANK 7069d[a]

Sample Site[b]	Depth (ft)	Benzene	Toluene	Xylene	Gasoline
			(ppm)		
S-11	5	<1	<1	<2	<10
	6	<1	<1	<2	<10
S-12	5	<1	<1	<2	<10
	10	<1	<1	<2	<10
S-13	2	<1	<1	<2	<10
S-15	5	<1	<1	<2	<10
	10	<1	<1	<2	<10
S-17	5	<1	<1	<2	<10
	10	<1	<1	<2	<10
S-18	5	<1	<1	<2	<10
	10	<1	<1	<2	<10

(a) Sampling conducted on December 15, 1986.
(b) For location, see Figure 3-22.

Source: Rohwer (1987).

TABLE 3-16

RESULTS OF SOIL SAMPLING AT FOUR SITES ALONG UTILITY LINES APPROXIMATELY 20 TO 50 FEET DOWNGRADIENT OF TANK 7069d(a)

Sample Site(b)	Depth (ft)	Benzene	Toluene	Xylene	Gasoline
			(ppm)		
S-1	5	<0.005	<0.005	<0.005	<10
S-1	8	0.116	0.311	4.550	<10
S-2	4	<0.005	<0.003	0.180	<10
S-3	4	<0.005	<0.005	<0.005	<10
S-4	5	<0.005	<0.005	<0.005	<10
S-4	8	<0.005	<0.005	<0.010	<10

(a) Sampling conducted February 3, 1987.
(b) For location, see Figure 3-22.

Source: Rohwer (1987).

TABLE 3-17

RESULTS OF SOIL GAS SAMPLING AT THREE SITES ADJACENT TO TANK 7069d[a]

Sample Site[b]	Depth (ft)	Benzene (ppb)
SG-12	3	<.007
SG-27	3	<.007
SG-28	3	<.007

[a] Sampling conducted on April 8, 1988.
[b] For location, see Figure 3-22.

Source: Rohwer (1988).

3.3.2.3 Surface Water/Sediments. Information pertaining to WAG 17 surface water/sediments is discussed in the following paragraphs.

Surface Water

Surface water quality information for WAG 17 is available from two monitoring stations: an ORNL station located on the WAG 17 Tributary (Station OSA-1) and a USGS station located on WOC. Very limited data are available for Station OSA-1, which receives drainage from most areas within WAG 17. At Station OSA-1, a single grab sample was collected in 1986 and analyzed for cesium-137, cobalt-60, strontium-90, and tritium. Reported concentrations for these four radionuclides did not exceed detection limits (Morrison and Cerling, 1987). These data support the general observation that WAG 17 is not expected to represent a source of radioactivity due to its use as a support services area. Results are summarized in Table 3-18. No other radiological or chemical analyses were performed.

During 1961-1964, water samples were collected several times yearly on a nonroutine basis at the USGS partial record station on WOC. These samples were analyzed for a range of chemical constituents typically present in regional surface waters. Additionally, one surface water sample was collected in September 1961 and analyzed for trace elements. No radiological analyses were performed. Results, summarized in Tables 3-19 and 3-20, reflect the lack of contamination in this reach of WOC and indicate that the waters are typical of other waters in Bethel Valley, being of the calcium-magnesium-bicarbonate type.

Major sources contributing to surface water contamination within and adjacent to WAG 17 include direct discharges from permitted ORNL outfalls, discharge of contaminated groundwater, and runoff that has been exposed to contamination from previous operational leaks and spills. Contaminated runoff is a particularly important source for this WAG since 50 percent of the area within its boundaries is impervious.

TABLE 3-18

RADIONUCLIDE AND METAL CONCENTRATIONS IN THE WAG 17 TRIBUTARY SURFACE WATERS AND SEDIMENTS AT STATION OSA-1[a]

Constituent	Concentrations[b] Background	OSA-1
	Water[c]	
Cobalt-60	<0.2	<0.3
Strontium-90	<0.2	<0.1
Cesium-137	<0.2	<0.3
Tritium	<30	<30
	Gravels[d]	
Cobalt-60[e]	<2	<5
Strontium-90[e]	<10	8.8 ± 7.1
Cesium-137[e]	3	30.5 ± 38.5
Cadmium[f]	0.05	0.8 ± 0.1
Chromium[f]	0.4	2.6 ± 0.2
Copper[f]	0.2	2.6 ± 1.6
Nickel[f]	0.9	ND[g]
Zinc[f]	3.6	47 ± 11

(a) Sampling conducted on July 31, 1986.
(b) "<" represents that analytical result was below the stated detection limit.
(c) Results, in Bq/L, based on testing of a single grab sample.
(d) Concentrations reported on basis of weight of gravel samples. Radionuclides in Bq/kg, metals in μg/g.
(e) Backgrounds estimated for counting procedures used in this study.
(f) Backgrounds estimated from several uncontaminated samples.
(g) Not detected.

Source: Morrison and Cerling (1987).

The storm sewer located on the WAG 17 Tributary is a permitted Category II NPDES outfall, designated as No. 234 (Energy Systems, 1988b). Compliance parameters include oil and grease, pH, and total suspended solids. Effluents, analyzed quarterly for these parameters, were in full compliance with NPDES permit requirements during 1987 (Energy Systems, 1988b).

Sediments

At Station OSA-1, streambed gravels and bank muds were also collected in 1986 and analyzed for radionuclides and chemicals. Results of metals and radionuclide evaluations for streambed gravels are summarized in Table 3-18. Results of organic evaluations for streambed gravels and bank muds are presented in Table 3-21. Triplicate gravel samples were analyzed for cobalt-60, strontium-90, cesium-137, and five metals. Cobalt-60 and strontium-90 concentrations were found to be at background levels; in one of the three samples, the cesium-137 concentration was elevated. Because similar radionuclide analyses of a surface water sample collected at this station indicated concentrations below detection limits, the cesium-137 detected in the gravels is probably a result of historical, rather than current, releases. Results indicated that the streambed gravels had some of the highest cadmium concentrations observed during the preliminary sampling survey for the RFA and concentrations of chromium, copper, and zinc were above background levels (Morrison and Cerling, 1987). Because similar metals analyses of a surface water sample collected at this station were not conducted, it is not possible at this time to determine whether the metals detected in the gravels are due to historical, rather than current, releases.

Additionally, a 6.1-in.^{3} hand-picked, tar-coated gravel sample was taken from the streambed (Morrison and Cerling, 1987). Analysis of this sample indicated the presence of semi-volatile organic compounds (SVOCs), as shown in Table 3-21. Those SVOCs detected were PAHs, which are components of petroleum fuels such as diesel.

TABLE 3-19

CHEMICAL COMPOSITION OF WOC WATERS AT THE USGS PARTIAL-RECORD STATION DURING 1961-64[a]

Constituent	Concentrations[a]					
	(9-18-61)	(2-15-62)	(12-04-62)	(9-12-63)	(4-17-64)	(6-23-64)
Silicon dioxide	7.6	7.0	6.8	7.4	5.7	6.7
Aluminium	—[c]	0.1	0.1	0.0	0.0	0.1
Iron[b]	0.03	0.01	0.0	0.0	0.01	0.0
Manganese[b]	0.02	0.0	0.01	0.01	0.0	0.0
Calcium	29	17	26	33	13	28
Magnesium	16	8.4	13	17	6.3	15
Sodium	0.5	0.2	0.6	0.8	0.5	1.1
Potassium	0.6	0.5	0.5	0.7	0.6	0.9
Lithium	—[c]	0.0	0.1	0.0	0.0	0.0
Bicarbonate	159	90	139	177	71	158
Carbonate	0	0	0	0	0	0
Sulfate	2.0	4.2	2.0	1.4	2.8	3.6
Chloride	1.3	0.3	0.6	0.2	1.1	2.0
Fluoride	0.1	0.2	0.1	0.1	0.0	0.2
Nitrate	0.5	0.0	0.3	0.1	0.6	0.0
Phosphate	0.1	0.0	0.0	0.0	0.0	0.0
Dissolved Solids Residue	135	82	115	136	67	138
Ca-Mg Hardness Total	136	78	118	150	60	132
Non-Carbonate	6	4	4	6	2	3
Specific Conductance	249	153	213	260	118	262
pH	7.8	7.5	8.0	8.1	7.6	8.1
Detergent	0.1	0.0	0.1	0.0	—[c]	—[c]

[a]Concentrations in mg/L except for specific conductance, which is in micromhos at 25°C.
[b]In solution when analyzed.
[c]Constituent not sought.

Source: McMaster (1967).

00056

TABLE 3-20

TRACE ELEMENT CONTENT OF WOC WATER
AT THE USGS PARTIAL-RECORD STATION(a)

Element	Concentration (μg/L
Aluminum	39.0
Boron	8.0
Barium	120.0
Chromium	<0.24
Copper	2.4
Iron	100.0
Lead	3.4
Lithium	0.24
Manganese	12.0
Nickel	<2.4
Rubidium	2.4
Strontium	21.0
Titanium	<2.4

(a)Sample collected in September 1961.

Note: The following elements were sought but not detected: beryllium, lanthanum, scandium, tin, cobalt, molybdenum, silver, vanadium, ytterbium, yttrium, zinc, zirconium.

Source: McMaster (1967).

Because similar analyses were not conducted on the surface water sample taken at this station, the assessment of whether these constituents are residuals from past releases or are the result of current releases cannot be made at this time.

3.3.2.4 Groundwater. At present, a groundwater quality monitoring system has not been installed at WAG 17. A limited amount of information pertaining to groundwater contamination is available from an environmental assessment conducted at Tank 7069d (17AA102d) (Rohwer, 1987). As part of the assessment, groundwater samples were taken from three piezometers (Nos. 794, 795, and 796) adjacent to the tank (Figure 3-22) in December 1986. Results, summarized in Table 3-22, indicated that benzene was present at concentrations which exceeded the TDHE action level (5 µg/L). Contamination in the wells, located within 6 ft of the tank, ranged from 22 to 1260 µg/L of benzene (Rohwer, 1987).

In June 1987, follow-up sampling at these piezometers indicated that benzene was still present at levels exceeding the TDHE action level (Rohwer, 1987). Results are summarized in Table 3-23. Levels in Piezometers 794 and 796 contained 650 and 702 µg/L benzene, respectively, while Piezometer 795 contained 32 µg/L. A water sample taken from inside the tank contained 16 µg/L benzene, suggesting that the tank itself was not a significant source of continuing contamination.

Additional samples taken in April 1988 from these piezometers showed the presence of petroleum hydrocarbons, with Piezometer 794 containing 35 µg/L, while Piezometers 795 and 796 contained <0.1 and 21 µg/L, respectively (Rohwer, 1987). The samples were not analyzed for benzene. No additional groundwater data are available for WAG 17.

00058

TABLE 3-21

ORGANICS CONCENTRATIONS IN WAG 17 TRIBUTARY MUDS AND GRAVELS AT STATION OSA-1[a]

SVOCs	Mud[b]	Gravel[c] (µg/kg)[d]
Di-n-butylphthalate	ND	ND
Phenanthrene	ND	120,000
Anthracene	ND	12,000
Fluoranthene	ND	87,000
Pyrene	ND	109,000
Benzo(a)anthracene	ND	36,000
Chrysene	ND	42,000
Benzo(b)fluoranthene	ND	24,000
Benzo(k)fluoranthene	ND	30,000
Benzo(a)pyrene	ND	21,000
Indeno (1,2,3-cd)pyrene	ND	24,000
Benzo(g,h,i)perylene	ND	24,000
Bis(2-ethylhexyl)phthalate	ND	ND
Butylbenzylphthalate	ND	ND

[a] Sampling conducted on July 31, 1986.
[b] Black mud, one sample.
[c] Gravel sample with black tarry coating, one sample.
[d] Wet weight.

ND = Not detected.

Source: Morrison and Cerling (1987).

TABLE 3-22

RESULTS OF GROUNDWATER SAMPLING AT THREE PIEZOMETERS ADJACENT TO TANK 7069d[a]

Piezometer Number[b]	Benzene	Toluene	Xylene
		(µg/L)	
794	1260	380	2800
795	22	5	340
796	870	445	4330

[a] Sampling conducted December 19, 1986.
[b] For location, see Figure 3-22.

Source: Rohwer (1987).

TABLE 3-23

RESULTS OF GROUNDWATER SAMPLING AT THREE PIEZOMETERS ADJACENT TO TANK 7069d[a]

Sample Site	Sample Type	Benzene	Toluene	Xylene	Ethylbenzene
		(µg/L)			
796[b]	Water	720	2100	6500	1100
795[b]	Water	32	5	5	5
794[b]	Water	650	1800	6000	1400
Tank	Water	16	19	>8	NR[c]

(a) Sampling conducted June 3, 1987.
(b) For piezometer location, see Figure 3-22.
(c) NR = Not reported.

Source: Rohwer (1987).

Table 1
Water Level Data
UST 7069B, 7069E, and 7069F Sites

Well No.[1]	Date	Depth of Well (Ft)	Top of Casing Elevation[2]	Depth to Water (Ft)	Water Level Elevation[2]
4036 (PZ1)	12/17/92	13.80	844.68	10.20	834.48
	01/06/93			9.56	835.12
	01/13/93			9.34	835.34
	08/19/93			11.35	833.33
4037 (PZ2)	12/16/92	10.18	841.78	9.90	831.88
	01/06/93			9.65	832.13
	01/13/93			9.64	832.14
	08/19/93			9.66	832.12
4038 (PZ3)	12/16/92	13.18	845.05	8.70	836.35
	01/06/93			8.22	836.83
	01/13/93			8.18	836.87
	08/19/93			8.58	836.47
4039 (MW1)	12/17/92	7.90	838.28	5.40	832.88
	01/13/93			2.96	835.32
	08/19/93			5.56	832.72
4040 (MW2)	12/17/92	8.00	841.47	2.15	839.32
	01/13/93			1.95	839.52
	08/19/93			3.43	838.04
4041 (MW3)	12/16/92	12.66	842.46	9.30	833.16
	01/06/93			7.03	835.43
	01/13/93			6.51	835.95
	08/19/93			9.43	833.03
4042 (MW4)	12/22/92	8.30	836.25	7.00	829.25
	01/13/93			6.29	829.96
4043 (MW5)	12/22/92	9.00	836.49	4.05	832.44
	01/13/93			3.81	832.68
	08/19/93			4.91	831.58
4044 (MW6)	12/22/92	7.20	835.99	5.00	830.99
	01/13/93			4.98	831.01
	08/19/93			5.48	830.51
4045 (MW7)	01/05/93	10.20	840.80	8.29	832.51
	01/13/93			8.40	832.40
	08/19/93			8.24	832.56
4095 (MW8)	08/10/93	8.80	837.66	7.67	829.99
	08/19/93			7.64	830.02
4096 (MW9)	08/05/93	16.00	836.94	4.96	831.98
	08/19/93			4.48	832.46
4097 (MW10)	08/05/93	15.10	839.11	7.90	831.21
	08/19/93			5.62	833.49
4098 (MW11)	08/06/93	11.50	835.93	7.69	828.24
	08/19/93			7.84	828.09

[1] ORNL I.D. Number (original field designation in parenthesis)
[2] Elevations relative to mean sea level (MSL).

and decontamination liquids were handled in accordance with Energy Systems ESP 1000: *Waste Management*.

C.5 Analytical Results

Groundwater samples were submitted to Lockheed Analytical Laboratory for analysis. The groundwater samples were analyzed at the laboratory for BTX (EPA Method 5030/8020) and TPH [EPA Methods 8000/5030/Gasoline Range Organics (GRO) and 8000/Diesel Range Organics (DRO)]. The analytical results are presented in Table 2 and the laboratory data sheets are contained in Appendix IV.

Groundwater samples collected from monitoring Wells 4039 and 4041 had TPH and benzene concentrations above cleanup levels when they were initially sampled in January 1993. The TPH concentrations were 2 ppm (Well 4039) and 8 ppm (Well 4041), while the benzene concentrations were 0.079 ppm (Well 4039) and 6.1 ppm (Well 4041). These monitoring wells were resampled in August 1993 and for Well 4039 the TPH/DRO concentration was 32 ppm and the benzene concentration is below the detection limit of .02 ppm. Well 4041 had a decrease in both the TPH (3.21 ppm) and the BTX (0.4 ppm) concentration but remain above the cleanup levels.

Of the new monitoring wells, only Well 4097 indicated contaminant concentrations slightly above the cleanup levels with a benzene concentration of .094 ppm. There was no additional groundwater TPH contamination identified and the benzene concentration had decreased below detection limits in Well 4039.

C.6 Water Level Data

An electronic water level indicator was used to collect water level data following Energy Systems ESP 302-1: *Groundwater Sampling Procedure: Water Level Measurements Using Water Level Indicator*. Water levels measured during the development, purging, and sampling of the monitoring wells are presented in Table 1. Previously recorded water level measurements are also included in this table.

C.7 Groundwater Classification Procedures

There are no groundwater use points that are, or could be, impacted by petroleum contamination from the Building 7069 facility. Groundwater is not used as a source of drinking water within the Oak Ridge Reservation. Potential groundwater users are located beyond the reservation boundary, which extends more than two miles in any direction from the Building 7069 facility. Based on the results of groundwater sampling at the site, the possibility of contaminants migrating from the site and impacting a user's water supply is extremely remote. Also, as indicated in Table 5 in Appendix B of the UST 7069 Sites EAR (April 1993), groundwater quality data from upgradient Wells 1196, 1197, 1198, 1199 indicates that the groundwater already exceeds drinking water standards for aluminum and iron. Therefore, the cleanup level deemed appropriate for the site is the non-drinking water standard of 0.070 ppm benzene and 1.0 ppm total petroleum hydrocarbons.

