

ornl

**OAK RIDGE
NATIONAL
LABORATORY**

MARTIN MARIETTA

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

MARTIN MARIETTA ENERGY SYSTEMS LIBRARIES



3 4456 0269193 2

ORNL/RAP-25

**The Site Corrective Measures
Program Maintenance and
Surveillance Plan
FY 1988-1997**

R. E. Norman

OAK RIDGE NATIONAL LABORATORY

CENTRAL RESEARCH LIBRARY

CIRCULATION SECTION

4500N ROOM 175

LIBRARY LOAN COPY

DO NOT TRANSFER TO ANOTHER PERSON

If you wish someone else to see this
report, send in name with report and
the library will arrange a loan.

UCN 7969 (3 9-77)

*per TIO
3/20/10*





ORNL/RAP-25

OPERATIONS DIVISION
ENVIRONMENTAL RESTORATION AND FACILITIES UPGRADE PROGRAM
REMEDIAL ACTION PROGRAM

(Activity KG 02 00 00 0, ONL-KG02)
(Activity AR 05 10 05 K, ONL-WN17)

THE SITE CORRECTIVE MEASURES PROGRAM
MAINTENANCE AND SURVEILLANCE PLAN
FY 1988-1997

R. E. Norman

Date of Issue - September 1987

Prepared for the
Assistant Secretary for Energy Research

Prepared by the
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under Contract No. DE-AC05-84OR21400



3 4456 0269193 2



TABLE OF CONTENTS

	<u>Page</u>
LIST OF ACRONYMS	v
LIST OF FIGURES	vii
LIST OF TABLES	ix
SUMMARY	xi
1. INTRODUCTION	1
1.1 THE SCMP	1
1.2 M&S PROGRAM OBJECTIVES	2
1.3 SCOPE OF THE M&S PLAN	2
2. PROGRAM DESCRIPTION	6
2.1 STRUCTURE AND RESPONSIBILITIES	6
2.2 M&S REQUIREMENTS	10
2.2.1 Surveillance Requirements	10
2.2.1.1 Site Surveillance	10
2.2.1.2 Radiological Surveillance	10
2.2.1.3 Safety Inspections	12
2.2.1.4 Security and Protection	12
2.2.2 Maintenance Requirements	12
2.2.2.1 Routine Maintenance	15
2.2.2.2 Special Maintenance	15
2.2.3 Documentation	15
3. SITE SUMMARIES	17
4. PROGRAM DEVELOPMENT	18
5. PROGRAM COSTS AND SCHEDULES	18
6. REFERENCES	22
APPENDIX A. DETAILED LISTING OF SCMP INACTIVE SITES BY PRIORITY	23
APPENDIX B. SCMP PRIORITY 1 AND 2 SITE SUMMARIES	27



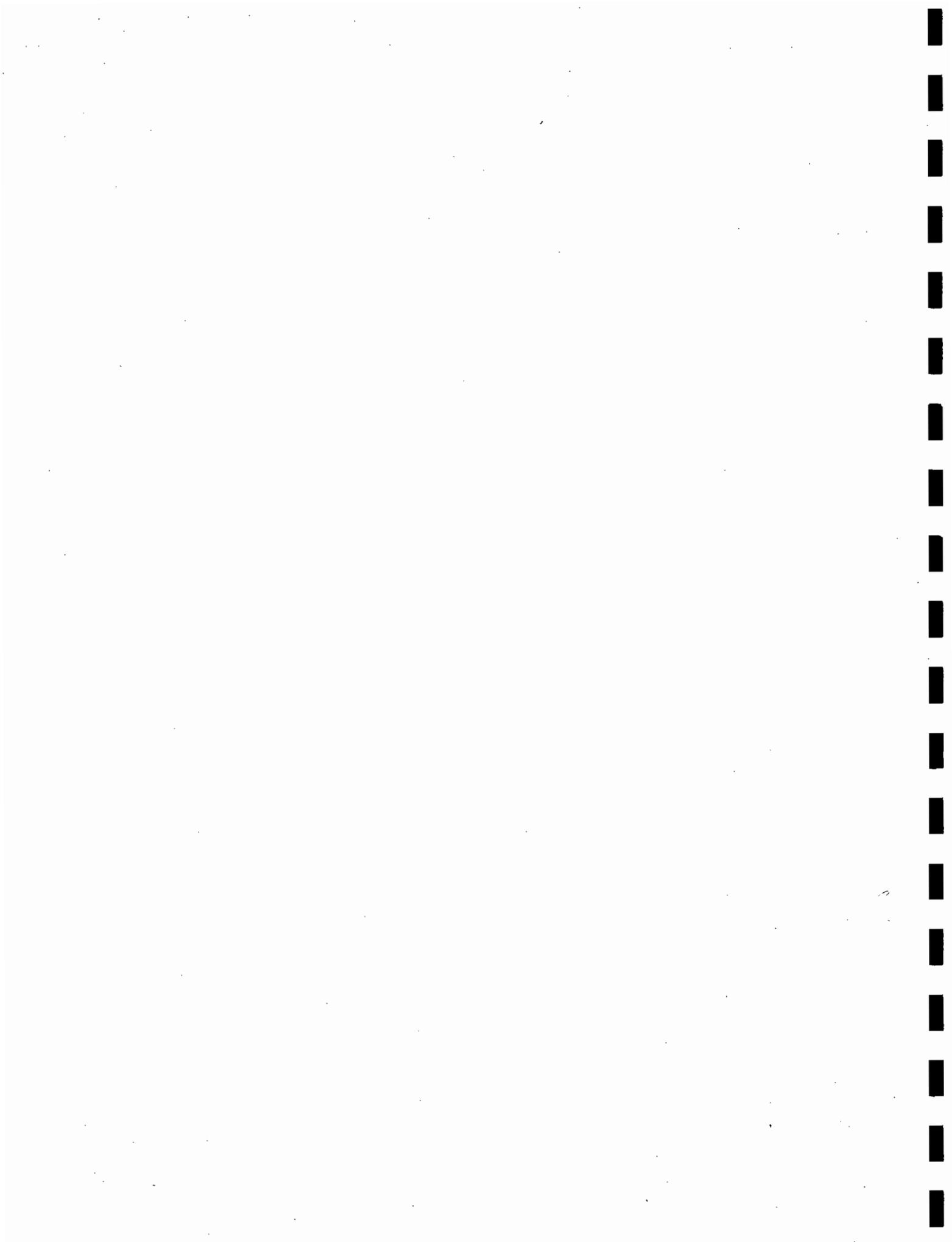
LIST OF ACRONYMS

AC	- Analytical Chemistry
AEC	- Atomic Energy Commission
EMCD	- Environmental Monitoring and Compliance Department
EAG	- Environmental Assessments Group
E&OS	- Environmental and Occupational Safety
EC&HP	- Environmental Compliance and Health Protection
ENG	- Engineering
ERFU	- Environmental Restoration and Facilities Upgrade
ESD	- Environmental Sciences Division
FTP/A	- Field Task Proposal/Agreement
HASRD	- Health and Safety Research Division
HRE	- Homogeneous Reactor Experiment
HTML	- High Temperature Materials Laboratory
LLW	- Low-Level Waste
LP	- Laboratory Protection
M&S	- Maintenance and Surveillance
MPC	- Maximum Permissible Concentration
NWT	- Northwest Tributary
OHF	- Old Hydrofracture Facility
OP	- Operations
ORNL	- Oak Ridge National Laboratory
P&E	- Plant and Equipment
QD	- Quality Department
QAA/P	- Quality Assurance Assessment/Plan
RAP	- Remedial Action Program
RI/FS	- Remedial Investigation/Feasibility Study