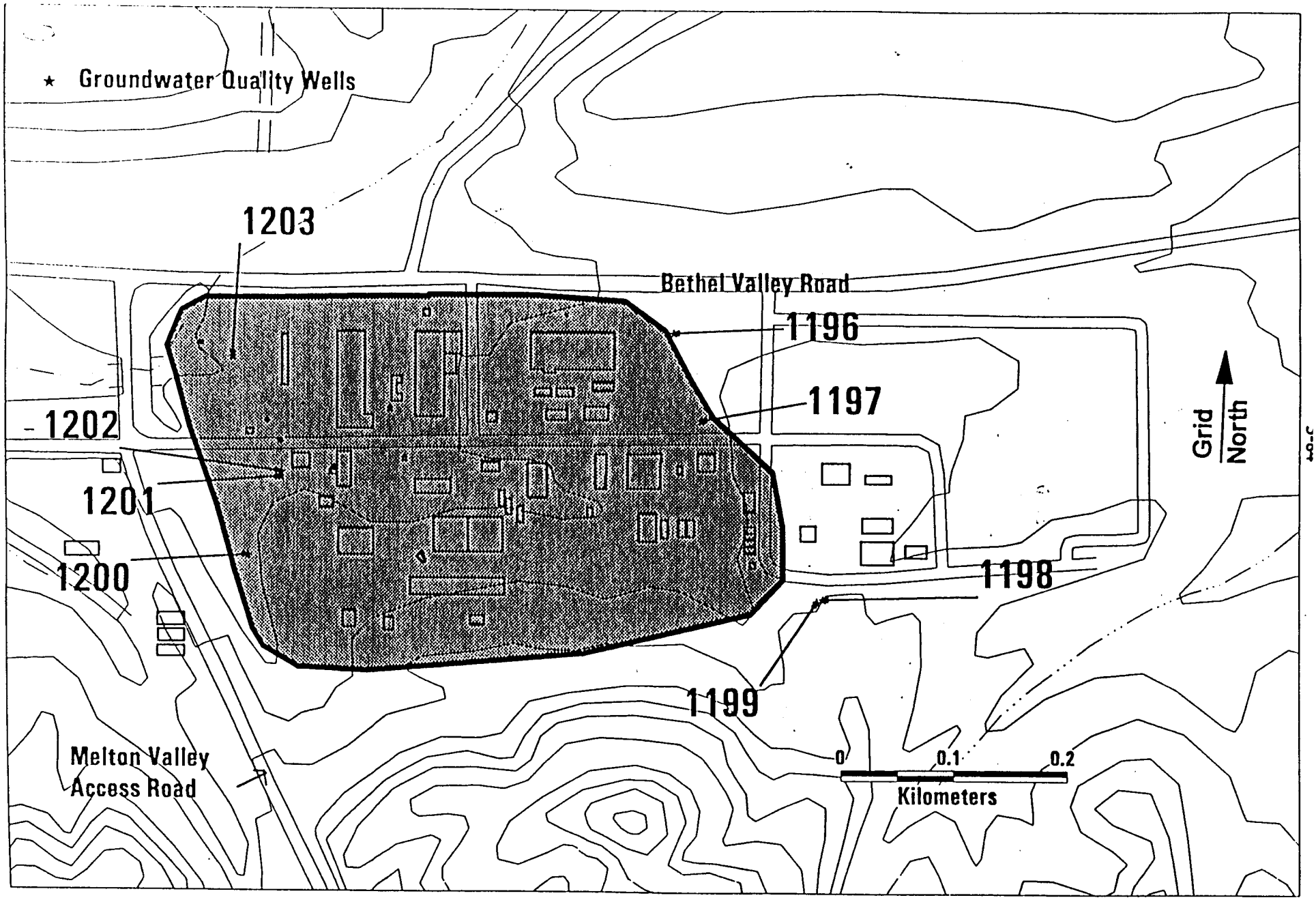


Fig. 3.27. Location of selected monitoring wells within WAG 17.

Table 3.10. Summary of WAG 17 groundwater monitoring system wells

Well no.	Total depth (ft)
Groundwater quality wells	
1196	18.30
1197	49.00
1198	43.30
1199	73.00
1200	40.00
1201	48.00
1202	20.30
1203	18.00

WAG 17

WELL	ANALYSIS	FREQ/ DET	PRG (1E-4)	AVG	RISK	%
1196	TRITIUM	3/3	8.8E+04	4.1E+03	4.7E-06	58%
1196	CO-60	3/3	3.2E+02	1.0E+01	3.3E-06	41%
				Total Risk	8.1E-06	
1197	CS-137	3/3	1.7E+02	6.8E+00	4.0E-06	62%
1197	TRITIUM	3/3	8.8E+04	2.1E+03	2.4E-06	37%
				Total Risk	6.5E-06	
1198	TRITIUM	3/3	8.8E+04	1.4E+04	1.6E-05	75%
1198	TOTAL SR	3/3	1.3E+02	3.6E+00	2.7E-06	13%
1198	CO-60	3/3	3.2E+02	7.9E+00	2.5E-06	12%
				Total Risk	2.1E-05	
1199	TRITIUM	3/3	8.8E+04	7.7E+03	8.7E-06	74%
1199	TOTAL SR	3/3	1.3E+02	3.9E+00	3.0E-06	26%
				Total Risk	1.2E-05	
1200	TRITIUM	3/3	8.8E+04	4.6E+03	5.3E-06	64%
1200	CO-60	3/3	3.2E+02	3.8E+00	1.2E-06	14%
1200	TOTAL SR	3/3	1.3E+02	1.4E+00	1.1E-06	13%
				Total Risk	8.3E-06	
1201	TRICHLOROETHENE	3/3	1.1E-01	7.6E+00	6.7E-03	55%
1201	VINYL CHLORIDE	3/3	2.8E-03	1.2E-01	4.2E-03	34%
1201	1,1-DICHLOROETHENE	3/3	1.7E-03	2.2E-02	1.3E-03	11%
				Total Risk	1.2E-02	
1202	CHLOROFORM	2/3	2.7E-02	8.4E-03	3.0E-05	64%
1202	TRICHLOROETHENE	3/3	1.1E-01	8.2E-03	7.2E-06	15%
1202	BROMODICHLOROMETHANE	1/3	1.4E-01	4.3E-03	3.2E-06	7%
1202	TOTAL SR	3/3	1.3E+02	2.5E+00	1.9E-06	4%
1202	CO-60	3/3	3.2E+02	5.3E+00	1.7E-06	4%
				Total Risk	4.7E-05	
1203	TRICHLOROETHENE	1/3	1.1E-01	2.1E-02	1.8E-05	65%
1203	CS-137	3/3	1.7E+02	8.8E+00	5.2E-06	19%
1203	TRITIUM	3/3	8.8E+04	3.9E+03	4.4E-06	16%
				Total Risk	2.8E-05	

of groundwater contamination

3.13 WAG 17

3.13.1 Site Location, Description, and Background

WAG 17 is located in Bethel Valley ~945 m (3100 ft) east of the main ORNL plant area and is composed of ~9.3 ha (23 acres) (Fig. 3.26). The facilities in this WAG constitute the ORNL Services Area and include the shipping and receiving departments, machine shops, carpenter shops, paint shops, lead burning facilities, garage facilities, welding facilities, tritium facility, and the materials storage area. This area contains eight SWMUs; the Septic Tank for Building 7000, Waste Oil Storage Tanks at 7002W, 7009E, 7075, 7021, and 7030E, and Photographic Reproduction Waste Storage Tanks at 7075A and 7075B. WAG 17 also contains one documented leak site involving the release of gasoline at an underground tank.

3.13.1.2 7002W Waste Oil Storage Tank

This tank is located above ground and is west of Building 7002. It is constructed of steel with a capacity of 9463 L (2500 gal) and has operated from 1984 to the present for waste oil storage. There are no records indicating that the tank has been used to store hazardous materials or radionuclides; however, the contents of the tank have not been analyzed. To date, there have been no documented releases from this unit.

3-82

3.13.2 Characterization of Groundwater Contamination

3.13.2.1 Groundwater monitoring system

The groundwater monitoring system in and around WAG 17 includes 24 piezometers installed in 1986 or 1987 and 8 monitoring wells installed between 1989 and 1990. The piezometers were constructed of 5-cm or 10-cm (2-in. or 4-in.) ID PVC casing and screens. Sandpack was placed around the screens, and a bentonite seal was placed above the sandpack. The remaining annulus was grouted, and each piezometer was completed with a cap and protective cover.

The monitoring wells at WAG 17 were installed as part of a groundwater quality monitoring well installation program at ORNL. These wells were constructed of 5-cm or 10-cm (2-in. or 4-in.) ID stainless steel casing and screens. The remainder of the well construction was the same as described for the piezometers. Each well was completed with a steel protective casing, locking cap, steel guardposts, and a concrete pad. The locations of the monitoring wells or piezometers within WAG 17 for which

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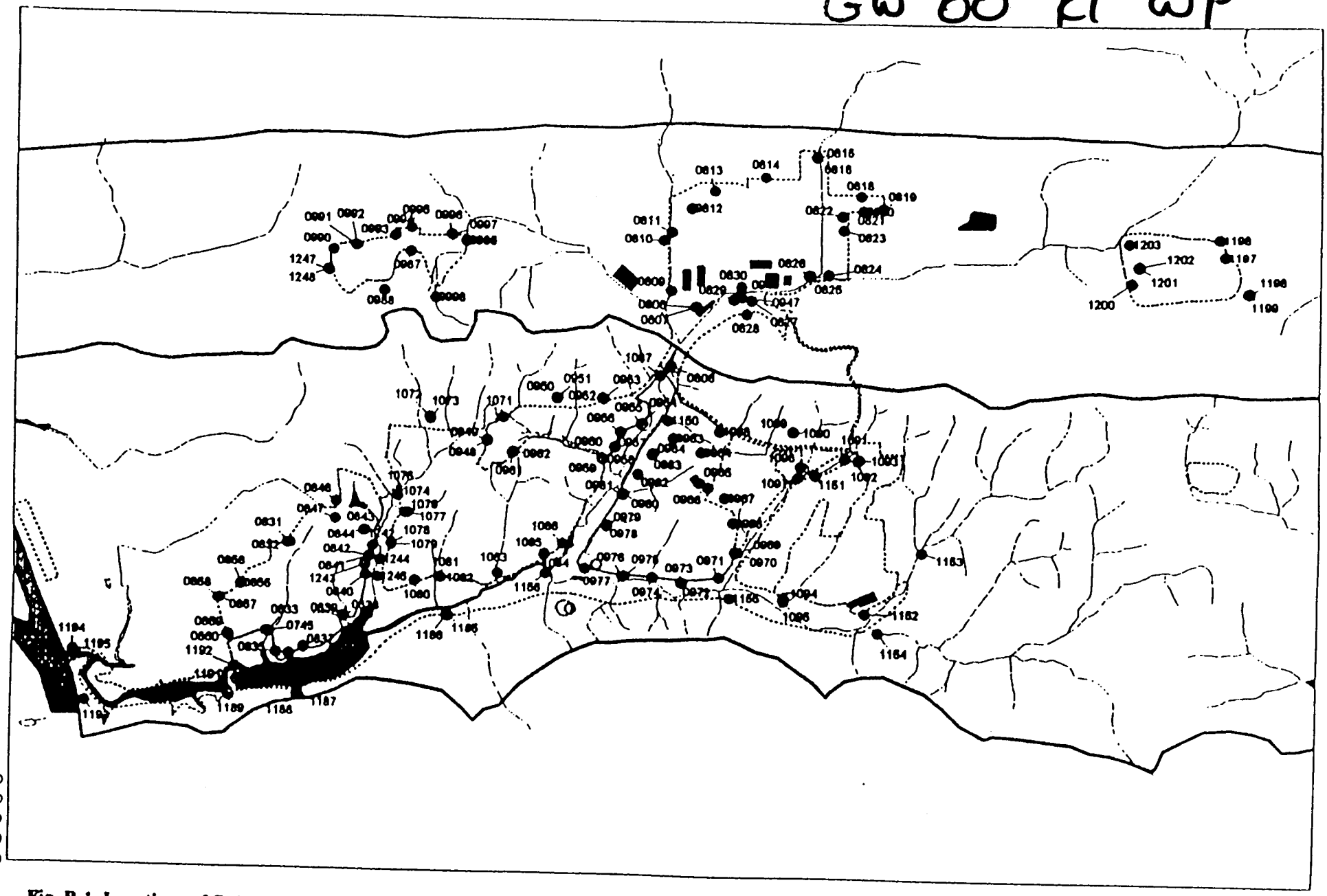

Fig. B-1. Locations of Oak Ridge National Laboratory waste area grouping perimeter monitoring wells.

Table A 7

Chemical Frequency of Detect by Well

VINYL_CH	TRI123	DI2CHL3	DBE12	DIOXAN14	PROPENE2	_3_3_DI	WAO	WELL
0/2							8	1089
0/2							8	1090
0/2							8	1091
0/2							8	1092
0/2							8	1093
0/2							8	1094
0/2							8	1095
0/2							8	1096
0/2							8	1097
0/2							11	1139
0/2							11	1140
0/2							11	1141
0/2							11	1143
0/2							11	1144
0/2							11	1145
0/2							11	1146
0/2							11	1147
0/2							11	1148
0/2							11	1149
0/2							11	1246
0/3							17	1196
0/3							17	1197
0/3							17	1198
0/3							17	1199
0/3							17	1200
3/3							17	1201
0/3							17	1202
0/3							17	1203
							Seep	SNW-1
							Seep	SNW-2
0/1		0/1	0/1				Seep	BTT
							Seep	FRENCH DRA
0/1		0/1	0/1				Seep	RS-1
							Seep	RS-3
0/1		0/1	0/1				Seep	SW2-1
0/1		0/1	0/1				Seep	SW2-2
0/2		0/2	0/2				Seep	SW2-3
0/1		0/1	0/1				Seep	SW2-4
0/1		0/1	0/1				Seep	SW2-5
2/4		0/4	0/4				Seep	SW4-1
2/2		0/2	0/2				Seep	SW4-2
							Seep	SW5-11
							Seep	SW5-3
							Seep	SW5-4
							Seep	SW5-5
							Seep	SW5-6
							Seep	SW5-7
							Seep	SW5-8
							Seep	SW5-9
0/1		0/1	0/1				Seep	SW6-1
0/1		0/1	0/1				Seep	SW6-2
0/2		0/2	0/2				Seep	SW7-1
0/2		0/2	0/2				Seep	SW7-2
0/2		0/2	0/2				Seep	SW7-3
0/1		0/1	0/1				Seep	SW7-5

A-94

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THORIUM STORAGE WELLS

Table 3. Concentrations of ^{238}U, ^{232}Th, and ^{226}Ra in soil samples taken from the Thorium Storage Facility (7019) site

Sample ID[a]	Depth (cm)	Radionuclide concentration in pCi/g (dry wt)		
		^{238}U[b]	^{232}Th	^{226}Ra
B1A	0-15	<57.00	950.00 ± 5.0	2.70 ± 1.0
B1B	15-30	<24.00	390.00 ± 2.0	1.70 ± 0.3
S1	0-15	<0.77	0.32 ± 0.02	0.35 ± 0.02
S2	0-15	1.40 ± 1.0	1.30 ± 0.07	1.00 ± 0.03

[a]Locations of soil sample hole numbers are shown on Fig. 8.
[b]Background levels of ^{238}U in the main ORNL complex usually range from 0.027 to 0.54 pCi/g (dry wt) (see ref. 8).

Table 4. Gamma exposure rates and alpha and beta-gamma activity levels measured on the interior surfaces of the storage wells at the Thorium Storage Facility (7019) site

Well number[b]	Gamma exposure rates[a] (μR/h)	Transferable contamination	
		Alpha (dpm/100 cm^2)[c]	Beta-gamma (dpm/100 cm^2)[c]
1	4-10	d	d
2	4-8	6	d
3	4-8	d	d
4	4-8	d	d
5	4-8	6	1200
6	4-7	d	d
7	4-6	15	170
8	4-8	15	d
9	4-7	6	d
10	4-6	6	d

[a]Gamma radiation was measured with a NaI scintillation probe connected to a portable scaler.
[b]Locations of well numbers are shown on Fig. 8.
[c]Disintegrations per minute per 100 cm^2.
[d]Background.

IV. Conceptual
Site Model

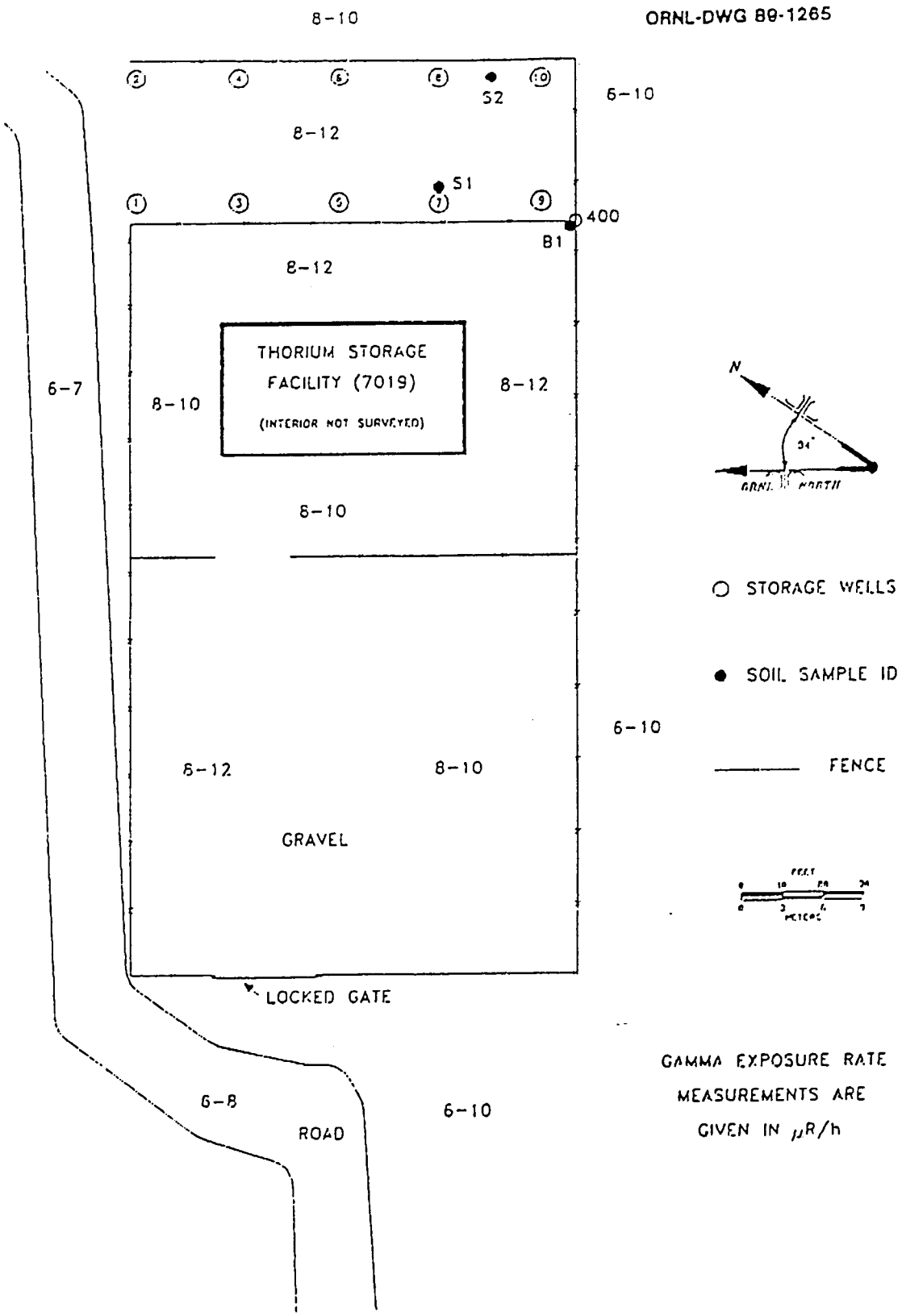


Fig. 8. Diagram showing results of outdoor gamma exposure rate measurements and locations of soil samples taken at the Thorium Storage Facility site. The dry storage wells located east of Building 7019 are numbered 1 to 10.

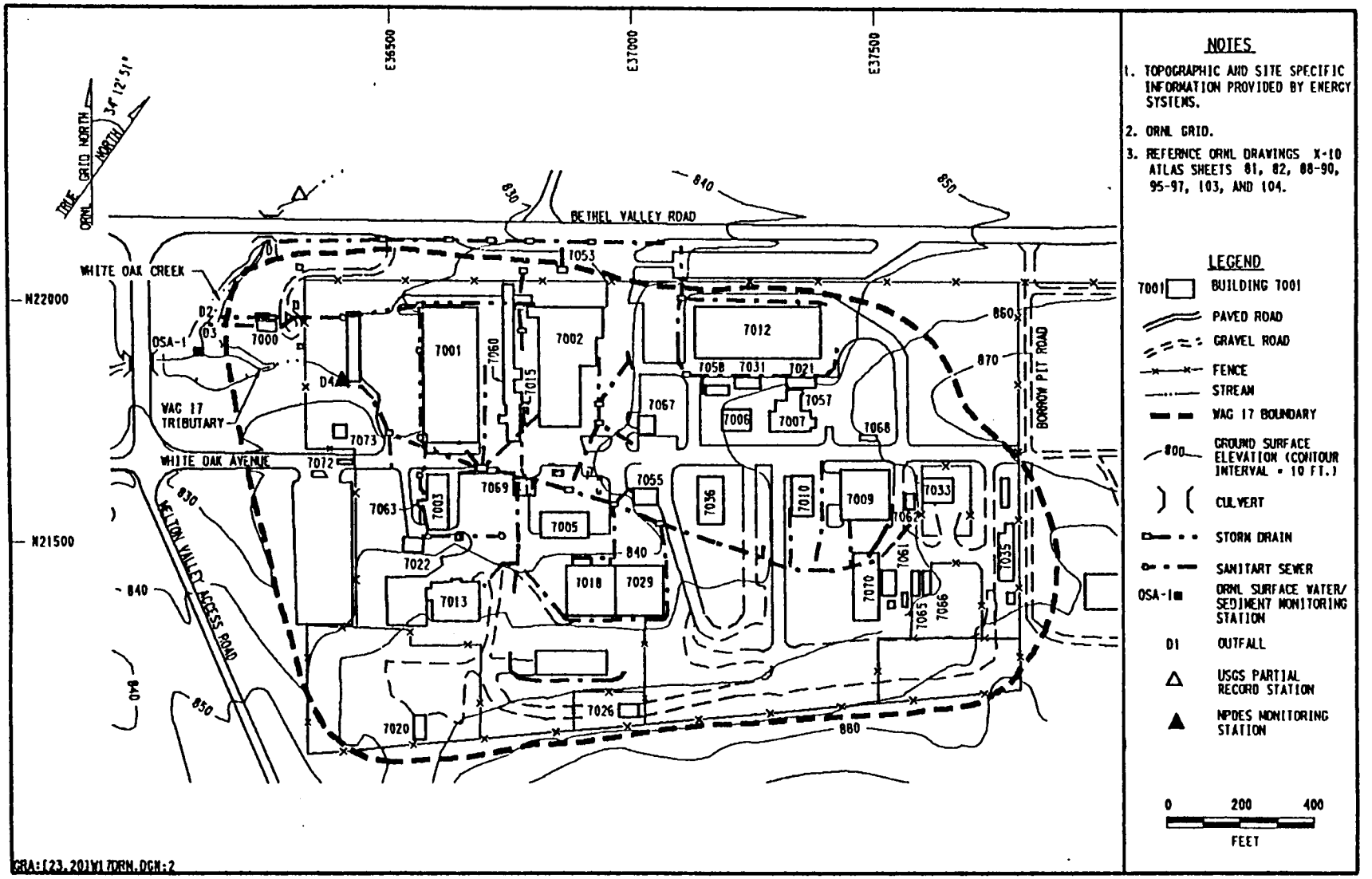
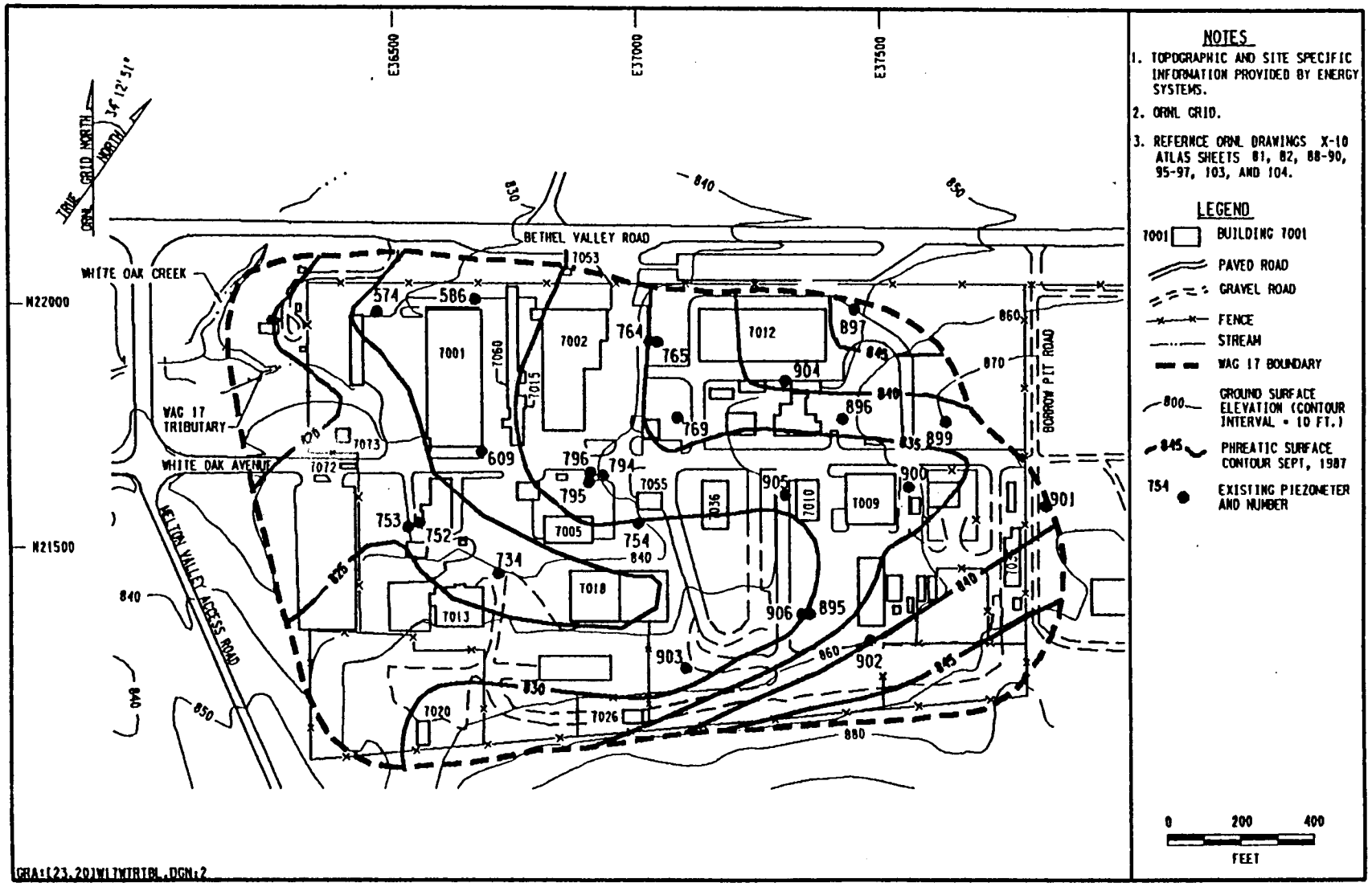


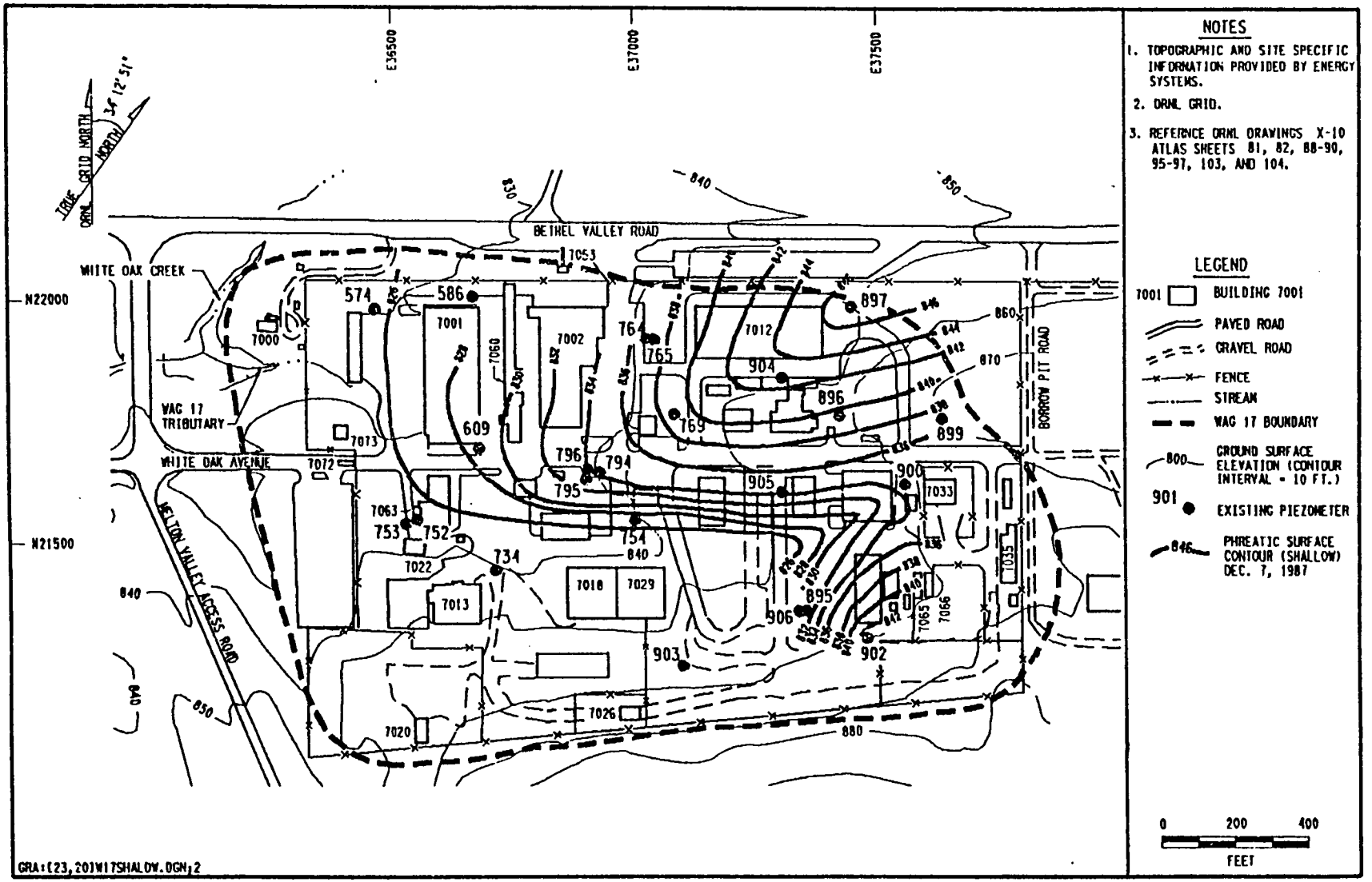
FIGURE 3-15
WAG 17 TOPOGRAPHY AND DRAINAGE



GRA:(23,20)WL17WTRIBL.DGN;2

SOURCE: Boegly and Moore (1988).

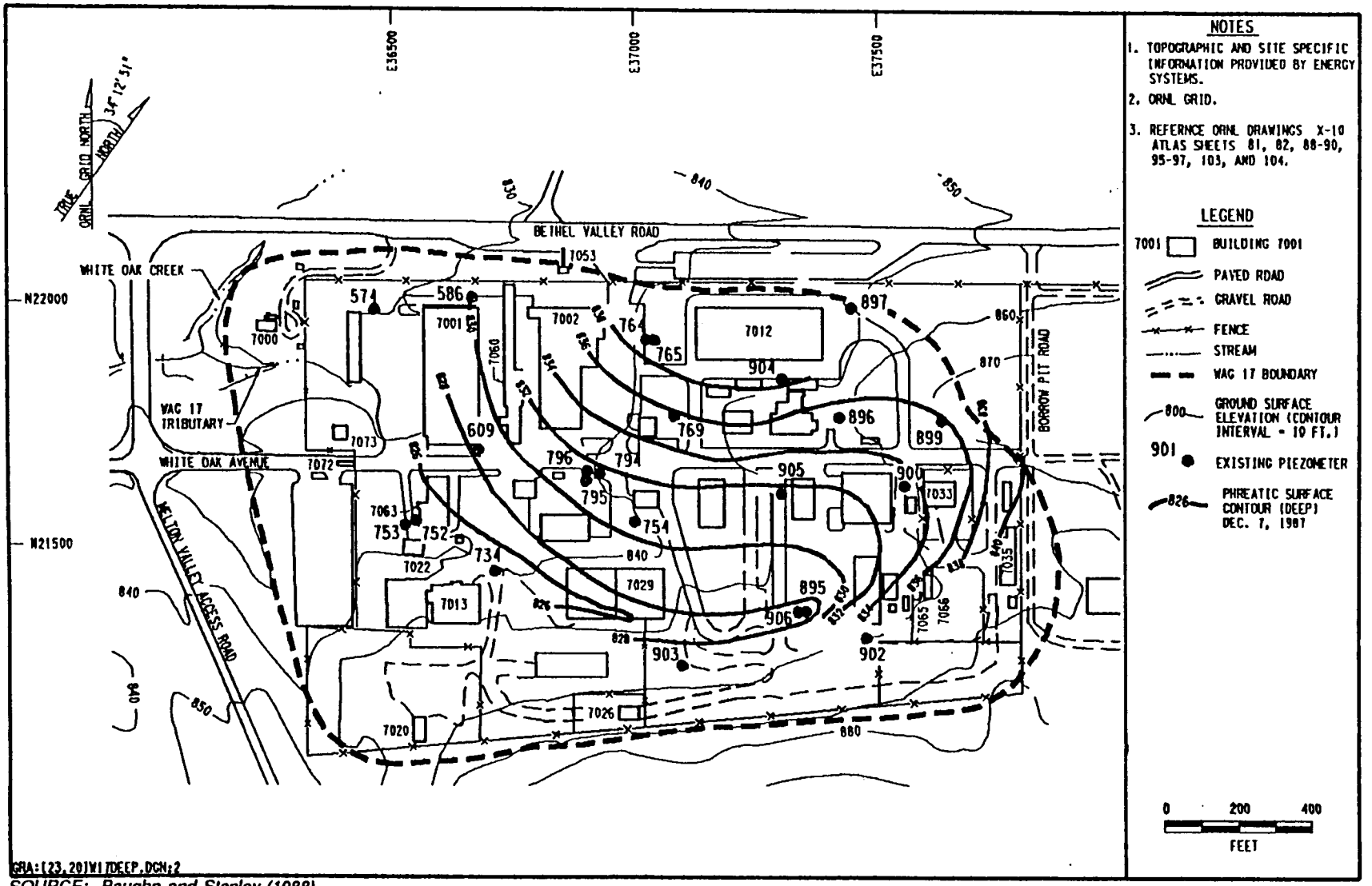
FIGURE 3-19
PHREATIC SURFACE MAP
FROM ALL PIEZOMETERS IN WAG 17



GRA:(23,20)W17SHALOW.DGN;2

SOURCE: BAUGHN AND STANLEY (1988).