- SCFP - Surplus Contaminated Facilities Program
- SCMP - Site Corrective Measures Program
- SFMP - Surplus Facilities Management Program
- SWMUs - Solid Waste Management Units
- SWSAs - Solid Waste Storage Areas
- TRE - Trivalent Rare Earths
- TRU - Transuranic
- WAGs - Waste Area Groupings
- WEAF - Waste Examination and Assay Facility
- WM - Waste Management
- WMO - Waste Management Operations
- WOC - White Oak Creek
- WOCC - Waste Operations Control Center

LIST OF FIGURES

	<u>Page</u>
Fig. 1. Overview of ORNL SCMP site locations.	5
Fig. 2. Remedial Action Program organizational structure.	9
Fig. 3. ORNL divisional participation in the SCMP Maintenance and Surveillance Program.	11



LIST OF TABLES

	<u>Page</u>
Table 1. Facilities currently managed by the ORNL Site Corrective Measures Program (SCMP)	3
Table 2. Overview of inactive SCMP M&S Program sites by priority	7
Table 3. Surface water monitoring for SCMP M&S Program	13
Table 4. Groundwater monitoring locations for SCMP M&S Program	14
Table 5. Routine M&S for SCMP Priority 1 and 2 sites	16
Table 6. Maintenance and Surveillance Program costs	19
Table 7. SCMP Maintenance and Surveillance Program cost breakout by task for FY 1988 - Priority 1 and 2 sites	20
Table 8. SCMP Maintenance and Surveillance Program annularized cost breakout by task for FY 1989 through 1997 - Priority 1 and 2 sites	21



SUMMARY

The Site Corrective Measures Program (SCMP) at the Oak Ridge National Laboratory (ORNL) is part of the Environmental Restoration and Facilities Upgrade (ERFU) Remedial Action Program (RAP). This work is funded jointly through the Multi Program Laboratories Facilities Support (KG) Program and the Remedial Action (WN17) Program. The purpose of ERFU is to provide comprehensive management of activities which will develop new and improved facilities to meet high priority environmental needs. Its objective is to provide ORNL the capability to meet applicable environmental regulations through facility development activities and site remedial actions. In support of this objective, the RAP provides collective management of sites within the Laboratory which are in need of corrective action; prioritizes those areas in terms of health, safety, and environmental concerns; and implements the appropriate level of remedial action. The SCMP provides support to many surplus sites formerly utilized in waste management activities at the Laboratory. Program activities include (1) maintenance and surveillance (M&S) of sites awaiting final disposition, (2) planning for safe and orderly final closure at each site, and (3) implementing a program to accomplish site final disposition in a safe, cost effective, and timely manner. In order to achieve the first objective, a formal plan which documents the M&S needs for each site must be prepared. This report provides the documentation for the highest priority inactive sites currently in the SCMP M&S Program.

This plan addresses the following areas: (1) program responsibilities and interfaces; (2) operational history and physical, radiological, and chemical contaminant condition; (3) routine M&S/monitoring requirements and their estimated funding requirements; (4) corrective action requirements/recommendations with estimated funding requirements; (5) surveillance/monitoring data acquisition, analysis, documentation, and reporting requirements; and (6) Quality Assurance/Quality Control (QA/QC), safety/health, environmental and waste handling/disposal requirements. Preparation of the plan required development of both surface water and groundwater monitoring programs for the 15 sites.

The M&S Plan covers the 10-year period FY 1988 through FY 1997. Costs are provided individually for each of the Priority 1 and 2 sites for each of the M&S items covered. Priority 3 and 4 site costs are included by groupings of sites on an annual basis rather than individually. All costs are given in FY 1988 dollars.



THE ORNL SITE CORRECTIVE MEASURES PROGRAM
MAINTENANCE AND SURVEILLANCE PLAN
FY 1988-1997

1. INTRODUCTION

The Site Corrective Measures Program (SCMP) at the Oak Ridge National Laboratory (ORNL) is part of the Environmental Restoration and Facilities Upgrade (ERFU) Remedial Action Program (RAP). This work is funded jointly through the Multi Program Laboratories Facilities Support (KG) Program and the Site Corrective Measures (WN17) Program. The purpose of ERFU is to provide comprehensive management of activities which will develop new and improved facilities to meet high priority environmental needs. Its objective is to provide ORNL the capability to meet applicable environmental regulations through facility development activities and site remedial actions. In support of this objective, the RAP provides collective management of sites within the Laboratory which are in need of corrective action; prioritizes those areas in terms of health, safety, and environmental concerns; and implements the appropriate level of remedial action. The SCMP provides support to many surplus sites formerly utilized in waste management activities at the Laboratory. Program activities include (1) maintenance and surveillance of sites awaiting final disposition, (2) planning for safe and orderly final closure at each site, and (3) implementing a program to accomplish final site disposition in a safe, cost effective, and timely manner. In order to achieve the first objective, a formal plan which documents the maintenance and surveillance (M&S) needs for each site must be prepared. This report provides the documentation for the highest priority inactive sites currently in the SCMP M&S Program.

1.1 THE SCMP

The SCMP includes a large number of sites, many of which have been out of service for many years. The program also includes a number of sites currently active which will become surplus sites in the near term. The total number of sites involved (both active and inactive) is 86, with 75 of these being inactive. While overall SCMP long-range planning includes all 86 sites, the M&S Plan described in this document incorporates only the currently inactive sites. M&S for the currently active sites is covered by other programs.

The SCMP sites vary greatly in their size, contaminant inventories, potential for contaminant release, and potential for personnel exposure. Some have been cleaned up, or at least partially so in the past; some have received significant surveillance attention; but for the majority, little or no information exists concerning even the extent of the contamination involved. These facts, combined with resource constraints, result in a phased development of an effective M&S program which focuses initially on highest priority sites with the remaining sites to be added later. This philosophy is reflected throughout this document and was also utilized in the SCMP Quality Assurance Assessment Plan (QAA/P), (Ref. 1).

An overview of the 75 inactive facilities currently managed by the SCMP is shown in Table 1. The additional 11 active facilities included in the program are also indicated in Table 1. The locations of the SCMP sites are shown in Fig. 1.

1.2 M&S PROGRAM OBJECTIVES

The M&S requirements for SCMP sites are established to:

1. ensure adequate containment of the residual radioactive and hazardous materials which are site contaminants,
2. ensure safety of on-site personnel and the general public.

Successfully meeting these objectives requires unified effort of the SCMP staff, site operating personnel, health and safety personnel, Laboratory security forces, and maintenance crafts. The program is also structured to be responsive to all applicable environmental regulations, as well as ORNL standard operating practices and procedures.

1.3 SCOPE OF THE M&S PLAN

This M&S plan will address M&S requirements appropriate for each Priority 1 and 2 site in the program for the ten-year period FY 1988-1997. The plan will provide: (1) an outline of the program structure, including functional and reporting responsibilities; (2) requirements of general, radiological, safety, and security inspections and/or monitoring; (3) requirements for site maintenance, including programmed and special maintenance activities; (4) documentation of program activities; (5) site specific summaries describing characteristics pertinent to M&S and estimates of annual resource commitments to carry out M&S; and (6) an integrated M&S strategy which will summarize the resource requirements within the framework of the program. The latter section will be used as a budget planning base for the ten-year funding period.

A philosophy was developed in Ref. 1 which resulted in prioritizing the M&S activities for the 75 inactive sites that make up the SCMP. The sites were divided into five groups. The groups were not formed along the lines shown in Table 1 [i.e., Waste Area Groupings (WAGs)] but rather were related to two primary criteria; the radionuclide inventory at each site and the potential risk of release and/or personnel or public exposure. Based on these criteria, the sites were placed in one of five priority categories shown below:

Priority 1: High radionuclide inventory sites with significant risk of release and/or personnel/public exposure. Examples are Solid Waste Storage Areas (SWSAs), and the Pits and Trenches.

Table 1. Facilities currently managed by the ORNL Site Corrective Measures Program (SCMP)

Waste Area Grouping (WAG)	Title	Description
WAG 1	Main Plant Area	35 SWMUs* including: 23 LLW** Line Leak Sites 2 Impoundments (one filled in) 2 SWSAs 4 Mercury Contaminated Sites 4 Miscellaneous Radioactively Contaminated Sites
WAG 3	Solid Waste Disposal Area 3	2 SWMUs including: SWSA 3 Closed Metal Scrap Yard
WAG 4	Solid Waste Disposal Area 4	3 SWMUs including: SWSA 4 LLW Line North of Lagoon Road Pilot Pits 1 and 2
WAG 5	Solid Waste Disposal Area 5	4 SWMUs including: SWSA 5 2 LLW Line Leak Sites 1 Impoundment
WAG 6	Solid Waste Disposal Area 6	2 SWMUs including: Emergency Waste Basin Explosives Detonation Trench
WAG 7	LLW Pits & Trenches	12 SWMUs including: 4 Pit Areas 3 Trench Sites 1 Fuel Well Site 3 LLW Line Leak Sites 1 Soil Contamination Site (Hydrofracture Experimental Site 1)
WAG 8	Melton Valley Area	8 SWMUs including: 7 LLW Line Leak Sites 1 Soil Contamination Site (Hydrofracture Experimental Site 2)
WAG 10	Hydrofracture Injection Wells & Grout Sheets	2 SWMUs including: 2 Hydrofracture Experimental Sites

Table 1. (continued)

Waste area grouping (WAG)	Title	Description
WAG 11	White Wing Scrap Yard	1 SWMU White Wing Scrap Yard
WAG 12	Closed Contractor Landfill	1 SWMU Closed Contractor's Landfill
WAG 13	Environmental Research Areas	2 SWMUs Both Cs-137 Contaminated Sites
WAG 16	Health Physics Research Reactor Area	2 SWMUs 1 Cs-137 Contaminated Site 1 Process Waste Basin
WAG 20	Oak Ridge Landfarm	1 SWMU Oak Ridge Landfarm

The eleven currently active SCMP sites currently managed by other programs are listed below.

WAG 1	Main Plant Area	3 SWMUs - All Impoundments (3524 & the 190 Ponds)
WAG 2	White Oak Creek/ White Oak Lake	2 SWMUs White Oak Lake & Embayment White Oak Creek & Tributaries
WAG 3	Solid Waste Disposal Area 3	1 SWMU Contractor's Landfill
WAG 6	Solid Waste Disposal Area 6	1 SWMU - SWSA 6
WAG 8	Melton Valley Area	4 SWMUs - All Impoundments (7905, 7906, 7907, 7908)

*Solid Waste Management Unit (SWMU)

**Low-Level Waste (LLW)

- | | |
|---------------------------|--|
| ① SWSA 1 | ⑫ White Wing Scrap Yard |
| ② SWSA 2 | ⑬ SWSA 5 Pond |
| ③ SWSA 3 | ⑭ Cs Contaminated Environmental Research Areas |
| ④ SWSA 4 | ⑮ 3512 Pond |
| ⑤ SWSA 5 | ⑯ East Sewage Lagoon |
| ⑥ Closed Scrap Metal Yard | ⑰ Closed Contractor's Landfill |
| ⑦ LLW Seepage Pit 1 | ⑱ Melton Valley Transfer Line |
| ⑧ LLW Seepage Pit 2 - 4 | ⑲ Contaminated Soil Locations (•) |
| ⑨ LLW Seepage Trench 5 | ⑳ Mercury Contaminated Sites |
| ⑩ LLW Seepage Trench 6 | |
| ⑪ LLW Seepage Trench 7 | |

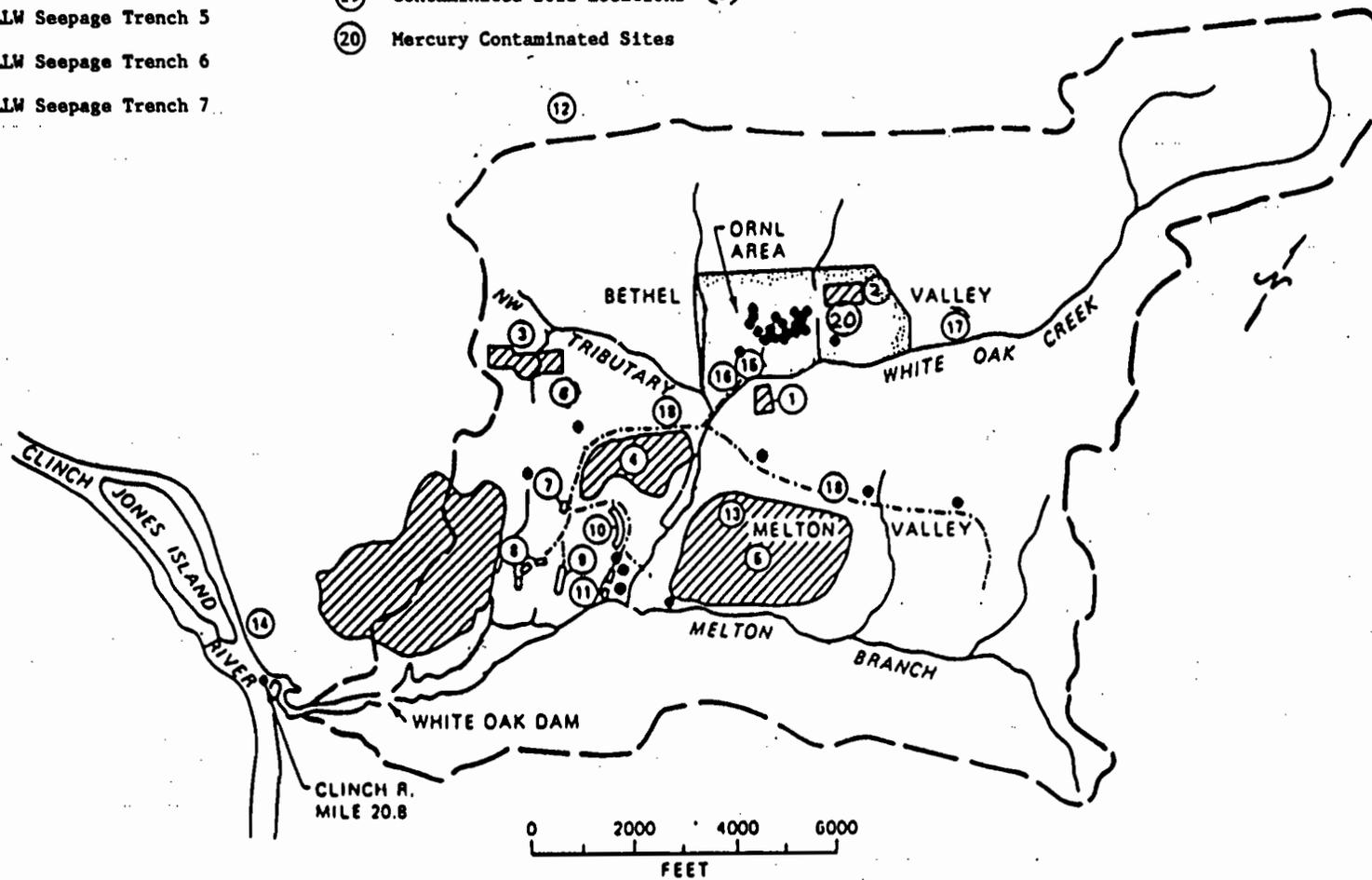


Fig. 1. Overview of ORNL SCMP site locations

- Priority 2: Medium radionuclide inventory sites with lower risk of release and/or personnel/public exposure. Examples are the Homogeneous Reactor Equipment (HRE) Fuel Wells and some of the more significant low-level waste (LLW) line leaks.
- Priority 3: Low radionuclide inventory sites with low risk of release from the ORNL Reservation and with low risk of personnel/public exposure. Examples are the large bulk of LLW line leak sites, abandoned LLW line segments, and a site contaminated during reactor operations.
- Priority 4: Lower radionuclide inventory sites with minimal risk of release from the ORNL Reservation and with minimal risk of personnel/public exposure. Examples are the less significant LLW line leak sites, several impoundments, White Wing Scrap Yard, the Closed Contractor's Landfill, and three mercury contaminated sites.
- Priority 5: Sites with no past release or identifiable probability for release. These sites have been recommended for removal from the list of Solid Waste Management Units (SWMUs).