FIGURE 3-20
PHREATIC SURFACE MAP
FROM SHALLOW PIEZOMETERS



SOURCE: Baughn and Stanley (1988).

FIGURE 3-21
PHREATIC SURFACE MAP
FROM DEEP PIEZOMETERS

V. Risk Assessment

Table B.2 Potential risk histories for selected* WAG perimeter wells

Well	94 Risk	95 Risk	Delta Risk	WAG
973	0.281	0.386	0.105	5
978	0.196	0.191	-0.005	5
974	0.0907	0.0854	-0.0053	5
969	0.0223	0.0151	-0.0072	5
977	0.0087	0.00732	-0.00138	5
812	0.00665	0.00699	0.00034	1
1201	0.00658	0.00646	-0.00012	17
843	0.00312	0.00232	-0.0008	6
1243	0.00232	0.00223	-9×10^{-5}	6
842	0.00165	0.000237	-0.001413	6
1076	0.00151	0.000411	-0.001099	7
971	0.00137	0.00163	0.00026	5
970	0.00132	0.00122	-0.0001	5
841	0.00129	0.000116	-0.001174	6
825	0.00103	0.000829	-0.000201	1
1191	0.000887	0.000687	-0.0002	2
1079	0.000825	0.000672	-0.000153	7
1097	0.000801	0.000207	-0.000594	8
1190	0.000716	0.000107	-0.000609	2
1096	0.000695	0.00241	0.001715	8
806	0.000658	0.000166	-0.000492	1
1078	0.00062	0.000488	-0.000132	7
1087	0.000605	0.000669	0.000064	8
994	0.000548	0.000796	0.000248	3
1242	0.000513	0.000406	-0.000107	6
847	0.000474	0.00017	-0.000304	6
844	0.000417	0.000183	-0.000234	6
1084	0.000306	0.000134	-0.000172	7
1244	0.000293	0.000134	-0.000159	6
993	0.000164	0.000368	0.000204	3
986	0.000131	0.000163	0.000032	3
1074	0.000117	0.000125	0.000008	7
996	0.0000075	0.000187	0.000795	3

*Wells included are those for which analytical results were available between May 1994 and April 1995 and for which potential risk exceeded 1×10^{-4}.

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Table B.1. (cont'd)

WELL	WAG	DCEE11	VINYL_CH	CO_60	TOTAL_SR	TRITIUM	BE	U_234	TC_99	Total Risk
980	5	0.00E+00	0.00E+00	1.82E-06	0.00E+00	0.00E+00	0.00E+00	.	.	1.82E-06
964	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-06	0.00E+00	.	.	1.34E-06
963	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E-07	0.00E+00	.	.	4.06E-07
843	6	0.00E+00	0.00E+00	3.22E-06	0.00E+00	2.31E-03	.	.	.	2.32E-03
1243	6	0.00E+00	0.00E+00	7.72E-05	0.00E+00	2.15E-03	.	.	.	2.23E-03
1242	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E-04	.	.	.	4.06E-04
842	6	0.00E+00	0.00E+00	6.22E-06	0.00E+00	8.52E-05	.	.	.	2.37E-04
844	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-04	.	.	.	1.83E-04
847	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-04	.	.	.	1.70E-04
1244	6	0.00E+00	0.00E+00	8.05E-05	5.08E-06	4.87E-05	0.00E+00	.	.	1.34E-04
841	6	0.00E+00	0.00E+00	2.47E-06	0.00E+00	1.14E-04	.	.	.	1.16E-04
839	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.81E-05	.	.	.	3.81E-05
838	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.53E-05	.	.	.	3.53E-05
835	6	0.00E+00	0.00E+00	0.00E+00	1.78E-06	1.56E-05	.	.	.	1.84E-05
840	6	0.00E+00	0.00E+00	0.00E+00	3.17E-06	1.34E-05	.	.	.	1.71E-05
859	6	0.00E+00	0.00E+00	0.00E+00	3.17E-06	7.71E-06	.	.	.	1.09E-05
836	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.12E-06	.	.	.	8.12E-06
837	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.28E-06	.	.	.	5.28E-06
833	6	0.00E+00	0.00E+00	0.00E+00	4.44E-06	0.00E+00	.	.	.	4.44E-06
1245	6	0.00E+00	0.00E+00	0.00E+00	3.81E-06	0.00E+00	0.00E+00	.	.	3.81E-06
831	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E-06	.	.	.	3.69E-06
745	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-06	.	.	.	2.76E-06
857	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E-06	.	.	.	2.15E-06
855	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E-06	.	.	.	1.74E-06
856	6	0.00E+00	0.00E+00	1.61E-06	0.00E+00	0.00E+00	.	.	.	1.61E-06
858	6	0.00E+00	0.00E+00	1.61E-06	0.00E+00	0.00E+00	.	.	.	1.61E-06
832	6	0.00E+00	0.00E+00	0.00E+00	1.40E-06	0.00E+00	.	.	.	1.40E-06
860	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.52E-07	.	.	.	8.52E-07
1079	7	0.00E+00	0.00E+00	1.61E-05	4.12E-06	6.49E-04	0.00E+00	.	7.47E-07	6.72E-04
1078	7	0.00E+00	0.00E+00	1.61E-04	6.98E-06	5.28E-05	0.00E+00	.	2.62E-04	4.88E-04
1076	7	0.00E+00	0.00E+00	0.00E+00	4.76E-06	4.06E-04	0.00E+00	.	.	4.11E-04
1084	7	0.00E+00	0.00E+00	2.90E-06	3.81E-06	1.22E-04	0.00E+00	.	5.40E-06	1.34E-04
1074	7	0.00E+00	0.00E+00	0.00E+00	4.44E-06	4.87E-07	1.20E-04	.	.	1.25E-04
1082	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	0.00E+00	.	.	2.60E-05
1083	7	0.00E+00	0.00E+00	0.00E+00	5.71E-06	1.06E-05	0.00E+00	.	1.59E-06	1.79E-05
1080	7	0.00E+00	0.00E+00	1.61E-06	3.17E-06	2.80E-06	0.00E+00	.	.	7.58E-06
1085	7	0.00E+00	0.00E+00	0.00E+00	4.44E-06	8.52E-07	0.00E+00	.	.	5.29E-06
1075	7	0.00E+00	0.00E+00	1.61E-06	1.84E-06	0.00E+00	0.00E+00	.	.	3.45E-06
1077	7	0.00E+00	0.00E+00	0.00E+00	1.74E-06	0.00E+00	0.00E+00	.	.	1.74E-06
1081	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-06	0.00E+00	.	.	1.01E-06
1071	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.74E-07	0.00E+00	.	.	9.74E-07
1096	8	0.00E+00	0.00E+00	0.00E+00	2.41E-03	0.00E+00	0.00E+00	.	.	2.41E-03
1087	8	0.00E+00	0.00E+00	1.72E-06	6.66E-04	9.33E-07	0.00E+00	.	.	6.69E-04
1097	8	0.00E+00	7.86E-05	1.61E-06	1.27E-04	0.00E+00	0.00E+00	.	.	2.07E-04
1088	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.33E-05	0.00E+00	.	.	9.33E-05
1092	8	0.00E+00	0.00E+00	1.07E-06	1.59E-06	5.28E-06	0.00E+00	.	.	7.93E-06
1095	8	0.00E+00	0.00E+00	0.00E+00	1.87E-06	1.14E-06	0.00E+00	.	.	4.01E-06
1094	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.98E-06	0.00E+00	.	.	3.98E-06
1090	8	0.00E+00	0.00E+00	0.00E+00	1.65E-06	0.00E+00	0.00E+00	.	.	1.65E-06
1091	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-06	0.00E+00	.	.	1.10E-06
1143	11	0.00E+00	0.00E+00	1.72E-06	2.38E-06	0.00E+00	0.00E+00	.	.	9.07E-06
1148	11	0.00E+00	0.00E+00	0.00E+00	2.44E-06	0.00E+00	0.00E+00	.	.	2.44E-06
1139	11	0.00E+00	0.00E+00	2.25E-06	0.00E+00	0.00E+00	0.00E+00	.	.	2.25E-06
1246	11	0.00E+00	0.00E+00	0.00E+00	1.46E-06	0.00E+00	0.00E+00	.	.	1.46E-06
1201	17	2.52E-04	-3.93E-03	0.00E+00	6.66E-06	8.52E-06	0.00E+00	.	.	-6.46E-03
1198	17	0.00E+00	0.00E+00	0.00E+00	3.49E-06	1.38E-05	0.00E+00	.	.	1.73E-05
1199	17	0.00E+00	0.00E+00	2.90E-06	2.92E-06	1.14E-05	0.00E+00	.	.	1.72E-05
1203	17	0.00E+00	0.00E+00	0.00E+00	7.30E-06	5.28E-06	0.00E+00	.	.	1.26E-05
1200	17	0.00E+00	0.00E+00	0.00E+00	4.12E-06	8.12E-06	0.00E+00	.	.	1.22E-05
1202	17	0.00E+00	0.00E+00	0.00E+00	6.66E-06	3.04E-06	0.00E+00	.	.	1.10E-05
1197	17	0.00E+00	0.00E+00	2.79E-06	0.00E+00	4.46E-06	0.00E+00	.	.	7.25E-06
1196	17	0.00E+00	0.00E+00	1.50E-06	0.00E+00	5.28E-06	0.00E+00	.	.	6.78E-06

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Table 8.5 Contaminants exceeding risk criteria in RCRA perimeter wells

	CONTAMINANTS		
WAG	Radionuclides	Metals	Organics
1	^{90}Sr, ^{234}U, ^{60}Co, ^{137}Cs, ^{3}H, ^{235}U, ^{238}U		Vinyl Chloride, Chloroform
2	^{90}Sr, ^{60}Co, ^{137}Cs, ^{3}H		
3	^{90}Sr, ^{60}Co, ^{137}Cs, ^{3}H		Vinyl Chloride, Trichloroethene
4	^{90}Sr, ^{60}Co, ^{3}H		Vinyl chloride, Bis(2-Ethylhexyl)pthalate, 1,2-Dichloroethane
5	^{90}Sr, ^{60}Co, ^{137}Cs, ^{3}H		Vinyl chloride, Bis(2-Ethylhexyl)pthalate, Benzene, 1,1-Dichloroethane
6	^{90}Sr, ^{60}Co, ^{3}H		
7	^{90}Sr, ^{60}Co, ^{137}Cs, ^{3}H	Be	
8	^{90}Sr, ^{60}Co, ^{3}H		Vinyl Chloride, Bis(2-Ethylhexyl)pthalate, Trichloroethene
11	^{90}Sr, ^{60}Co		Trichloroethene
17	^{90}Sr, ^{60}Co, ^{3}H		Vinyl Chloride, 1,1-Dichloroethene, Trichloroethene

[1]Underlined contaminants exceed a carcinogenic risk of 1×10^{-4}; the remaining contaminants are within the 1×10^{-4} to 1×10^{-6} risk range.

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Table 8.6 Groundwater Contaminants of Concern

Name	# Analyzed	# > 1×10^{-4}	# > 1×10^{-6}
Hydrogen-3	125	17	92
Strontium-90[1]	125	10	80
Vinyl Chloride	125	6	7
Technetium-99	4	1	3
1,1-Dichloroethene	125	1	2
Cobalt-60	125	1	35
Uranium-234	1	1	1
Total Risk	125	31	122

[1]Analysis conducted for total strontium (^{89}Sr and ^{90}Sr) and slope factor used for ^{90}Sr and ^{90}Y.

8.4.2 Prioritization of WAGs and Individual Wells

The EPA recommends taking the average of the representative exposure concentrations when aggregating analytical data from multiple wells within an exposure unit. Table 8.7 lists the average risk for each of the WAGs with wells analyzed for the time period April 1994–March 1995 based on this criteria. These risk results are not comprehensive as not all of the available RCRA perimeter wells were analyzed in the time period April 1994–May 1995. However, they are in good general agreement with the ranking of the WAGs in terms of their contributions to the surface water risk at White Oak Dam.

Table 8.7 Prioritization of WAGs based on Groundwater Risk

WAG	Carcinogenic Risk
4	8×10^{-2}
5	1×10^{-2}
17	8×10^{-4}
8	4×10^{-4}
1	4×10^{-4}
6	2×10^{-4}
7	1×10^{-4}
3	1×10^{-4}
2	2×10^{-5}
11	4×10^{-6}

Table 5.2. GWOU wells ranked by total risk with quality of aquifer denotations

WAG	Well	Total risk	WAG	Well	Total risk	WAG	Well	Total risk
5	973	2.2E-01	3	992	2.1E-04	2	1189	1.4E-05
5	978	1.6E-01	11	1145	1.9E-04	1	821	1.3E-05
5	974	6.7E-02	6	847	1.8E-04	3	987	1.3E-05
4	958	4.2E-02	6	844	1.7E-04	2	1151	1.3E-05
5	969	2.0E-02	6	1244	1.5E-04	5	980	1.2E-05
17	1201	1.2E-02	3	1248	1.5E-04	6	1245	1.2E-05
4	954	1.0E-02	3	993	1.4E-04	4	952	1.2E-05
5	975	8.7E-03	6	836	1.3E-04	5	983	1.2E-05
4	957	7.5E-03	5	968	1.3E-04	17	1199	1.2E-05
5	976	6.6E-03	3	986	1.2E-04	7	1081	1.1E-05
1	812	6.2E-03	6	838	1.1E-04	4	962	1.1E-05
5	977	5.6E-03	6	832	1.0E-04	5	965	1.1E-05
5	981	2.2E-03	6	839	1.0E-04	8	1090	1.1E-05
6	842	1.6E-03	1	816	9.9E-05	5	964	1.1E-05
5	971	1.3E-03	4	960	9.3E-05	2	1192	1.1E-05
7	1076	1.3E-03	6	745	9.2E-05	2	1193	1.0E-05
2	1190	1.2E-03	5	982	8.0E-05	7	1083	1.0E-05
5	970	1.1E-03	8	1088	7.2E-05	5	967	9.9E-06
1	809	9.6E-04	11	1246	6.9E-05	11	1149	9.5E-06
4	955	8.9E-04	5	979	6.9E-05	2	1150	9.4E-06
2	1191	8.6E-04	2	1194	6.9E-05	7	1080	9.0E-06
6	843	8.1E-04	1	947	6.4E-05	17	1200	8.3E-06
7	1079	6.9E-04	6	835	6.3E-05	17	1196	8.1E-06
4	956	6.6E-04	2	1195	5.9E-05	4	959	7.9E-06
6	837	6.4E-04	1	946	5.7E-05	2	1155	7.5E-06
1	825	6.2E-04	1	826	5.6E-05	11	1144	6.7E-06
1	830	6.0E-04	3	997	5.3E-05	3	995	6.6E-06
8	1096	6.0E-04	7	1073	5.0E-05	2	1188	6.5E-06
8	1097	5.9E-04	7	1071	5.0E-05	17	1197	6.5E-06
6	841	5.5E-04	7	1077	4.8E-05	8	1092	6.2E-06
3	994	5.2E-04	17	1202	4.7E-05	8	1093	6.1E-06
8	1087	4.9E-04	2	1185	4.7E-05	3	996	6.1E-06
6	831	4.8E-04	6	860	4.6E-05	2	1186	6.0E-06
6	840	4.0E-04	7	1074	4.6E-05	3	991	5.7E-06
6	846	4.0E-04	5	984	4.5E-05	4	961	5.6E-06
6	855	3.8E-04	7	1075	4.5E-05	4	953	5.6E-06
6	858	3.8E-04	1	822	4.3E-05	2	1245	5.6E-06
6	856	3.7E-04	1	820	4.1E-05	8	1094	5.3E-06
6	833	3.6E-04	1	815	4.1E-05	7	1086	4.9E-06
6	857	3.5E-04	4	949	4.1E-05	3	990	4.8E-06
1	813	3.3E-04	7	1072	4.0E-05	11	1140	4.7E-06
1	806	3.3E-04	1	818	3.6E-05	5	966	3.8E-06
2	1152	2.9E-04	8	1089	3.0E-05	4	950	3.4E-06
1	814	2.8E-04	17	1203	2.8E-05	3	998	3.2E-06
1	828	2.5E-04	7	1082	2.7E-05	4	951	2.7E-06
7	1078	2.5E-04	1	823	2.6E-05	11	1139	2.6E-06
1	807	2.4E-04	11	1143	2.4E-05	7	1085	2.5E-06
1	824	2.4E-04	3	985	2.3E-05	3	988	2.3E-06

Risk	WAG 1		WAG 2		WAG 3		WAG 4		WAG 5		WAG 6		WAG 7		WAG 8		WAG 11		WAG 17	
	Well	Total Risk	Well	Total Risk	Well	Total Risk	Well	Total Risk	Well	Total Risk	Well	Total Ris	Well	Total Risk	Well	Total Risk	Well	Total Risk	Well	Total Risk
1 x 10-1									973	2.2E-01										
									978	1.6E-01										
1 x 10-2							958	4.2E-02	974	6.7E-02									1201	1.2E-02
							954	1.0E-02	969	2.0E-02										
1 x 10-3	812	6.2E-03	1190	1.2E-03			957	7.5E-03	975	8.7E-03	842	1.6E-03	1076	1.3E-03						
									976	6.6E-03										
									977	5.6E-03										
									981	2.2E-03										
									971	1.3E-03										
									970	1.1E-03										
1 x 10-4	809	9.6E-04	1191	8.6E-04	994	5.2E-04	955	8.9E-04	972	2.2E-04	843	8.1E-04	1079	6.9E-04	1096	6.0E-04	1145	1.9E-04		
	825	6.2E-04	1152	2.9E-04	992	2.1E-04	956	6.6E-04	968	1.3E-04	837	6.4E-04	1078	2.5E-04	1097	5.9E-04				
	830	6.0E-04	1156	2.2E-04	1248	1.5E-04					841	5.5E-04	1084	2.2E-04	1087	4.9E-04				
	813	3.3E-04			993	1.4E-04					831	4.8E-04								
	806	3.3E-04			986	1.2E-04					840	4.0E-04								
	814	2.8E-04									846	4.0E-04								
	828	2.5E-04									855	3.8E-04								
	807	2.4E-04									858	3.8E-04								
	824	2.4E-04									856	3.7E-04								
	827	2.3E-04									833	3.6E-04								
	808	2.3E-04									857	3.5E-04								
	811	2.3E-04									847	1.8E-04								
	829	2.3E-04									844	1.7E-04								
	810	2.2E-04									1244	1.5E-04								
											836	1.3E-04								
											838	1.1E-04								
											832	1.0E-04								
											839	1.0E-04								
1 x 10-5	816	9.9E-05	1194	6.9E-05	997	5.3E-05	960	9.3E-05	982	8.0E-05	745	9.2E-05	1073	5.0E-05	1088	7.2E-05	1246	6.9E-05	1202	4.7E-05
	947	6.4E-05	1195	5.9E-05	985	2.3E-05	949	4.1E-05	979	6.9E-05	835	6.3E-05	1071	5.0E-05	1089	3.0E-05	1143	2.4E-05	1203	2.8E-05
	946	5.7E-05	1185	4.7E-05	987	1.3E-05	952	1.2E-05	984	4.5E-05	860	4.6E-05	1077	4.8E-05	1091	2.0E-05	1146	1.4E-05	1198	2.1E-05
	826	5.6E-05	1153	1.8E-05			962	1.1E-05	980	1.2E-05	1245	1.2E-05	1074	4.6E-05	1095	1.7E-05			1199	1.2E-05
	822	4.3E-05	1154	1.7E-05			959	7.9E-06	983	1.2E-05			1075	4.5E-05	1090	1.1E-05				
	820	4.1E-05	1189	1.4E-05					965	1.1E-05			1072	4.0E-05						
	815	4.1E-05	1151	1.3E-05					964	1.1E-05			1082	2.7E-05						
	818	3.6E-05	1192	1.1E-05									1081	1.1E-05						
	823	2.6E-05	1193	1.0E-05									1083	1.0E-05						
	819	1.5E-05																		
	821	1.3E-05																		
1 x 10-6			1150	9.4E-06	995	6.6E-06	961	5.6E-06	967	9.9E-06	859	1.7E-06	1080	9.0E-06	1092	6.2E-06	1149	9.5E-06	1200	8.3E-06
			1155	7.5E-06	996	6.1E-06	953	5.6E-06	966	3.8E-06			1086	4.9E-06	1093	6.1E-06	1144	6.7E-06	1196	8.1E-06
			1188	6.5E-06	991	5.7E-06	950	3.4E-06					1085	2.5E-06	1094	5.3E-06	1140	4.7E-06	1197	6.5E-06
			1186	6.0E-06	990	4.8E-06	951	2.7E-06									1139	2.6E-06		
			1187	2.2E-06	998	3.2E-06	948	2.2E-06									1148	1.8E-06		
					988	2.3E-06											1147	1.5E-06		
1 x 10-7									963	7.4E-07	1243	4.1E-07								

Fig. 5.1. WAG contributions to risk in the GWOU.

0001163

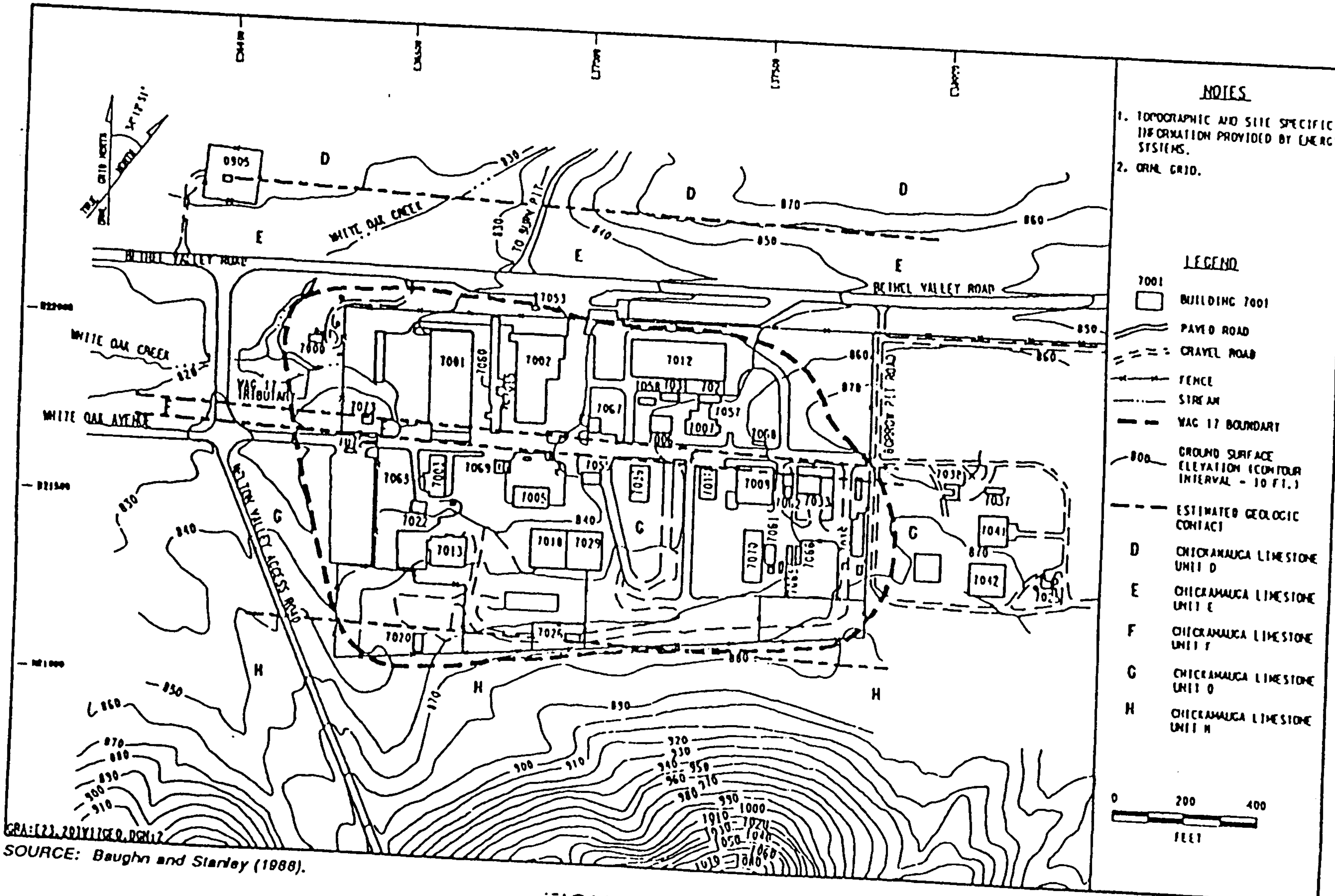
VI. Other

groundwater quality data were evaluated for this summary are presented in Fig. 3.27, and a summary of the total depths for these installations is presented in Table 3.10.

3.13.2.2 Contamination nature and extent

The principal source document used to develop an understanding of groundwater contamination at WAG 17 was the *Oak Ridge Reservation Environmental Report for 1991* (Energy Systems 1992b). Groundwater quality information was not presented for WAG 17 in the *Preliminary Geohydrologic Site Characterization and Proposed Water Quality Well Locations for WAG 17 and Lower WAG 2* (Energy Systems 1988b). The environmental report summarized results for groundwater samples collected during April 1991 from the eight groundwater quality wells located along the east and west boundaries of the WAG. Several volatile organic contaminants were detected in samples collected from Well 1201: 1,1-dichloroethene, benzene, tetrachloroethene, trichloroethene, and vinyl chloride. Concentrations of these contaminants ranged from 21 μg/L for benzene to 1200 μg/L for trichloroethene. Well 1202 was also found to contain trichloroethene contamination at a concentration of 13 μg/L. Subsequent sampling conducted during April 1992 found similar concentrations of the same contaminants in Well 1201. However, trichloroethene contamination in Well 1202 was absent, and trichloroethene not previously detected in Well 1203 was encountered at 53 μg/L.

Based on the historical information and analytical sampling results reported for WAG 17, the source and release mechanism for trichloroethene contamination within the WAG has not been identified, and the extent of groundwater contamination associated with trichloroethene and its degradation products has not been defined.



SOURCE: Baughn and Stanley (1988).

FIGURE 3-12
WAG 17 GEOLOGIC MAP

000167

00071

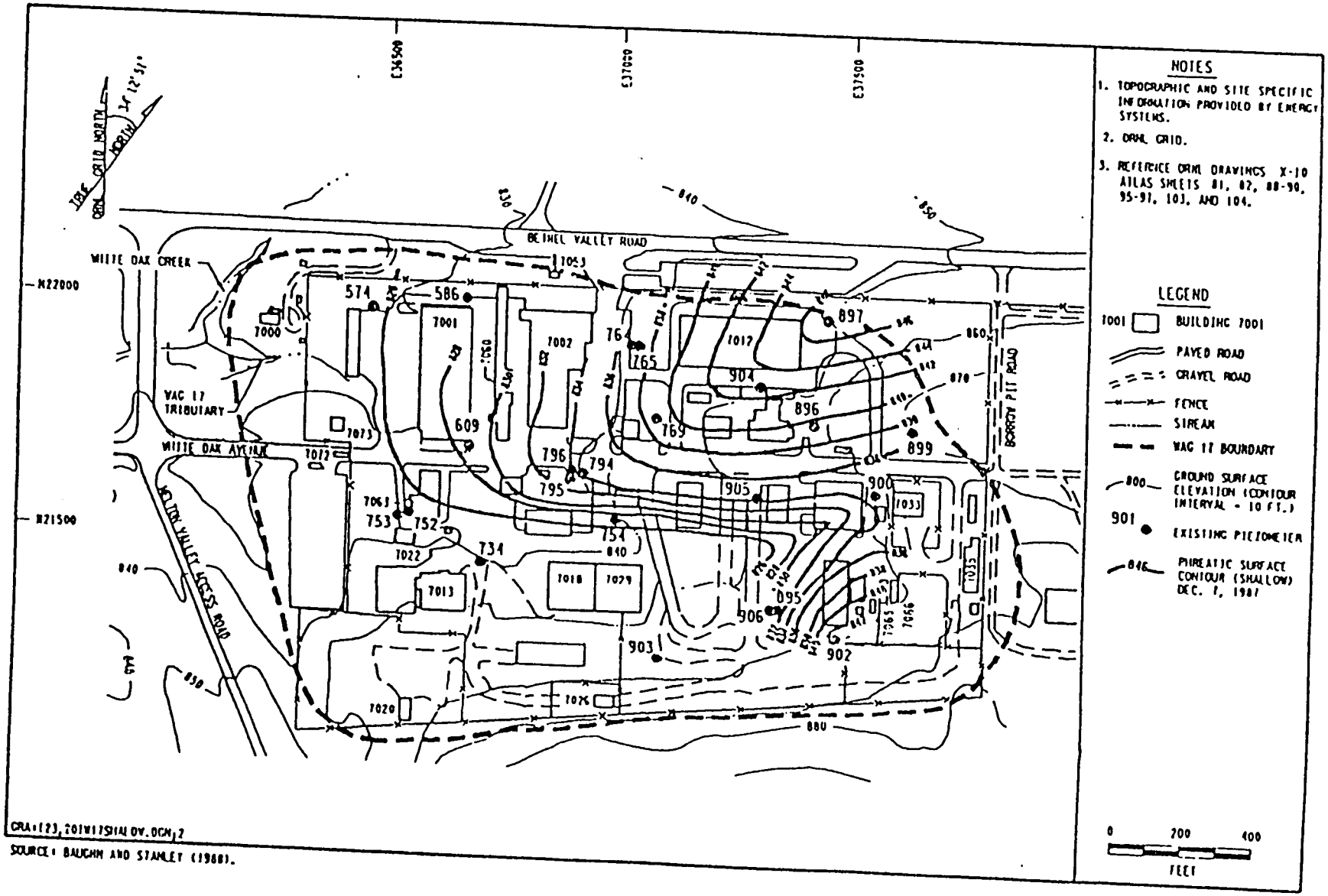
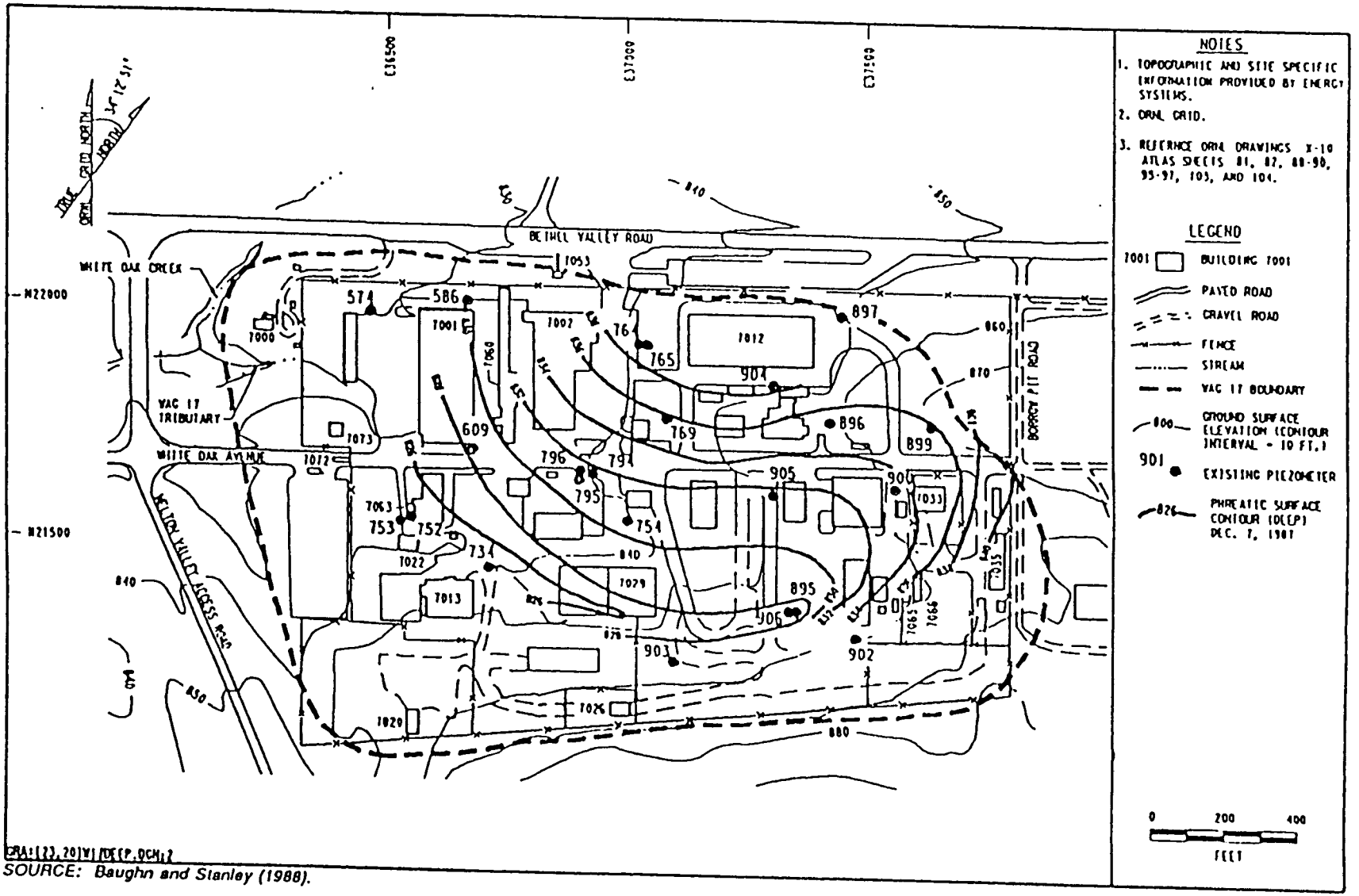


FIGURE 3-20
PHREATIC S FACE MAP
FROM SHALLO

00072

00016



SOURCE: Baughn and Stanley (1988).

FIGURE 3-21
PHREATIC SURFACE MAP
FROM DEEP PIEZOMETERS

Record of Conversation

TO: Ernest Ryan (ORNL Compliance)

FROM: Angie Brill

DATE: December 14, 1995

SUBJECT: ORNL WAG 17 SWMU Update

I called Ernest Ryan in follow up to my telephone conversation with John Mayo. We began discussing tank removal/closure activities in WAG 17 and he had the following comments.

- Tank 7075 was closed in place via filling the tank with inert material.
- Send him list of other tanks to review their status.

I sent a FAX to Ernest on 12/14/95 at 9:30 a.m. and await his reply.

Record of Conversation

TO: John Mayo (ORNL Engineering)

FROM: Angie Brill

DATE: December 13, 1995

SUBJECT: ORNL WAG 17 SWMU Update

I contacted John to determine the status of WAG 17 tank removals/corrective actions and he provided the following information.

- Tanks ~~7002W and~~ 7009E were removed/excavated in 1989.
- Tanks 7069A, 7069B, 7069C, and 7069D were removed/excavated.
- He suggested that I contact Ernest Ryan (ORNL Compliance) for more information.