Only sites in the first four priorities have been considered in this M&S plan since sites in Priority 5 have been determined to have no release.

The purpose of the prioritization is to focus the M&S attention on the highest risk sites. This is necessary because of the large effort involved in characterizing any group of sites to provide an effective program within resource constraints. Since Priority 1 and 2 sites contain both the large bulk of the radionuclide inventory and highest potential for public and/or personnel exposure, the decision was made to focus this initial version of the SCMP M&S plan on these 15 sites.

A summary listing of sites by priority is shown in Table 2. A detailed listing of SCMP sites by priority has been included as Appendix A for completeness.

In order for this M&S Plan to remain current and effective, it will be reviewed and updated annually. The revised plan will support the annual drafting of the Field Task Proposal/Agreement (FTP/A) for the RAP M&S subtask. It will also serve as a reference document providing DOE and management personnel with program philosophy and direction.

2. PROGRAM DESCRIPTION

2.1 STRUCTURE AND RESPONSIBILITIES

The SCMP M&S Program is administered by staff of the RAP Group in the Technical Resources Section of the Operations Division, with programmatic direction from the RAP and the ERFU office under the Nuclear and Chemical

Table 2. Overview of inactive SCMP M&S Program Sites by priority

Priority 1 Sites (11 total)

- 4 Solid Waste Storage Areas (SWSA 1, 3, 4, and 5)
- 4 LLW Pits (Pits 1, 2, 3, and 4)
- 3 LLW Trenches (Trenches 5, 6, and 7)

Priority 2 Sites (4 total)

- 3 LLW Line Leaks
- 1 HRE Fuel Well

Priority 3 Sites (31 total)

- 27 LLW Line Leaks
- 2 Reactor Operations Contaminated Areas (Graphite Reactor Storage Canal Overflow & ORR Decay Tank Rupture)
- 2 Abandoned LLW lines (North of Lagoon Road and Melton Valley Transfer Line)

Priority 4 Sites (22 total)

- 3 Hazardous Waste Sites (mercury contaminated)
- 9 LLW Line Leaks (5 associated with OHF)
- 4 Landfills (SWSA 2, Closed Scrap Metal Yard, White Wing Scrap Yard, and Closed Contractor's Landfill)
- 3 Impoundments (SWSA 5, East Sewage, & 3512 which is filled in)
- 2 Environmental Research Areas (0800 & 0807)
- 1 Contaminated area (from 1959 3019 explosion)

Priority 5 Sites (7 total)

- 2 Waste Basins (have no release-never used)
 - 1 Mercury site (has no release)
 - 1 Pilot Pits (has no release)
 - 1 Environmental Research - Cs Forest (has no release)
 - 1 Landfarm (has no release)
 - 1 Explosives Detonation Trench (has no release)
-

Waste Program (Fig. 2). M&S is one of three primary functions in the implementation of remedial action. The other primary functions include management of current remedial action projects, and remedial investigations and feasibility studies. Two other M&S programs are administered by the RAP: the Surplus Facilities Management Program (SFMP) and the Surplus Contaminated Facilities Program (SCFP). Both of these deal primarily with contaminated facilities while the SCMP deals primarily with nonfacility contaminated sites.

M&S functions are carried out by a multidisciplinary team from many different support groups. However, primary responsibility for conducting M&S lies with the Operations Division which has responsibility for these sites under the RAP. Financial support flows through the SCMP, which has the ultimate responsibility for ensuring that the objectives of the program are being met. The Maintenance, Surveillance, and Corrective Actions Phase of the RAP has the overall responsibility for planning and carrying out all M&S activities, including those for the SCMP sites. Planning activities are facilitated by the use of scoping surveys which provide needed information concerning the type and level of contaminants at the sites. The scoping surveys are performed by the Environmental Assessments Group (EAG) of the Health and Safety Research Division (HASRD). Implementation of SCMP M&S activities is carried out by the Waste Management Operations (WMO) Group of the Waste Management Section in the Operations Division. This group is responsible for all the day-to-day activities required to complete the planned M&S Program. Some additional surveillance information is provided by the Department of Environmental Monitoring and Compliance (DEMC) of the Environmental Compliance and Health Protection (EC&HP) Division. This information is gathered as part of the Laboratory's compliance reporting activities.

The M&S activities described in this plan have been developed by looking at individual site needs and represent the conclusions of the QAA/P (Ref. 1) prepared earlier this fiscal year. Some activities have been continuing for many years, while others are being initiated; still others are being strengthened in some way. Maintenance requirements for the SCMP sites range from such routine items as mowing and weed control to major repairs of structurally deteriorating items. Surveillance items include surface and groundwater monitoring, radiological surveys, and visual inspections.

In summary, the Operations Division has direct responsibility for the SCMP sites, including the M&S activities. In addition, eight other divisions have active participation in the program by their direct or indirect support. These are:

1. HASRD,
2. EC&HP,
3. Quality Department (QD),
4. Plant and Equipment (P&E),
5. Analytical Chemistry (AC),
6. Environmental and Occupational Safety (E&OS),
7. Laboratory Protection (LP), and
8. Engineering (ENG).

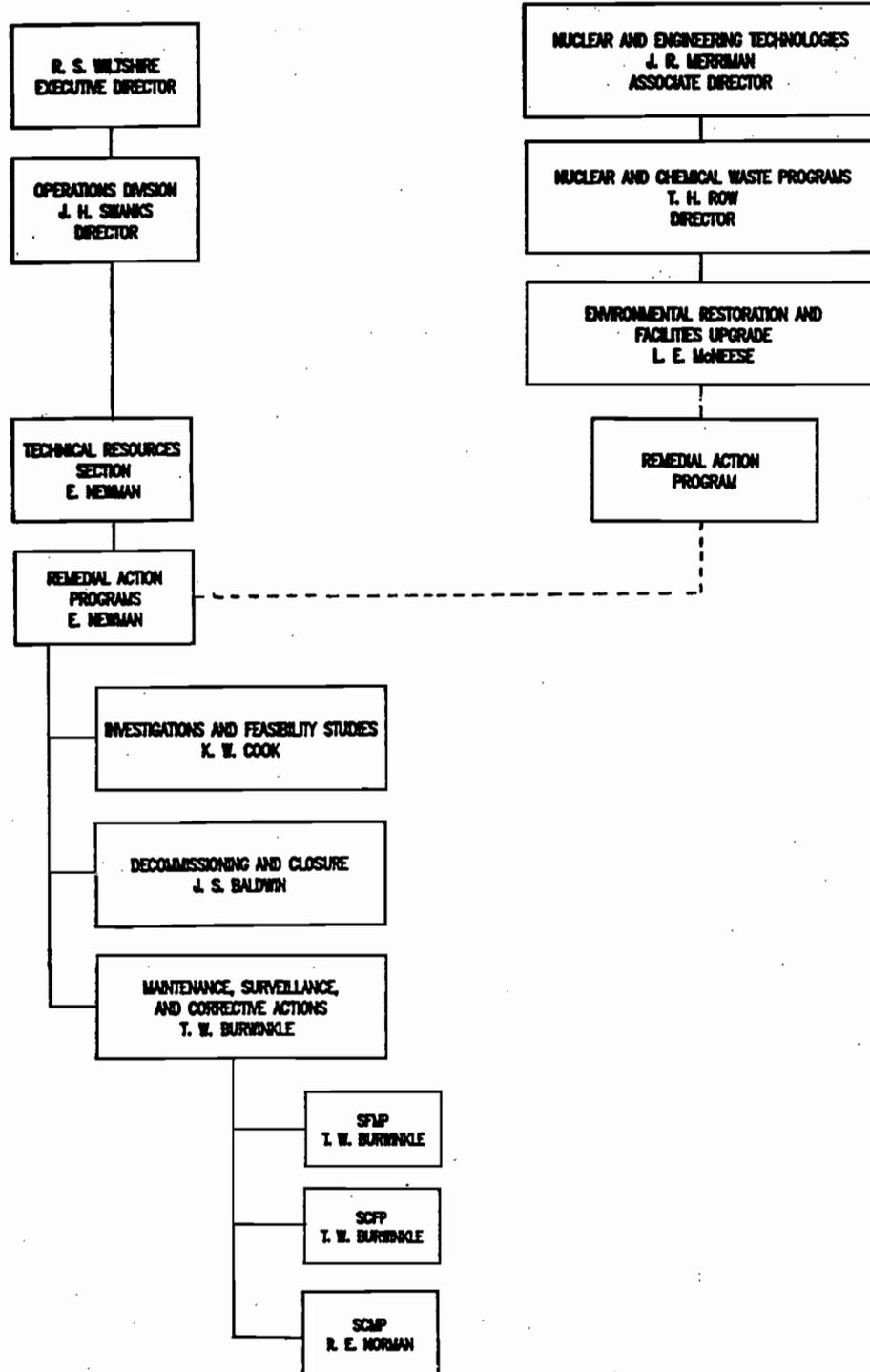


Fig. 2. Remedial Action Program organizational structure

2.2 M&S REQUIREMENTS

Brief outlines of the M&S requirements for the SCMP sites are presented in the following report sections. These discussions have been formatted to correspond with the M&S activities listed in Fig. 3, in terms of (1) surveillance requirements, (2) maintenance requirements, and (3) documentation. Details of the M&S activities conducted at each site to fulfill these requirements are provided in Appendix B.

2.2.1 Surveillance Requirements

Routine surveillance is provided at SCMP sites in order to ensure that each site remains in a radiologically safe condition and hazardous materials are safely contained. Inspections are conducted to (1) survey radiological conditions and mark areas of radioactivity; (2) visually observe the condition of the site and its structural members both on and at site perimeters; (3) look for evidence of new water seepage areas; and (4) to provide for personnel safety. Monitoring of both surface water and groundwater is conducted to ensure that site contaminants continue to be contained adequately (i.e., so that unacceptable increases in release are noted and dealt with). Requirements have been established for these activities in four general areas: (1) Site Surveillance, (2) Radiological Surveillance, (3) Safety Inspections, and (4) Security and Protection. Discussion of these requirements follows below. It should be noted that the current program does not provide for surveillance of hydrofracture monitoring wells. These are currently included in the remedial investigation of subsurface hydrofracture operations, and routine surveillance by this program is unnecessary.

2.2.1.1 Site Surveillance

Periodic inspection of each SCMP site must be conducted. For the 15 Priority 1 and 2 sites, visual inspections will be conducted weekly by driving over and around the sites, and in more detail monthly by walking over the sites. These inspections are intended to find problems in the initial stages, to trigger maintenance items, and to detect significant changes at the site since the last inspection. These inspections are conducted by the WMO Group in the Operations Division.

2.2.1.2 Radiological Surveillance

Radiological surveillance at these sites is conducted in three areas. The first is radiological meter surveys, which are performed to locate and mark all surface radioactivity at the site. These are performed either by the EAG of the HASRD or the Radiation Protection Department of the EC&HP Division. The intent of these surveys is to ensure that personnel safety is not threatened at the sites.

The second and third areas are surface water and groundwater monitoring, both of which are performed to ensure that contaminants are adequately contained at the sites. Surface and groundwater monitoring have been conducted at these sites for a number of years (Refs. 2 and 3). This data is reported as part of the ORNL Waste Operations Control Center (WOCC) responsibility which provides continuous surveillance of liquid and gaseous effluents released from operating areas within the Laboratory and from the SCMP Priority 1 and 2 sites as well.

Division/Department	Surveillance				Maintenance		Documentation
	Site surveillance	Radiological surveillance	Safety inspections	Security and Protection	Routine maintenance	Major repairs	Activity reporting
<u>Facility Control</u>							
Operations	X	X	X	X	X	X	X
<u>Support</u>							
Health and Safety Research		X					X
Environmental Monitoring Compliance Department	X	X					X
Quality Department	X						X
Plant and Equipment					X	X	X
Analytical Chemistry		X					X
Environmental and Occupational Safety	X	X	X		X	X	X
Laboratory Protection			X	X			X
Engineering						X	X

Fig. 3. ORNL divisional participation in the SCMP Maintenance and Surveillance Program

However, the current program represents an expansion over previous sampling to more thoroughly cover the Melton Valley Area. Surface water monitoring is conducted by the WMO Group of the Operations Division and by the Environmental Monitoring Compliance (EMC) Department of the EC&HP Division. Groundwater monitoring is conducted by both EMC Department and the Environmental Sciences Division (ESD).

Surface water monitoring samples are taken in a number of frequencies, depending on need; some continuously and some periodically. Table 3 shows the locations, sample types, and analysis frequency planned for the SCMP Priority 1 and 2 sites.

Groundwater monitoring samples are taken on a number of frequencies depending on need. Table 4 shows the locations and analysis frequency for the SCMP Priority 1 and 2 sites.

2.2.1.3 Safety Inspections

Safety inspections will be conducted on a routine basis for the SCMP Priority 1 and 2 sites to ensure that all potential hazards to personnel at these sites have been identified and dealt with. Inspections will be performed annually in accordance with Procedure 1.1 of the ORNL Safety Manual (Ref. 4). To maximize the efficiency and consistency of the process, the inspections should be carried out in conjunction with the routine safety inspections for the active facilities in the respective areas and by the same inspection team appointed for this task. Results from the safety inspections should be used to redefine the SCMP M&S Program as warranted.

2.2.1.4 Security and Protection

As a restricted government installation, the ORNL is provided with comprehensive safeguards, security, and protection systems. These systems include exclusion fencing around the main Laboratory complex and around remote facilities (which includes SCMP Priority 1 and 2 sites), continuously manned fire department, and routine (random) security patrols. Due to this complete and comprehensive protection network, little additional security or protective measures are required for these SCMP sites. However, controlled access to the sites to restrict unauthorized personnel is required. A system to provide restricted personnel access is in place and is currently being upgraded. When completed, access to these SCMP sites will be controlled by Laboratory Protection.

2.2.2 Maintenance Requirements

Maintenance of SCMP sites falls into two categories: (1) routine, or programmed maintenance, and (2) special maintenance required for major site repairs or improvements. Guidance for most routine maintenance requirements is provided in the Plant and Equipment (P&E) Division Procedures Manual (Ref. 5). The P&E Division is responsible for conducting most programmed maintenance according to its own routine maintenance schedule or at the request of the WMO Group. Support for the maintenance of SCMP sites, both routine and special, is provided by the SCMP.