MARTIN·MARIETTA

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

May 16, 1990

RECEIVED
MAY 1 0 1990
Reactors + Isotopes Division

J. B. Richard

Liability for Environmental Cleanup at Building 7019

In your memo of April 16, 1990, you requested clarification on ORNL policy regarding environmental cleanup of this facility which has been contaminated by previous multiple tenants. We will not ask you to assume responsibility for existing contamination. For example, contamination in the thorium storage wells adjacent to the building and within the building floor drain will continue to be the responsibiliity of ORNL whether or not you move into the building. On the other hand, it is assumed that Building 7019 will receive the same careful management attention after you occupy it that you give to other ORNL facilities which you occupy.

O B Morgan

O. B. Morgan, 4500N, MS-6260 (4-8447)

OBM/WCK/stb

cc: H. A. Glovier
W. C. Kuykendall
W. R. Rich
M. W. Rosenthal
File - RC

RESEARCH REACTORS DIVISION
Distributed by H. A. Glovier

J. L. Eggers ____ D. M. McGinty ____
G. F. Flanagan ✓ R. M. Stinnett ____
S. S. Hurt ____ R. L. Stover ____

W. K. Brown ____ J. B. Richard ____
R. E. Fenstermaker ____ D. R. Stapleton ✓
P. F Wright ____

RRD-CARTS ____ Chron File ____
RRD-DCC ____ Comm. No. ____

Please Handle ____ Due Date ____
Responsible ____
A = Action I = Information Only
C = Comments to Responsible Person

000173
TOTAL P.05

FACILITY CONTACT CHECKLIST

Unit Name: 7035 and 7007
Unit Number: Paint Stores and Paint Shop
Facility Manger/Contact: Frank Kolski
Date: 4/4/97

Historic Use/Purpose: Storage and use of paint and painting-related chemicals.

Current Status: active

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated: approx. 25 years

Waste Inventory/Characteristics: paints, solvents, etc.

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References: Inventory of materials and air release information available.

Date Prepared:

7007 Paint Shop Input Log

Date	Location	Product I.D.	Usage (gal/ month)	Density (lb/gal)	Weight Fraction of VOC	Weight Fraction of Solids	VOC Emitted	Rolling VOC Inventory/Mo.	Estimated Reverse Inventory/Mo.
Jan-97	SpraybootheAB	Crown Lacquer Thinner	5.0 gal	6.67	100.0%	0%	0.017 T	0.017T	235 gal
Jan-97	SpraybootheAB	510	5.0 gal	9.9	57.0%	43%	0.014 T	0.031T	232 gal
Jan-97	SpraybootheA	510	4.0 gal	9.9	57.0%	43%	0.011 T	0.042T	229 gal
Jan-97	SpraybootheA	510	1.0 gal	9.9	57.0%	43%	0.003 T	0.045T	229 gal
Jan-97	SpraybootheA	Crown Lacquer Thinner	5.0 gal	6.67	100.0%	0%	0.017 T	0.062T	225 gal
Jan-97	SpraybootheA	6-284	1.0 gal	8	47.3%	53%	0.002 T	0.063T	224 gal
Jan-97 Total							0.063 T		1374 gal
Grand Total							0.063 T		1374 gal

000177

7007 Paint Shop Input Log

Date	Location	Product I.D.	Usage (gal/ month)	Density (lb/gal)	Weight Fraction of VOC	Weight Fraction of Solids	VOC Emitted	Rolling VOC Inventory/Mo.	Estimated Reverse Inventory/Mo.
Feb-97	SpraybootheA	59620	1.0 gal	7.74	75.9%	24%	0.003 T	0.003T	239 gal
Feb-97	SpraybootheA	6-284	1.0 gal	8	47.3%	53%	0.002 T	0.005T	238 gal
Feb-97	SpraybootheAB	59620	5.0 gal	7.74	75.9%	24%	0.015 T	0.020T	235 gal
Feb-97	Ext	510	2.0 gal	9.9	57.0%	43%	0.006 T	0.025T	233 gal
Feb-97	SpraybootheB	Keeler Long	1.0 gal	11	42.0%	58%	0.002 T	0.027T	233 gal
Feb-97 Total							0.027 T		
Grand Total							0.027 T		

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04-04-1997
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by CAREA)

UNCLASSIFIED
Page: 1
Installation: ORNL

3 Division: 321 Department: Control Area: XW067 Building: 7007 Room: Area: WA Code:
m ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
e Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Conc Type Cd:

:EA: XW067 WRIGHT R F

RECID	**	CASNO	MATERIAL NAME	MMES C A	R T	Total VOL/WEIGHT AMOUNT	UNIT	Total POUNDS	Total KILOGRAMS	No of Items
89419		NISS	CROWN EPOXY THINNER	N	Y	2.0000	GAL	14.0200	6.3594	2
89420		NISS	CROWN LACQUER THINNER OR PT 129, SOLVENT	N	Y	58.0000	GAL	411.4216	186.6194	14
89421		NISS	CROWN MINERAL SPIRITS	N	N	4.0000	GAL	33.3808	15.1412	4
94490		NISS	DAP DERUSTO BARBEQUE & STOVE BLACK H-64 BRUSHABL	N	Y	1.0000	GAL	8.3452	3.7853	1
B0670		NISS	DEVOE DE-VO-LAC (R) SUPER BUILD LACQUER CLEAR SA	N	Y	12.0000	GAL	100.1424	45.4236	12
B1149		NISS	DEVOE DE-VO-LAC SUPER BUILD CLEAR LACQUER	N	Y	7.0000	GAL	58.4164	26.4971	7
96130		NISS	DEVOE TRAFFIC LINE WATER BASED MARKING PAINT YEL	Y	Y	4.0000	GAL	33.3808	15.1412	4
96103		NISS	DUPONT ENAMEL REDUCER 3812S	N	Y	8.0000	GAL	66.7616	30.2824	8
B2021		NISS	FLOOD COMPANY EASY SURFACE PREP	N	Y	1.0000	GAL	8.3452	3.7853	1
85527		NISS	GAVLON 510 ENAMEL, ANY COLOR	N	Y	75.0000	GAL	625.8900	283.8975	75
90588		NISS	KEELER & LONG P-SERIES POLY-SILICONE ENAMELS	N	N	5.0000	GAL	45.1355	20.4730	5
85576		NISS	KILZ ALKYD RESIN PRIMER	N	N	2.0000	GAL	16.6904	7.5706	2
89823		NISS	NAZDAR 59-000 (59100) SERIES SYNTHETIC GLOSS ENA	Y	Y	2.2500	GAL	18.7767	8.5168	6
89668		NISS	NAZDAR ENAMEL PLUS GLOSS SCREEN INK	N	N	11.0000	QT	22.9493	10.4093	11
89523		NISS	NAZDAR FILM ADHERENT	N	N	2.0000	QT	4.1726	1.8926	2
A3017			NEW HERMES GRAVOPLY (A3015 & A3016)	N	N	2.0000	LB	0.0000	0.0000	1
93426		NISS	PENETROL/MARINE PENETROL	N	N	1.0000	GAL	8.3452	3.7853	1
85508		NISS	PPG CUSTOM BULK COLORANTS, 96 LINE	N	Y	7.0000	QT	22.6366	10.2676	7
B0696		NISS	PPG INDUSTRIES PITT-TECH 90-475	N	Y	1.0000	GAL	9.7639	4.4288	1
A6607		NISS	PPG INDUSTRIES QUICK DRY ENAMEL - REGAL BLUE	N	Y	1.0000	GAL	8.6793	3.9368	1
1338		NISS	PPG METAL SIDING REFINISH, 71 LINE	Y	Y	15.0000	GL	156.4740	70.9761	3
3054		NISS	PPG PITT GLAZE REDUCER, 16-125	N	N	1.0000	GAL	7.0100	3.1797	1
A5769		NISS	PPG PITT-TECH HIGH GLOSS	N	Y	20.0000	GAL	201.9560	91.6061	16
A9857		NISS	PPG PITT-TECH SATIN 90-474	N	Y	20.0000	GAL	205.2940	93.1204	4
93125		NISS	PPG REZ URETHANE VARNISHES, 77-N	N	N	1.0000	GAL	8.3452	3.7853	1
85575		NISS	PPG REZ VARNISHES 77-A	N	N	2.0000	GAL	16.6904	7.5706	2
A0764		NISS	PPG SPEEDHIDE 6-306	N	N	3.0000	GAL	25.0356	11.3559	3
89201		NISS	PPG SPEEDHIDE ALKYD GLOSS ENAMELS, 6-P	N	Y	11.0000	GAL	105.5670	47.8861	11
89353		NISS	PPG SPEEDHIDE LATEX FLAT PAINTS, 6-B	N	N	47.0000	GAL	490.2852	222.3899	47
88524		NISS	PPG SPEEDHIDE LO-SHEEN ENAMELS, 6-C	N	N	32.0000	GAL	333.8112	151.4152	16
89401		NISS	PPG WHITE MULTIPRIME, 97-684	N	Y	3.0000	GAL	31.5450	14.3085	3
B5274		NISS	SAFETY COATINGS PLASTIBAR YELLOW	Y	Y	100.0000	GAL	1109.9220	503.4576	20
89368		NISS	SHEFFIELD BRONZE PAINT PRUSSIAN BLUE	N	N	12.0000	OZ	1.3140	0.5952	12
91048	*	NISS	SIKAGARD 62, YELLOW, GREEN, GRAY, RED, TAN (A293	N	N	4.0000	GL	33.3811	15.1415	1
89683		NISS	STABLER 3148 L/F AREA YELLOW PRIMER	N	N	1.0000	GAL	8.3452	3.7853	1
89521		NISS	SYNKO INTERIOR AND EXTERIOR SPACKLING PASTE	N	Y	2.0000	GL	16.6904	7.5706	2
89971		NISS	USG JOINT TREATMENT PRODUCTS - READY MIXED COMPO	N	Y	10.0000	GL	83.4528	37.8538	2
A3603		NISS	WHITE LIGHTNING 'ONE STEP' SPACKLING COMPOUND	N	N	1.0000	GAL	4.0891	1.8548	1
			CAREA XW067 Totals:					4356.4615	1976.0638	311

indicates MSDS is not available
indicates MSDS updated within last three months

:SR003B
:53:59

04-04-1997
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by CAREA)

UNCLASSIFIED
Page: 1
Installation: ORNL

. 3 Division: 321 Department: Control Area: XW068 Building: 7035 Room: Area: WA Code:
:m ID: LIST: Ingredient: Mix Comp:. to HAZ Class: HAZ Rating:
:c Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

:EA: XW068 WRIGHT R F

RECID	**	CASNO	MATERIAL NAME	MMBS C A	MMBS R T	Total VOL/WEIGHT AMOUNT	UNIT	Total POUNDS	Total KILOGRAMS	No of Items
00677		000067-64-1	ACETONE	N	N	2.0000	GAL	13.1520	5.9656	2
B0699		NISS	ATLANTA SUNDRIES GOOF OFF REMOVER	N	Y	2.0000	GAL	16.6904	7.5706	2
B1157		NISS	BALTIMORE SET FAST(TM) WATER BORNE TRAFFIC MARKI	Y	Y	45.0000	GAL	552.0411	250.4034	9
89875		NISS	BENJAMIN MOORE BENWOOD POLY URETHANE FINISH, FLA	N	N	1.0000	GAL	8.3452	3.7853	1
89414		NISS	BIX STRIPPER	N	Y	1.0000	GAL	8.3452	3.7853	1
94921		NISS	BORDEN KRYLON 1311 MATTE FINISH SPRAY COATING	N	Y	22.0000	OZ	1.4342	0.6504	2
89478		NISS	BULLETIN COLOR, 158 DARK BLUE	N	N	1.0000	QT	2.0863	0.9463	1
A1931		NISS	BULLSEYE ENVIRONMENTAL CORP. BULLTACK SPRAY ADHE	N	Y	24.0000	OZ	0.0828	0.0374	2
89420		NISS	CROWN LACQUER THINNER OR PT 129, SOLVENT	N	Y	262.0000	GAL	1858.4916	843.0058	54
89421		NISS	CROWN MINERAL SPIRITS	N	N	50.0000	GAL	417.2600	189.2650	50
94490		NISS	DAP DERUSTO BARBEQUE & STOVE BLACK H-64 BRUSHABL	N	Y	11.0000	GAL	91.7972	41.6383	11
89129		NISS	DAY-GLO COLOR 215 ALKYD PAINT	N	N	6.0000	GL	50.0712	22.7118	6
92165		NISS	DAY-GLO FILTERAY B 202-01	N	Y	2.0000	GL	16.6904	7.5706	2
89382		NISS	DAZ-L FLUORESCENT (ALL COLORS)	Y	Y	5.0000	GL	41.7260	18.9265	5
87236	**	NISS	DEVOE AND REYNOLDS DE-VO-LAC (R) LACQUER RETARDE	N	Y	6.0000	GAL	50.0712	22.7118	6
50165		NISS	DEVOE BAR RUST 236 CLEAR CONVERTER/MULTI PURPOSE	Y	N	6.2500	GAL	52.1580	23.6585	5
B0670		NISS	DEVOE DE-VO-LAC (R) SUPER BUILD LACQUER CLEAR SA	N	Y	24.0000	GAL	200.2848	90.8472	24
B1149		NISS	DEVOE DE-VO-LAC SUPER BUILD CLEAR LACQUER	N	Y	5.0000	GAL	41.7260	18.9265	5
96106		NISS	DEVOE DEVOKO(R) BAR-OX Q.D. ALK. GLOSS ENAMEL 58	Y	N	2.0000	GAL	16.6904	7.5706	2
97470		NISS	DEVOE PRE-PRIME 167 CLEAR BASE	N	N	5.0000	GAL	41.7260	18.9265	5
7469		NISS	DEVOE PRE-PRIME 167 CONVERTER	N	N	5.0000	QT	10.4315	4.7315	5
.0637		NISS	DEVOE T-10 THINNER	N	Y	2.0000	GAL	16.6904	7.5706	2
96129		NISS	DEVOE TRAFFIC LINE WATER BASED MARKING PAINT - W	Y	Y	5.0000	GAL	41.7348	18.9308	1
96130		NISS	DEVOE TRAFFIC LINE WATER BASED MARKING PAINT YEL	Y	Y	1.0000	GAL	8.3452	3.7853	1
94818		NISS	DEVOE TRU-GLAZE WB EPOXY GLOSS COATING PART A	N	Y	17.0000	GL	141.8684	64.3501	17
97458		NISS	DEVOE TRU-GLAZE-WB(TM) WATERBORNE EPOXY CLEAR GL	N	Y	5.0000	GL	41.7260	18.9265	5
96137		NISS	DEVOE WONDER SHIELD EXTERIOR ACRYLIC LATEX SATIN	Y	Y	171.0000	GAL	1427.0292	647.2863	171
A2444		NISS	DUMOND PEEL AWAY I	N	N	1.0000	GAL	11.0992	5.0345	1
90164		NISS	DUPONT ACRYLIC LACQUER PRIMER AND SEALER 80S	N	Y	1.0000	GAL	8.3452	3.7853	1
96103		NISS	DUPONT ENAMEL REDUCER 38123	N	Y	7.0000	GAL	58.4164	26.4971	7
89897		NISS	DUPONT LACQUER RETARDER	N	N	5.0000	GAL	41.7263	18.9268	2
89894		NISS	DUPONT PLATINUM GRAY PX PRIMER SURFACER NUMBER 3	N	Y	1.0000	GAL	8.3452	3.7853	1
90357		NISS	DUPONT WHITE, 817A	N	Y	3.0000	GAL	25.0356	11.3559	3
89405		NISS	DURHAM'S ROCK HARD WATER PUTTY	N	N	4.0000	LB	4.0000	1.8143	1
97222		NISS	DYNATRON 490 PATCH KIT	N	Y	5.0000	LB	5.0000	2.2679	1
B0934		NISS	E.I. DUPONT GREEN 99553L	N	Y	2.0000	GAL	16.6904	7.5706	2
B2021		NISS	FLOOD COMPANY EASY SURFACE PREP	N	Y	8.0000	GAL	66.7616	30.2824	8
B0689		NISS	FLOOD COMPANY FLOETROL	N	N	4.0000	GAL	33.3808	15.1412	4
A6742		NISS	GARON PRODUCTS GUARD TOP	Y	N	5.0000	GAL	46.8991	20.8196	1
85527		NISS	GAVLON 510 ENAMEL, ANY COLOR	N	Y	283.0000	GAL	2361.6916	1071.2399	283
93425		NISS	H&C SILICONE ACRYLIC CONCRETE STAIN	N	Y	9.0000	GAL	75.1068	34.0677	9
90388		NISS	KESLER & LONG P-SERIES POLY-SILICONE ENAMELS	N	N	34.0000	GL	306.9214	139.2167	30
85576		NISS	KILZ ALKYD RESIN PRIMER	N	N	25.0000	GAL	208.6300	94.6325	25
96575		NISS	LENMAR GLOSS BLACK BRUSH LACQUER	N	Y	2.0000	GAL	16.6904	7.5706	2
92851		NISS	LENMAR NITROCELLULOSE REGAL BLUE BRUSH LACQUER	N	Y	3.0000	GAL	25.0356	11.3559	3

indicates MSDS is not available
indicates MSDS updated within last three months

LSR003B
:53:59

04-04-1997
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by CAREA)

UNCLASSIFIED
Page: 2
Installation: ORNL

.: 3 Division: 321 Department: Control Area: XW068 Building: 7035 Room: Area: WA Code:
em ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
te Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

06441	008001-26-1	LINSEED OIL	N	N	3.0000 GAL	23.3109	10.5735	3
00037	000078-93-3	METHYL ETHYL KETONE	N	Y	5.0000 GAL	33.6060	15.2435	5
A6233	NISS	MINWAX FAST DRYING POLYURETHANE GLOSS, SEMIGLOSS	N	N	1.0000 GAL	7.1894	3.2610	1
89813	NISS	NAZDAR 59-000 (59100) SERIES SYNTHETIC GLOSS ENA	Y	Y	16.0000 QT	33.3808	15.1408	16
89523	NISS	NAZDAR FILM ADHERENT	N	N	1.0000 QT	2.0863	0.9463	1
93426	NISS	PENETROL/MARINE PENETROL	N	N	9.0000 GAL	75.1068	34.0677	9
89385	NISS	PPG AQUAPON 'A' COMPONENTS 97-A	N	Y	9.0000 GAL	101.3949	45.9918	9
91131	NISS	PPG AQUAPON COMP. A SAFETY BLUE 97-11	N	Y	2.0000 GL	20.1956	9.1606	2
85508	NISS	PPG CUSTOM BULK COLORANTS, 96 LINE	N	Y	274.0000 QT	886.0612	401.9032	274
93058	NISS	PPG ELASTOMERIC PITT-PLEX, 4-110	N	N	55.0000 GL	628.8172	285.2289	11
89526	NISS	PPG EXTERIOR FLAT LATEX, 72 LINE	Y	Y	4.0000 GAL	43.3952	19.6840	4
93080	NISS	PPG HI SOLIDS PITT GLAZE 16-B COMPONENT B	N	N	6.0000 GAL	75.1074	34.0680	6
89362	NISS	PPG HI SOLIDS PITT GLAZE COMPONENT A, 16-A	Y	N	24.0000 GAL	200.2848	90.8472	24
B0692	NISS	PPG INDUSTRIES PITT-TECH 90-376	N	Y	35.0000 GAL	309.6100	140.4382	7
B0695	NISS	PPG INDUSTRIES PITT-TECH 90-475	N	Y	3.0000 GAL	29.2917	13.2867	3
A6607	NISS	PPG INDUSTRIES QUICK DRY ENAMEL - REGAL BLUE	N	Y	20.0000 GAL	173.5820	78.7360	20
90338	NISS	PPG METAL SIDING REFINISH, 71 LINE	Y	Y	30.0000 GL	312.9480	141.9522	6
50078		PPG PITT GLAZE ACRYLIC EPOXY COMPONENT A(16-C) A	Y	N	4.0000 GL	33.3810	15.1414	2
89361	NISS	PPG PITT GLAZE ACRYLIC EPOXY COMPONENT A, 16-C	Y	N	19.0000 GAL	182.3430	82.7108	19
89436	NISS	PPG PITT GLAZE ACRYLIC EPOXY COMPONENT B, 16-D	Y	N	16.0000 GL	173.5808	78.7344	16
93054	NISS	PPG PITT GLAZE REDUCER, 16-125	N	N	5.0000 GAL	35.0500	15.8985	5
89439	NISS	PPG PITT GUARD COMP. B, 97-149	Y	N	1.0000 GAL	11.5999	5.2617	1
89378	NISS	PPG PITT-GUARD DIRECT TO RUST COMP. A, 97-D	N	Y	22.0000 GL	275.3938	124.9171	11
A5769	NISS	PPG PITT-TECH HIGH GLOSS	N	Y	154.0000 GAL	1555.0612	705.3686	58
A5770	NISS	PPG PITT-TECH PRIMER	N	Y	1.0000 GAL	10.1812	4.6181	1
9857	NISS	PPG PITT-TECH SATIN 90-474	N	Y	41.0000 GAL	420.8527	190.8973	9
89917	NISS	PPG PITTHANE ACRYLIC URETHANE COMPONENT A, 97-I	N	Y	1254.3818 OZ	81.7836	37.0964	6
91666	NISS	PPG PITTHANE CATALYST COMP. B, 97-819	N	N	10.5000 L	3.4720	1.5736	14
89664	NISS	PPG POLYCLOTCH WASH PRIMER - ACID COMP., 97-688	N	N	2.0000 QT	3.7970	1.7222	2
89662	NISS	PPG POLYCLOTCH WASH PRIMER A, 97-687	Y	N	1.0000 GAL	7.4273	3.3690	1
94841	NISS	PPG QUICK DRY ENAMEL SAFETY YELLOW, 6-330	N	N	2.0000 GAL	17.8588	8.1006	2
88527	NISS	PPG QUICK DRY ENAMELS, 54-A AND 54-B	N	Y	5.0000 GAL	41.7260	18.9265	5
89448	NISS	PPG QUICK DRY SPRAY ENAMELS, 55-B	N	Y	286.0000 OZ	13.9832	6.3426	22
89410	NISS	PPG QUICK-DRY WOOD SAND-SEAL-FINISH OIL, 6-10	N	N	7.0000 GAL	49.0700	22.2579	7
85575	NISS	PPG REZ VARNISHES 77-A	N	N	7.0000 GAL	58.4164	26.4971	7
A0744	NISS	PPG SPEEDHIDE 6-306	N	N	10.0000 GAL	83.4520	37.8530	10
89391	NISS	PPG SPEEDHIDE ALKYD FLAT PAINTS, 6-A	Y	N	1.0000 GAL	10.8488	4.9209	1
89201	NISS	PPG SPEEDHIDE ALKYD GLOSS ENAMELS, 6-F	N	Y	195.0000 GAL	1871.4150	848.8724	195
89388	NISS	PPG SPEEDHIDE FLAT BLACK LATEX INTERIOR/EXTERIOR	Y	Y	6.0000 GAL	61.5882	27.9360	6
87165	NISS	PPG SPEEDHIDE LATEX FIRE RETARDANT, 42-7	N	N	50.0000 GAL	542.4400	246.0500	50
89353	NISS	PPG SPEEDHIDE LATEX FLAT PAINTS, 6-B	N	N	257.0000 GAL	2680.9212	1216.0471	253
89032	** NISS	PPG SPEEDHIDE LATEX S/G ENAMELS, 6-H	N	N	13.0000 GAL	130.1859	59.0512	13
88524	NISS	PPG SPEEDHIDE LO-SHEEN ENAMELS, 6-C	N	N	90.0000 GAL	938.8440	425.8532	86
86230	NISS	PPG SPEEDHIDE PRIMER, 6-603	N	Y	85.0000 GAL	858.3130	389.3272	17
89202	NISS	PPG SUN-PROOF S/G LATEX HOUSE AND TRIM, 76 LINE	Y	Y	50.0000 GAL	479.8840	217.6600	10
89985	NISS	PPG WHITE GALVANIZED STEEL PRIMER, 6-209	N	N	1.0000 GAL	13.6862	6.2080	1
89401	NISS	PPG WHITE MULTIPRIME, 97-684	N	Y	12.0000 GAL	126.1800	57.2348	12
89392	NISS	PPG WHITE TRAFFIC AND ZONE MARKING PAINT, 11-3	N	Y	20.0000 GL	242.0132	109.7764	4
89393	NISS	PPG YELLOW TRAFFIC AND ZONE MARKING PAINT, 11-4	Y	Y	15.0000 GL	125.1792	56.7807	3
91869	NISS	PRATT & LAMBERT NL CAMPBELL EASY SANDING CLEAR L	Y	Y	3.0000 GAL	25.0356	11.3559	3

indicates MSDS is not available
indicates MSDS updated within last three months

:SR003B
53:59

04-04-1997
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by CAREA)

UNCLASSIFIED
Page: 1
Installation: ORNL

3 Division: 321 Department: Control Area: XW068 Building: 7035 Room: Area: WA Code:
:m ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
:e Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

90571	NISS	PRATT & LAMBERT NITROCELLULOSE FLAT BLACK LACQUE	Y	Y	3.0000	GL	25.0356	11.3559	3
95626	NISS	RABCO COCOON 501	Y	Y	20.0000	GAL	151.8840	68.8940	4
89818	NISS	RABCO COCOON WEBBING AGENT	N	Y	5.0000	GAL	41.7264	18.9269	1
92481	NISS	RESIST-A-CHEM HIGH BUILD EPOXY COATING COMPONENT	N	N	6.2500	GAL	52.1580	23.6585	5
92485	NISS	RESIST-A-CHEM RACROC EPOXY PRIMER COMPONENT A	N	N	16.0000	GAL	133.5232	60.5648	16
92486	NISS	RESIST-A-CHEM RACROC EPOXY PRIMER COMPONENT B	N	Y	22.0000	QT	45.8986	20.8186	22
95581	NISS	RESIST-A-CHEM VINYL ESTER RESIN COATING	N	Y	23.0000	GAL	222.6515	100.9930	23
B5275	NISS	SAFETY COATINGS PLASTIBAR WHITE	N	Y	19.0000	GAL	206.1272	93.4990	19
B5274	NISS	SAFETY COATINGS PLASTIBAR YELLOW	Y	Y	14.0000	GAL	155.3888	70.4830	14
94208	NISS	SEAL-KRETE SKID-PROOF TEXTURED DECORATIVE COATIN	N	N	316.9060	LB	316.9056	143.7470	7
92367	NISS	SEAL-KRETE WATERPROOFING SEALER	N	N	3.0000	GAL	25.0356	11.3559	3
B0937	NISS	SHEFFIELD BURNT UMBER - 7 TINTSALL	N	N	18.0000	OZ	1.1734	0.5322	2
B0936	NISS	SHEFFIELD RAW SIENNA - 5 TINTSALL	N	N	9.0000	OZ	0.5867	0.2661	1
92136	NISS	SHERWIN-WILLIAMS BLEND-A-COLOR(TM) TONER	N	Y	18.0000	QT	37.5534	17.0324	18
B0962	NISS	SHERWIN-WILLIAMS C20 P 1 NO. 162 PURPLE	N	Y	3.0000	QT	6.5718	2.9808	3
B0961	NISS	SHERWIN-WILLIAMS C20 W 1 WHITE	N	N	1.0000	QT	2.1906	0.9936	1
94497	NISS	SHERWIN-WILLIAMS OPEX(TM) LACQUER, BLACK	N	Y	3.0000	GAL	25.0356	11.3559	3
A2940	NISS	SIKAGARD 62 HI BILD PART B ALL COLORS	N	N	20.0000	GAL	263.7110	119.6180	10
91048	* NISS	SIKAGARD 62, YELLOW, GREEN, GRAY, RED, TAN (A293	N	N	88.0000	GL	734.3862	333.1130	22
89683	NISS	STABLER 3148 L/F AREA YELLOW PRIMER	N	N	4.0000	GL	33.3808	15.1412	4
89521	NISS	SYNKO INTERIOR AND EXTERIOR SPACKLING PASTE	N	Y	32.0000	GL	267.0464	121.1296	32
B6245	NISS	THEMEC SERIES 041 NO. 2 THINNER	N	Y	1.0000	GL	8.3452	3.7853	1
94837	NISS	TRU-GLAZE W/B-CLEAR PART B	N	N	128.0000	OZ	8.3450	3.7850	5
94207	NISS	TRU-GLAZE-WB EPOXY GLOSS COATING, PART B	N	Y	20.0000	GAL	166.9040	75.7060	20
89871	NISS	USG JOINT TREATMENT PRODUCTS - READY MIXED COMPO	N	Y	45.0000	GL	375.5376	170.3421	9
1352	NISS	USG POWDER JOINT COMPOUND	N	N	30.0000	GAL	250.3584	113.5614	6
3603	NISS	WHITE LIGHTNING "ONE STEP" SPACKLING COMPOUND	N	N	9.0000	GL	75.1068	34.0677	9
89156	NISS	WHITE LIGHTNING, 3006	N	N	1716.0000	OZ	179.0076	81.1968	24
		CAREA XW068 Totals:					26419.3465	11983.6436	2323

indicates MSDS is not available
indicates MSDS updated within last three months

FACILITY CONTACT CHECKLIST

Unit Name: Lead Shop
Unit Number: 7005
Facility Manger/Contact: Robert Mink, 574-4127
Date: 4/4/97

Historic Use/Purpose: Facility used for storing and melting lead

Current Status: active

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated: in operation

Inventory/Characteristics: lead used in current operations

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References:

Date Prepared: 4/4/97

FACILITY CONTACT CHECKLIST

Unit Name: Carpenter Shop
Unit Number: 7009
Facility Manger/Contact: Frank Kolski, 241-4661
Date: 4/4/97

Historic Use/Purpose: Carpenter shop

Current Status: active

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated: closed between 1987 and 1997, currently in operation.

Inventory/Characteristics: Standard chemicals associated with carpentry activities eg. glues, contact cement, epoxy, and thinning solvents.

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments: Building 7009 was closed for 10 years due to the presence of asbestos ceiling materials which was falling to the floor. Reengineering of the ceiling has eliminated the work hazard and the building has reopened.

References: no inventory documentation available

Date Prepared: 4/4/97

FACILITY CONTACT CHECKLIST

Unit Name: Metals and Ceramics Storage
Unit Number: 7026
Facility Manger/Contact: Ron Baldwin, 574-8603
Date: 4/4/97

Historic Use/Purpose: Storage of metals and ceramics

Current Status: active

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated: in operation

Waste Inventory/Characteristics: no hazardous materials as per personal communication.

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References:

Date Prepared: 4/4/97

FACILITY CONTACT CHECKLIST

Unit Name: LLW Line Item and Material Storage
Unit Number: 7039 and 7041
Facility Manger/Contact: Gary Denton, 574-4672
Date: 4/4/97

Historic Use/Purpose: 7039 was originally a lumber shed, usage was changed to storage of stainless piping for use for tank construction (Bethel Valley). 7041 was, and is still, a lumber storage shed.

Current Status: active

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: no hazardous materials (except for the metal which is categorized as hazardous due to welding activities associated with it).

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References:

Date Prepared: 4/4/97

FACILITY CONTACT CHECKLIST

Unit Name: Pickling Vat
Unit Number: 7055
Facility Manger/Contact: Robert Mink, 574-4127
Date: 4/4/97

Historic Use/Purpose: Facility used for pickling of materials (metals fabrication). Has also been used to store fertilizer in the past. Current use is as a 90-day hazardous waste collection area

Current Status: active

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated: in operation

Waste Inventory/Characteristics: pickling chemicals (no specifics)

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References:

Date Prepared: 4/4/97

FACILITY CONTACT CHECKLIST

Unit Name: Chemical Storage Area
Unit Number: 7075
Facility Manger/Contact: Dave Drake, 241-3694
Date: 4/4/97

Historic Use/Purpose: 7075 was used to store used oil (inside the building). Behind the building were 2 poly tanks used to store waste photographic chemicals

Current Status: used as a storage facility for spill response supplies

Facility Fate: NA

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: Used oil has been removed (RCRA Closure Report available), photographic chemicals have also been removed, documentation may or may not be available.

Known Releases: none

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References: see attached

Date Prepared: 4/4/97

Fax
D. Dr
D Hu
B Edge

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Solid Waste Management
Fifth Floor, L & C Tower
401 Church Street
Nashville, TN 37243-1535

October 19, 1994

Mr. Larry L. Radcliffe
Director, Waste Management Division
U.S. DOE Oak Ridge Operations
Oak Ridge National Laboratory
P.O. Box 2001
Oak Ridge, Tennessee 37831-7468

Certified Mail # P 995 329 083
Return Receipt Requested

Dr. Alvin W. Trivelpiece
Oak Ridge National Laboratory Director
Martin Marietta Energy Systems, Inc.
P.O. Box 2008
Oak Ridge, Tennessee 37831

Certified Mail # P 995 329 083
Return Receipt Requested

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Butch/D. Drake/Dhall	From 10/28 Nan
Co.	Co.
Dept.	Phone #
Fax # 6-1553	Fax #

RE: Closure Certification
RCRA Closure Plan for Tank 7075
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831
EPA ID Number: TN1 89 009 0003
Unit(s): Tank

Dear Mr. Radcliffe and Dr. Trivelpiece:

This letter is to inform you that the Tennessee Department of Environment and Conservation's Division of Solid Waste Management has completed its review of the Owner/Operator, Co-Operator, and Independent Registered Professional Engineer Closure Certifications submitted under a cover letter dated September 13, 1994 for the above unit.

The Department concurs that closure has been performed in accordance with the approved closure plan and in compliance with the closure performance standards of Tennessee Rule 1200-1-11-.05(7)(a)1.

If you have any questions or concerns on this matter, please feel free to contact Mr. Robert S. Nakamoto of my staff at 615-532-0868.