Table 3. Surface water monitoring for SCMP M&S Program

Existing monitoring location	Area monitored
Northwest Tributary (NWT)	SWSA 3
Raccoon Creek (RC)	SWSA 3
7500 Bridge (Station 2A)	SWSA 3, SWSA 1, Main Plant
White Oak Creek (Station 3)	SWSA 4, SWSA 1, SWSA 3, Main Plant
Melton Branch 1 (Station 4)	SWSA 5, 7500 Area, 7900 Area
Homogeneous Reactor Test (HRT)	7500 Area, SWSA 5
Melton Branch 2 (MB-2)	7900 Area
East Weir	Pits & Trenches
West Weir	Pits & Trenches
<u>New monitoring stations to be established</u>	
SWSA 4 Seeps Station	SWSA 4
Trench 6/7 Station	Pits & Trenches
HFIR Tributary Station	7900 Area

NOTE: Currently, six locations above are grab sampled weekly, composited and analyzed monthly by the ORNL surface water monitoring program. For the SCMP M&S Program, these stations would be upgraded to provide continuous monitoring to give mass balance information for both water and solutes. These stations are NWT, RC, and MB-2. In addition, three new stations will be set up as shown above. All stations will be analyzed bimonthly.

Table 4. Groundwater monitoring locations for SCMP M&S Program

Area monitored/number of wells	Well number
SWSA 1 - 3 Wells	828 Upgradient 946, 947 Downgradient
SWSA 3 - 5 Wells	998 Upgradient 985, 986, 993, 994 Downgradient
SWSA 4 - 6 Wells	950 Upgradient 954-958 Downgradient
SWSA 5 - 10 Wells	980, 981 Upgradient 969, 970, 972, 973, 975-977 Downgradient
Pits and Trenches	To be determined in FY 1988. Selection of well locations in progress.

NOTE: All wells will be sampled quarterly for the first year and semiannually thereafter until data justifies extending the sampling period.

2.2.2.1 Routine Maintenance

Routine maintenance requirements and schedules are established as a joint effort between the SCMP M&S Task Leader and the WMO Maintenance Supervisor. These activities include grass, weed and brush control, fence repair, minor diversion system and asphalt cap repairs, and covering of surface activity if required. Table 5 shows the requirements and schedule for these routine maintenance activities.

2.2.2.2 Special Maintenance

Periodically, major site repairs or improvements are required to ensure that contaminant inventories in the SCMP Priority 1 and 2 sites continue to be retained in an acceptable manner. Such repairs or improvements would involve items such as subsidence repair to the SWSAs, major water diversion system repairs, resurfacing or expanding asphalt covers, and fencing significant areas of surface activity to ensure personnel safety or reduce potential for deer contamination. The need for special maintenance is indicated by evaluation of results from the Surveillance Program (Sect. 2.2.1) and is decided jointly by the SCMP M&S Task Leader and the WMO Maintenance Supervisor. The scope of special maintenance tasks can vary from routine construction jobs to more complex tasks requiring engineering design, safety reviews, detailed work plans, and specialized work forces.

2.2.3 Documentation

Documentation of all M&S activities supported by the SCMP is provided by the division responsible for each task. Reporting may range from data sheets for day-to-day activities to detailed engineering design packages for major repairs. The Supervisor of Maintenance for WMO is responsible for maintaining a file of all site-related M&S activities which he initiates or controls. Health Physics records are archived by the EC&HP Division, and P&E program maintenance files are maintained on a computer with routine distribution to appropriate facility operators or division management. Quality Department inspection reports are also computer filed, with summaries distributed to division offices. Remaining M&S participants maintain permanent records of their activities within the respective divisions.

The above approach to managing M&S provides the most cost-effective method for controlling inactive sites. Responsibility for ensuring the necessary M&S activities are carried out rests with the SCMP M&S Task Leader. Reviews of activities will be conducted periodically, and audits of M&S records will be performed to assure the SCMP program that adequate M&S is being carried out and documented. Status reports will be provided monthly by the Supervisor of Maintenance for WMO to the SCMP M&S Task Leader for incorporation in the RAP monthly report to DOE. Semiannual M&S summary reports will be prepared by the SCMP Task Leader for submittal to RAP Management. Annual reports summarizing the past year's M&S activities will also be compiled by the SCMP Task Leader at the end of the fiscal year. These will be based on summary information provided by the Supervisor of Maintenance. These reports will provide a concise

Table 5. Routine M&S for SCMP Priority 1 and 2 Sites

Activity	Frequency
A. Surveillance	
Visual inspection	Weekly driveover Monthly walkover
Radiological Surface Survey	Quarterly
Surface water monitoring	Continuous with monthly analysis or grab sample analyzed bimonthly
Groundwater monitoring	Quarterly for first year Semiannually from second year on
B. Maintenance	
Grass/weed control	As required by visual inspection
Fence upkeep	As required by visual inspection
Service road upkeep	As required by visual inspection
Subsidence repair	As required by visual inspection
Water diversion system repair	As required by visual inspection

summary of the past year's surveillance data and a summary of significant maintenance carried out. In addition, the annual reports should include a brief discussion of the future needs at each site, with cost estimates for special maintenance activities. In conjunction with the annual reporting, an annual review and program audit will be conducted and documented to ensure that program needs are being met.

3. SITE SUMMARIES

Summary descriptions have been developed for each of the Priority 1 and 2 SCMP sites addressed in this M&S Plan (see Appendix B). The summaries have been developed with information obtained from interviews with site contacts and from many reports prepared for the RAP. In addition to M&S requirements, the summaries also include a brief overview of the site history, and current conditions. Site-specific costs and overall program resource requirements are included in Sect. 5. The M&S summaries contain information in the following categories:

1. Facility Name - The ORNL-designated facility title which, in most cases, describes the site or project associated with its former use.
2. SWMU ID Number - The ORNL-designated SWMU Number which identifies the site from the official list of RAP sites.
3. Location - Provides the ORNL coordinates for the site and gives a general physical description of the site location. The description also includes identifying the location in Melton Valley or Bethel Valley.
4. Dates of Operation - The period of time over which the site was considered operational. At some locations, the exact dates of operation are not precisely known and have been approximated.
5. Site Status - A listing of the current site status in terms of construction detail, contaminant inventory, interim corrective actions taken, and site responsibility.
6. Site Description - A brief discussion of the facility operating history, physical description, current conditions, and radiological and chemical hazards. These descriptions are based on available historical information, recollections of knowledgeable personnel, and RAP documents.
7. Security Protection Systems - A description of the security protection provided at each site, particularly of site access control for limiting access of personnel.

8. Surveillance Activities - Provides a list of surveillance activities conducted at each site and defines the responsible group for the surveillance activity. Division responsibilities are consistent with those found in Sect. 2. Surveillance documentation exists in a variety of forms, including data checkoff sheets, memos to file, and computer printouts.
9. Maintenance Activities - Provides an itemized listing of maintenance activities for each site, similar in scope to Item 8.
10. Anticipated Repairs/Improvements - A brief description of identified major repairs or other site improvements scheduled for the planning period. These include the need for repairs, scope of the task (including an estimate of resource needs), and the proposed year of expenditure.

4. PROGRAM DEVELOPMENT

In order to maintain a responsive and viable program, a comprehensive reevaluation will be undertaken at least every five years. This effort will focus on assessing the status of the SCMP sites to ensure adequate control is being maintained and to provide input for establishing final closure priorities. During FY 1988, the M&S Program will continue in the formative stage as additional areas of M&S activities are implemented. Also, at the end of FY 1988, a revised M&S Plan will be issued incorporating additional sites from Priority 3. The M&S Plan will continue to undergo revision to incorporate the remaining Priority 3, as well as Priority 4 sites in later years.

5. PROGRAM COSTS AND SCHEDULES

Based on information compiled for each site, overall M&S Program costs have been developed. The annual resource requirements are given in Table 6 for the planning period FY 1988 through FY 1997. Costs for Priority 1 and 2 sites, which are the sites addressed in this M&S Plan, have been itemized by site and grouped according to priority. Estimated costs for Priority 3 and 4 sites have been included separately for each year. Program management support is listed as a separate item. Cost estimates are given in FY 1988 dollars throughout the planning period. To provide additional detail, costs for each M&S task have been broken out separately for each site in Tables 7 (FY 1988) and 8 (FY 1989 through 1996). The major difference between Tables 7 and 8 is that the SCMP M&S Program begins to pick up additional groundwater monitoring costs in FY 1989. Prior to this time, these costs were funded separately.

The M&S Program has been structured to provide adequate control over the sites until they enter the final closure stage. Funding for special (nonroutine) maintenance has been included in each of the planning years to

Table 6. Maintenance and Surveillance Program costs

Priority/site	Site operations support	Fiscal year (\$ x 1000)										TOTAL
		88	89	90	91	92	93	94	95	96	97	
Routine M&S												
<u>Priority 1 sites</u>												
SWSA 1	DP	30	43	43	43	43	43	43	43	43	43	417
SWSA 3	DP	59	74	74	74	74	74	74	74	74	74	725
SWSA 4	DP	73	91	91	91	91	91	91	91	91	91	892
SWSA 5	DP	121	138	138	138	138	138	138	138	138	138	1,363
LLW Pit 1	DP	29	42	42	42	42	42	42	42	42	42	407
LLW Pit 2	DP	22	37	37	37	37	37	37	37	37	37	355
LLW Pit 3	DP	22	37	37	37	37	37	37	37	37	37	355
LLW Pit 4	DP	27	42	42	42	42	42	42	42	42	42	405
LLW Trench 5	DP	21	37	37	37	37	37	37	37	37	37	354
LLW Trench 6	DP	21	36	36	36	36	36	36	36	36	36	345
LLW Trench 7	DP	21	36	36	36	36	36	36	36	36	36	345
Subtotal Priority 1		446	613	613	613	613	613	613	613	613	613	5,963
<u>Priority 2 sites</u>												
HRE Fuel Wells	ER	5	10	10	10	10	10	10	10	10	10	95
LLW Line Leak	ER	9	14	14	14	14	14	14	14	14	14	135
LLW Line Leak/Pit 6 SE	ER	9	14	14	14	14	14	14	14	14	14	135
LLW Line Leak/End Trench 7 Access Road	ER	9	14	14	14	14	14	14	14	14	14	135
Subtotal Priority 2		32	52	52	52	52	52	52	52	52	52	500
<u>Priority 3 and 4 sites</u>												
36 LLW Line Leak Sites	ER	0	155	180	180	180	180	180	180	180	180	1,595
3 Hazardous Waste Sites	ER	0	15	15	15	15	15	15	15	15	15	135
4 Miscellaneous Contaminated Sites	ER	0	20	20	20	20	20	20	20	20	20	180
4 Experimental Hydrofracture Sites	DP	0	20	20	20	20	20	20	20	20	20	180
2 Impoundments (one filled in)	DP	2	20	20	20	20	20	20	20	20	20	182
3 Landfills	DP	2	30	30	30	30	30	30	30	30	30	272
Subtotal 3 and 4	DP	4	260	285	285	285	285	285	285	285	285	2,544
Total Routine M&S		482	925	950	950	950	950	950	950	950	950	9,007
Special Maintenance/Corrective Actions		595	520	650	700	700	700	700	700	700	700	6,665
Groundwater Treatment and Control		1,250	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	22,850
Program Management/Development		500	550	550	250	250	250	250	250	250	250	3,350
PROGRAM TOTALS		2,827	4,395	4,550	4,300	41,872						

Table 7. SCMP Maintenance & Surveillance Program cost breakout by task for FY 1988 - Priority 1 and 2 sites

SWMU ID #	SWMU description	Surveillance activities			Maintenance activities			Totals (\$ X 1000)	
		Visual inspection (\$ X 1000)	Radiological survey (\$ X 1000)	Surface water monitoring (\$ X 1000)	Groundwater monitoring (\$ X 1000)	Grass/weed control (\$ X 1000)	Fence upkeep (\$ X 1000)		Roads/grounds upkeep (\$ X 1000)
<u>Priority 1 - 11 sites</u>									
1.46	SWSA 1	3	4	6	3	5	5	4	30
3.1	SWSA 3	4	6	12	6	10	12	9	59
4.3	SWSA 4	4	7	13	8	14	15	12	73
5.7	SWSA 5	7	10	28	13	21	24	18	121
7.5	LLW Pit 1	2	4	6	3	5	5	4	29
7.6a	LLW Pit 2	2	4	2	3	4	4	3	22
7.6b	LLW Pit 3	2	4	2	3	4	4	3	22
7.6c	LLW Pit 4	3	4	3	3	5	5	4	27
7.7	LLW Trench 5	2	4	1	3	4	4	3	21
7.8	LLW Trench 6	2	4	1	3	4	4	3	21
7.9	LLW Trench 7	2	4	1	3	4	4	3	21
Subtotal Priority 1		33	55	75	51	80	86	66	446
<u>Priority 2 - 4 sites</u>									
7.2	HRE Fuel Wells	included in 7.7 above		2	2	1	0	0	5
7.4a	LLW Line Leak/Gauging Station Northeast of Building 7852	1	1	2	2	2	1	0	9
7.4b	LLW Line Leak/Pit 6 Southeast (Site 1)	1	1	2	2	2	1	0	9
7.4c	LLW Line Leak/End of Trench 7 Access Road (Site 2)	1	1	2	2	2	1	0	9
Subtotal Priority 2		3	3	8	8	7	3	0	32

Table 8. SCMP Maintenance and Surveillance Program annualized cost breakout by task for FY 1989 through 1997 - Priority 1 and 2 sites

SWMU ID #	SWMU description	Surveillance activities			Maintenance activities			Totals (\$ X 1000)	
		Visual inspection (\$ X 1000)	Radiological survey (\$ X 1000)	Surface water monitoring (\$ X 1000)	Groundwater monitoring (\$ X 1000)	Grass/weed control (\$ X 1000)	Fence upkeep (\$ X 1000)		Roads/grounds upkeep (\$ X 1000)
<u>Priority 1 - 11 sites</u>									
1.46	SWSA 1	3	4	6	16	5	5	4	43
3.1	SWSA 3	4	6	12	21	10	12	9	74
4.3	SWSA 4	4	7	13	26	14	15	12	91
5.7	SWSA 5	7	10	28	30	21	24	18	138
7.5	LLW Pit 1	2	4	6	16	5	5	4	42
7.6a	LLW Pit 2	2	4	2	18	4	4	3	37
7.6b	LLW Pit 3	2	4	2	18	4	4	3	37
7.6c	LLW Pit 4	3	4	3	19	5	4	4	42
7.7	LLW Trench 5	2	4	1	18	4	5	3	37
7.8	LLW Trench 6	2	4	1	18	4	4	3	36
7.9	LLW Trench 7	2	4	1	18	4	4	3	36
Subtotal Priority 1		33	55	75	218	80	86	66	613
<u>Priority 2 - 4 sites</u>									
7.2	HRE Fuel Wells	included in 7.7 above		2	7	1	0	0	10
7.4a	LLW Line Leak/Gauging Station Northeast of Building 7852	1	1	2	7	2	1	0	14
7.4b	LLW Line Leak/Pit 6 Southeast (Site 1)	1	1	2	7	2	1	0	14
7.4c	LLW Line Leak/End of Trench 7 Access Road (Site 2)	1	1	2	7	2	1	0	14
TOTALS		3	3	8	28	7	3	0	52

provide adequate support for both anticipated and unanticipated items. In addition to costs for the 15 Priority 1 and 2 sites included in this program plan, costs for the remainder of the SCMP sites have been included separately for each planning year.