Sincerely,

Tom Tiesler

Tom Tiesler, Director
Division of Solid Waste Management

94-3435

Enclosure

cc:
G. Alan Farmer, Chief, RCRA Branch, EPA, Region IV
Earl Loming, Director, DOE Oversight Office, TDEC
Jack Crabtree, Manager, Knoxville Field Office, DSWM
Jacqueline Okoreeh-Baah, Chief, Hazardous Waste Permitting, DSWM
M. Edward Cox Jr., Hazardous Waste Permitting, DSWM
Ed Casey, Public Participation, DSWM
O.J. Wingfield, Financial Responsibility, DSWM

FACILITY CONTACT CHECKLIST

Unit Name: Synthetic Fuel Storage
Unit Number: 7038
Facility Manger/Contact: Wayne Greist, 574-4864
Date: 4/4/97

Historic Use/Purpose: Facility used to store synthetic fuels

Current Status: inactive

Facility Fate: na

Approximate Dimensions and Capacity:

Dates Operated:

Waste Inventory/Characteristics: see attached

Known Releases: 53 gallons of diesel fuel was spilled on to the gravel parking area in 1993 - occurrence report attached

S&M Responsibilities: na

Database availability/contact: FIA

Comments:

References:

Date Prepared: 4/4/97

Category 1. Petroleum Fuels

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
9201, 9202, 9204, 9205	Fog Oil	4 x 55	1
	Fog Oil	13 x 5	1
9101, 1910, 1911, 1914-1921	Phillips Referee DF-2	11 x 55	2
	Phillips Referee DF-2	17 x 5 6 x 2 17 x 1L	2

Category 2a. Naphthas, Jet Fuels, and Diesel Fuels

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
4614	Petroleum JP-5	1 x 55	1
4615, 1924-1926	Petroleum JP-8	4 x 55	1
1922	Petroleum Jet A-1	1 x 55	1
9525	Suncor Naphtha	1 x 55	2
9526	Suncor Kerosene	1 x 55	3
9527	Suncor Diesel	1 x 55	3
9523	Tar Sands/Petrol. DF-2	1 x 55	4
4705	Shale JP-4	1 x 55	5
4801, 4802	Shale DF-2	2 x 55	6
4604, 4608	Shale Pre. & JP-5	2 x 55	7
4605, 4609	Shale Pre. & JP-8	2 x 55	7
4606	Shale Pre. DFM	1 x 30	6
1325, 1329, 1336	H-Coal Naphtha	3 x 55	8
1651, 1656	EDS Naphtha	2 x 55	8
985-988	Synthetic Gasolines	4 x 5	9

Category 2b. Crudes and Light/Heavy Oils
from Petroleum and Synthetic Fuels

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
9521	West TX Intermed. Crude Oil	1 x 5	1
CRM 3	Wilmington Crude Oil	1 x 55	1
CRM 5	Recluse Cude Oil	1 x 55	1
9522	Kensyntar Crude	1 x 5	1
9528	Suncor Unifying Gas Oil	1 x 55	2
4701-4704	Occidental Crude Shale Oil	4 x 55	3
CRM 2	Paraho Crude Shale Oil	1 x 20	3
4602	HDT Paraho Shale Oil	1 x 55	4
4607	HDT Shale Oil Residue	1 x 40	5
4101	LETC Crude Shale Oil	1 x 30	3
1320, 1322, 1326, 1330, 1332, 1335, 1337	H-Coal Light Oil	8 x 55	6
1321, 1323, 1327, 1331, 1334, 1338	H-Coal Heavy Oil	6 x 55	7
934	H-Coal, HDT-H	1 x 5	8
935	H-Coal, HDT-L	1 x 5	8
1652-1653	EDS Middle Distillate	2 x 55	9
1654-1655	EDS Heavy Distillate	2 x 55	10
1657-1658	EDS Spent Solvent & Recycle Solvent	2 x 55	11
1002, 1004, 1006-1009	DITSL Distillates	2 x 1 4 x 5	8
990, 991	IRDC SRC & TSL Middle Distillates	2 x 5	8
979-981	HDT ITSL Liquid	3 x 5	8
982, 983	ITSL Liquid	2 x 2	8
CRM 1	SRC-II Fuel Oil Blend	1 x 10 (in 55 gal. drum)	8
1503, 1507	SRC-I Wash and Process Solvents	2 x 55	12
1706	SRC-II Middle Distillate	1 x 55	13
9501-9510	Kern River Heavy Crude Oil	10 x 5	14
9520	Lt. LA Sweet Crude Oil	1 x 55	15

Note: HDT = hydrotreated.

Category 3a. Pourable or "Shovelable" Solids Which Can Be Ground or Mixed, and Which Have ≥ 7,000 BTU/lb Heat Content

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
1702	SRC-II Coal Slurry	1 x 55	1
1703	SRC-II Stripper Twr. Btm.	1 x 55	2
1704, 1705	SRC-II Vacuum Btm.	2 x 55	3
1502	SRC-I Product	1 x 55	4
984	IRDC SRC-I Product*	2 x 5	5
1659	EDS Vac. Tower. Btm.	1 x 55	6
-	H-Coal Vacuum Bottoms*	4 x 5	5
989	IRDC ITSL Solid Product*	2 x 5	5
1000, 1001, 1003, 1005	DITSL Residuals*	4 x 1	5
CRM 4	UMD Coal Gasifier Tar	1 x 30	7

Category 3b. Solids With ≤ 7,000 BTU/lb Heat Content

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
4205	Retorted Shale	1 x 25 (in 55 gal. bbl)	1
4211	Retorted Shale, < 10 μm	1 x 20	2
4212	Retorted Shale, > 10 μm	1 x 55	3
4204	Raw Oil Shale	10 x 5	4
1505	SRC-I Dry Mineral Residue	1 x 55	5
(Ed Davis)	SRC-II Centrifuged Sludge	3 x 5	6
MPM/CWF	Sealed Paint Cans	40 x 1	7
MPM	Sludge	Ca. 40 lbs in box	8
MPM/CWF	Recovery Clay	1 x 55	9

Category 4. Miscl. Small-Volume Bottles of Organic Liquids or Solids Packed Into Drums

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
-	Drums of Small Bottles	9 x 55	9 separate

Category 5. Aqueous Liquids

Sample No.	Description	No. x Volume (gal.)	Grouping for Sampling
-	Waste Water from Coal Conversion	5 x 5	1

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

September 27, 1993

Distribution

Revised 10 Day/Final Occurrence Report (I0011390) for Off-Normal Incident at Building 7038 on September 1, 1993

Attached is a copy of the revised 10 day/final occurrence report for the diesel fuel spill at building 7038. The ESAMS does not allow modifications, so the report was rejected to permit revision per DOE/ORO review. These revisions are as follows:

Item 20: "2B Proc. Problem - Lack of Procedure" was added as a contributing cause.
Item 21: The root cause was changed to "2B Proc. Problem - Lack of Procedure"
Item 23: "Speed of fork lift on the uneven gravel parking lot also may have contributed." was added.

The "2B Proc. Problem - Lack of Procedure" was the closest of the limited choices to indicating the need for better work instructions. A formal procedure is not needed, and the corrective action of a memo to P&E to check the drum closures before moving drums is sufficient.

Wayne H. Griest, Bldg. 4500-S, MS-6120 (4-4864)

WHG:btm

Enclosures

cc: D. K. Arakawa
C. A. Biggs
R. Chung
M. R. Guerin
W. R. Laing
L. Robinson
J. Wagner
S. D. Wright

OCCURRENCE REPORT

X10ANLCHEM - Analytical Chemistry
(Name of Facility)

Balance of Plant
(Facility Function)

Oak Ridge National Laboratory
(Name of Laboratory Site or Organization)

Name: W H GRIEST
Title: GROUP LEADER
Telephone No. (615)574-4864
(Facility Manager/Designee)

Name: W H GRIEST
Title: GROUP LEADER
Telephone No. (615)574-4864
(ORIGINATOR)

1. OCCURRENCE REPORT NUMBER: ORO--MMES-X10ANLCHEM-1993-0003
   MMES Occurrence Number: MMES-93-000993 X10 -93-00168 (I0011390)
   Action Item Reference ID:
   Source ID Number:

2. REPORT TYPE AND DATE:

	Date	Time
[ ] Notification Report	09/02/1993	09:59
[ ] 10 Day Report	09/03/1993	10:15
[ ] 10 Day Update (latest)		
[X] Final Report	09/23/1993	08:42

3. OCCURRENCE CATEGORY:

   [ ] Emergency
   [ ] Unusual
   [X] Off-Normal
   [ ] Non-Routine
   [ ] Void

4. DIVISION OR PROJECT:
   Analytical Chemistry

5. DOE PROGRAM OFFICE:
   ER - Energy Research

OCCURRENCE REPORT

6. SYSTEM, BLDG., OR EQUIPMENT:
7038

7. UCNI?
NO

8. PLANT AREA:
Parking lot

9. DATE AND TIME DISCOVERED:
09/01/1993 08:55

10. DATE AND TIME CATEGORIZED:
09/01/1993 11:00

11. DATE AND TIME OF DOE NOTIFICATION:

12. DATE AND TIME OF OTHER NOTIFICATIONS:
09/01/1993 09:05 . . FACSIMILE COPY / OR-EOC
09/01/1993 09:05 R O HULTGREN / SITE REP

13. SUBJECT OR TITLE OF OCCURRENCE:

Diesel fuel spill

14. NATURE OF OCCURRENCE:

2B Env. - Haz. Subst/Reg. Pollutants/Oil Releases

15. DESCRIPTION OF OCCURRENCE:

A fork lift was carrying a 55 gal. drum of diesel fuel to a refrigerated storage unit when the drum fell from the drum snatcher. The drum fell to the ground and the diesel fuel spilled. A total of 53 gal. of diesel fuel was spilled on the gravel parking area.

16. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

Returning drums to storage unit

17. ACTIVITY CATEGORY:

Normal Operations

18. IMMEDIATE ACTIONS TAKEN AND RESULTS:
Press Release Anticipated: NO

Notified Lab Shift Superintendent. LSS notified Environmental Compliance & Documentation and the Spill Response Team. Spill Response Team dug up the contaminated gravel and stored it in drums.

ANO--MMES-X10ANLCHEM-1993-0003

OCCURRENCE REPORT

19. DIRECT CAUSE:
3E Personnel Error - Other Human Mistake

20. CONTRIBUTING CAUSE(S):
3B Personnel Error - Inattention to Detail
2B Proc. Problem - Lack of Procedure

21. ROOT CAUSE:
2B Proc. Problem - Lack of Procedure

22. DESCRIPTION OF CAUSE:

Apparent cause was failure to notice that the drum head locking ring was not bolted. This may have allowed the drum to distort and slip from the drum snatch. Speed of fork lift on the uneven gravel parking lot also, may have contributed.

23. EVALUATION: (by Facility Manager/Designee) COST EVALUATION: 2B

Incident was avoidable. It can be prevented in the future by inspecting drums before they are moved.

24. IS FURTHER EVALUATION REQUIRED: Yes [ ] No [X]
IF YES, BEFORE FURTHER OPERATION: Yes [ ] No [X]
IF YES, BY WHOM? BY WHEN?

25. CORRECTIVE ACTIONS:

SEQUENCE NUMBER: 001 ACTION ID: A0032718

Memo to Plant & Equipment inspecting the closure on each drum before moving with a fork lift.

TARGET COMPLETION DATE: 09/15/1993 COMPLETION DATE:

26. IMPACT ON ENVIRONMENT, SAFETY, AND HEALTH:

Minimal, 20 drums of diesel fuel, contaminated gravel were collected in the remediation. Streams, other surface water, and ground water were not contaminated, and animals or humans were not injured.

27. PROGRAMMATIC IMPACT:

None

OCCURRENCE REPORT

28. IMPACT UPON CODES AND STANDARDS:

None

29. FINAL EVALUATION AND LESSONS LEARNED:

Failure to inspect items before moving caused the spill.
Items must be inspected before moving.

30. SIMILAR OCCURRENCE REPORT NUMBERS:
None

31. DOE FACILITY REPRESENTATIVE INPUT:

Entered by: Date:

OCCURRENCE REPORT

32. SIGNATURES:

_____ Date:_____
Facility Manager (Name, Position)

_____ Date:_____
DOE Facility Representative (Name, Position)

_____ Date:_____
DOE Program Manager (Name, Position)

MARTIN MARIETTA

nternal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

Date: 31 August 1995

To: John Parrott, Jr., 3017, MS-6044, 4-6595

From: K.B. Thomas, 4500N, MS-6209, 4-4947 Kimberly B. Thomas

cc: W.H. Griest, 4500S, 4-4864

Subject: Tar Contaminated Rain Water

During the week of August 21, 1995, the refrigeration in building 7038 failed, causing the samples to overheat. One jar of coal tar (MSDS attached) broke. The contents drained out of the unit and contaminated approximately 120 gallons of rainwater. The spill response team absorbed most of the tar into clay and rags; however, the remaining water is discolored and has a sheen. Plant and Equipment Division has had coal tar analyzed and found that it does not fail RCRA tests for any characteristic or toxicity. Chemical and Analytical Sciences Division requests permission to dispose of the rainwater contaminated with coal tar via the Nonradiological Wastewater Treatment Plant.

Note: we did receive that permission, and the contaminated rainwater was disposed through the NWTP.
W.H. Griest
4/3/97

VII. References

ORNL/RAP/Sub-87/99053/20

REMEDIAL INVESTIGATION PLAN FOR WASTE AREA GROUPING 17

DECEMBER 1988

OAK RIDGE NATIONAL LABORATORY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Report Prepared by
Bechtel National, Inc.
P. O. Box 350
Oak Ridge, Tennessee 37830
under
Subcontract 30B-99053C

for

Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831

Operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under Contract DE-AC05-84OR21400

Access to the information in this report is limited to those indicated on the distribution list, to the U.S. Department of Energy and its contractors, to other Government Agencies and their contractors, and to Tennessee Government Agencies.

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ORNL/ER-124

Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Annual Report of the Environmental Restoration Monitoring and Assessment Program at Oak Ridge National Laboratory for FY 1992

R. B. Clapp, Editor

Date Issued—September 1992

Prepared by
Environmental Sciences Division
Oak Ridge National Laboratory
ESD Publication 3945

Prepared for
U.S. Department of Energy
Office of Environmental Restoration and Waste Management
under budget and reporting code EW 20

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6285
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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DOE/OR/01-1290&D1

Third Annual Environmental Restoration Monitoring and Assessment Report for FY 1994 of the Oak Ridge National Laboratory, Oak Ridge, Tennessee

X-002883

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ORNL/ER-74

Environmental Restoration Division
ORNL Environmental Restoration Program

Groundwater Quality Monitoring Well Installation for Waste Area Grouping 17 at Oak Ridge National Laboratory, Oak Ridge, Tennessee

J. A. Mortimore
M. L. Ebers

Date Issued—September 1994

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
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831-6285
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

000243
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DOE/OR/01-1413&D1

Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Fourth Annual Environmental Restoration Monitoring and Assessment Report (FY 1995), Oak Ridge National Laboratory, Oak Ridge, Tennessee

R. B. Clapp and
J. A. Watts, Editors

Date Issued: September 1995

Prepared by
Environmental Sciences Division
Oak Ridge National Laboratory
ESD Publication 4463

Prepared for
U.S. Department of Energy
Office of Environmental Management
under budget and reporting code EW 20

Environmental Restoration and Waste Management Programs
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831-6285
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

DOE/OR/01-1252&D1
ORNL/ER-221&D1

Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Remedial Investigation Work Plan for the Groundwater Operable Unit at Oak Ridge National Laboratory, Oak Ridge, Tennessee

Date Issued—March 1994

Prepared by
Science Applications International Corporation
Oak Ridge, Tennessee
under contract 95B-99069C-X01-106

Prepared for
U.S. Department of Energy
Office of Environmental Restoration and Waste Management
under budget and reporting code EW 20

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6285
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MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

94-010MS/032394

ORNL/ER-391

Energy Systems Environmental Restoration Program

Site Descriptions of Environmental Restoration Units at Oak Ridge National Laboratory, Oak Ridge, Tennessee

A. J. Kuhaida, Jr.
A. F. Parker

Date Issued—February 1997

Prepared by
Advanced Sciences, Inc.
Oak Ridge, Tennessee
under subcontract 9128.X01

Prepared for the
U.S. Department of Energy
Office of Environmental Management
under budget and reporting code EW 20

Environmental Management Activities at
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

ORNL/ER-249/R2

Energy Systems Environmental Restoration Program

Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Oak Ridge, Tennessee

Date Issued—August 1995

Prepared by
Isotopes Facilities Deactivation Project
Environmental Restoration Divison
Oak Ridge National Laboratory

Prepared for
U.S. Department of Energy
Office of Environmental Management
under budget and reporting code EW 20

Environmental Restoration and Waste Management Programs
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831-6285
managed by
LOCKHEED MARTIN ENERGY SYSTEMS
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

000251

SITE-SPECIFIC STANDARD REQUEST FOR UNDERGROUND STORAGE TANK SITES 7069B, 7069E, AND 7069F AT THE OAK RIDGE NATIONAL LABORATORY

FACILITY ID. NO. 0-730089

REVISION 1

Prepared for:
Martin Marietta Energy Systems, Inc.
Subcontract No. 1BX-SK978C

Prepared by:
Ogden Environmental and Energy Services
1009 Commerce Park Drive, Suite 100
Oak Ridge, TN 37830

January 25, 1994

Ogden File No. 2-4514-0100-0000

ORNL/ER-345

Energy Systems Environmental Restoration Program

Annual Summary Report on the Surveillance and Maintenance Activities for the Oak Ridge National Laboratory Environmental Restoration Program for Fiscal Year 1995

Date Issued—November 1995

Prepared by
The S. M. Stoller Corporation
Oak Ridge, Tennessee
under subcontract 70M-SC914C

Prepared for the
U.S. Department of Energy
Office of Environmental Management
under budget and reporting codes EW 20 and EX 20

Environmental Management Activities at the
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

MARTIN MARIETTA ENERGY SYSTEMS LIBRARIES
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ADDENDUM TO THE ENVIRONMENTAL ASSESSMENT REPORT FOR UNDERGROUND STORAGE TANK SITES 7069B, 7069E, AND 7069F AT THE OAK RIDGE NATIONAL LABORATORY

Facility I.D. No. 0-730089

Prepared For:

Martin Marietta Energy Systems, Inc.
Subcontract No. 1BX-SK978C

Prepared By:

Ogden Environmental and Energy Services Co., Inc.
1009 Commerce Park Drive, Suite 100
Oak Ridge, Tennessee

August 30, 1993

Ogden No. 2-4514-0100

ENVIRONMENTAL ASSESSMENT REPORT
FOR
UNDERGROUND STORAGE TANK SITES
7069B, 7069E, AND 7069F
AT THE
OAK RIDGE NATIONAL LABORATORY

Facility I.D. No. 2-730089

Prepared For:

Martin Marietta Energy Systems, Inc.
Subcontract No. 1BX-SK978C

Prepared By:

Ogden Environmental and Energy Services Co., Inc.
1009 Commerce Park Drive, Suite 100
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April 1993

Ogden No. 2-4514-0000