6. REFERENCES

1. R. E. Norman, SCMP Maintenance & Surveillance, OP-WM-QAA-37, July 1987.
2. B. M. Eisenhower, et al., Current Waste Management Practices and Operations at Oak Ridge National Laboratory, ORNL-5917 (September 1982).
3. T. W. Oakes et al., Methods and Procedures Utilized on Radiation Protection Environmental Management Activities at Oak Ridge National Laboratory, ORNL/TM-7212 (March 1981).
4. Oak Ridge National Laboratory, Safety Manual, prepared by the Environmental Compliance and Health Protection Division, Revised 1986.
5. Oak Ridge National Laboratory, Plant and Equipment Division Procedures Manual, prepared by the Plant and Equipment Division, Revised 1984.

APPENDIX A

DETAILED LISTING OF SCMP INACTIVE SITES BY PRIORITY



Appendix A

Detailed listing of SCMP inactive sites by priority

SWMU ID #	SWMU Description	Waste Area Grouping
Priority 1 - 11 Sites		
1.46	SWSA 1	WAG 1
3.1	SWSA 3	WAG 3
4.3	SWSA 4	WAG 4
5.7	SWSA 5	WAG 5
7.5	LLW Pit 1	WAG 7
7.6 a-c	LLW Pits 2, 3, and 4	WAG 7
7.7	LLW Trench 5	WAG 7
7.8	LLW Trench 6	WAG 7
7.9	LLW Trench 7	WAG 7
Priority 2 - 4 Sites		
7.2	HRE Fuel Wells	WAG 7
7.4a	LLW Line Leak/Gauging Station Northeast of Building 7852	WAG 7
7.4b	LLW Line Leak/Pit 6 Southeast (Site 1)	WAG 7
7.4c	LLW Line Leak/End of Trench 7 Access Road (Site 2)	WAG 7
Priority 3 - 31 Sites		
1.5a	LLW Line Leak/Building 3020, South	WAG 1
1.5b	LLW Line Leak/Building 3020, East	WAG 1
1.5c	LLW Line Leak/Building 3082, West	WAG 1
1.5d	LLW Line Leak/Building 3019, North	WAG 1
1.5e	LLW Line Leak/Building 3019, Southwest	WAG 1
1.5f	LLW Line Leak/Between WC-5 and WC-19	WAG 1
1.5g	LLW Line Leak/Building 3047 Underneath	WAG 1
1.5h	LLW Line Leak/General Isotopes Area (3037, 3033, etc.)	WAG 1
1.5j	LLW Line Leak/Building 3026 Underneath	WAG 1
1.5k	LLW Line Leak/Building 3024, between WC-1 and WC-5	WAG 1
1.5l	LLW Line Leak/Building 3085, ORR Waterline	WAG 1
1.5m	LLW Line Leak/Building 3028	WAG 1
1.5n	LLW Line Leak/Building 2531, East	WAG 1
1.5o	LLW Line Leak/Building 3515 Underneath	WAG 1
1.5p	LLW Line Leak/Building 3525, To a Sump	WAG 1
1.5q	LLW Line Leak/Building 3550, Underneath	WAG 1
1.5r	LLW Line Leak/Sewer Near Building 3500	WAG 1
1.5s	LLW Line/Abandoned Line Central Avenue	WAG 1
1.5t	LLW Line Leak/Building 4508, North	WAG 1
1.5v	LLW Line Leak/Northwest of SWSA 1	WAG 1
1.7	Contamination at Base of 3019 Stack	WAG 1
1.8	Graphite Reactor Storage Canal Overflow	WAG 1

Appendix A (continued)

SWMU ID #	SWMU Description	Waste Area Grouping
Priority 3 - 31 Sites (continued)		
1.9	ORR Decay Tank Rupture	WAG 1
4.1	Abandoned LLW Line North of Lagoon Road	WAG 4
5.1b	LLW Line Leak/Old Hydrofracture Facility	WAG 5
7.3	Hydrofracture Experimental Site/Soil Contamination (HF-1A)	WAG 7
8.3a	LLW Line Leak/Melton Valley Dr & Lagoon Rd.	WAG 8
8.3c	LLW Line Leak/7500 Area	WAG 8
8.3f	LLW Line Leak/7920 Ditch Line	WAG 8
8.3g	Abandoned Melton Valley Transfer Line	WAG 8
10.1	Hydrofracture Experimental Site 1 (HF-S1)	WAG 8
Priority 4 - 22 Sites		
1.1	Mercury Contaminated Soil/3503	WAG 1
1.2	Mercury Contaminated Soil/3592	WAG 1
1.3	Mercury Contaminated Soil/4501	WAG 1
1.5i	LLW Line Leak/Building 3092 Area	WAG 1
1.5u	LLW Line Leak/Building 3518 West	WAG 1
1.5w	LLW Line Leak/Building 3503 Ground Contamination	WAG 1
1.6	Contaminated Surfaces/Soil from 1959 Explosion in Building 3019 Cell	WAG 1
1.11	Abandoned Filled-in Impoundment 3512	WAG 1
1.16	Sewage Aeration Pond/East 2543	WAG 1
1.47	SWSA 2	WAG 1
3.2	Closed Scrap Metal Yard	WAG 3
5.1a	OHF Release of Grout	WAG 5
5.6	SWSA 5 Pond	WAG 5
8.2	Hydrofracture Experimental Site 2, Soil Contamination (HF-SA2)	WAG 8
8.3b	LLW Line Leak/Melton Valley Dr. and SWSA 5 Access Road	WAG 8
8.3d	LLW Line Leak/Melton Valley West of Pumping Station Area	WAG 8
8.3e	LLW Line Leak/Building 7920 and Melton Valley Pumping Station Area	WAG 8
10.2	Hydrofracture Experimental Site 2	WAG 10
11.1	White Wing Scrap Yard	WAG 11
12.1	Closed Contractor's Landfill	WAG 12
13.1	Cs Contaminated Field/0800 Area	WAG 13
13.2	Cs Erosion/Runoff Study (0807 Area)	WAG 13
Priority 5 - 7 Sites		
1.4	Mercury Contaminated Soil/4508	WAG 1
4.2	Pilot Pits 1 and 2/7811 Area	WAG 4
6.2	Emergency Waste Basin	WAG 6
6.3	Explosives Detonation Trench	WAG 6
16.1	Cs-137 Forest Area	WAG 16
16.2	Process Waste Basin/7711	WAG 16
20.1	Oak Ridge Landfarm	WAG 20

APPENDIX B

SCMP PRIORITY 1 AND 2 SITE SUMMARIES



TABLE OF CONTENTS

APPENDIX B

SCMP Priority 1 and 2 Site Summaries

	<u>Page</u>
SWSA 1	31
SWSA 3	33
SWSA 4	35
SWSA 5	39
LLW Pit 1	41
LLW Pit 2	43
LLW Pit 3	45
LLW Pit 4	47
Trench 5	49
Trench 6	51
Trench 7	53
HRE Fuel Wells	55
LLW Lines and Leak Sites - Gauging Station Northwest of Building 7852	57
LLW Lines and Leak Sites - Pit 6 Southeast (Site 1)	59
LLW Lines and Leak Sites - End of Trench 7 Access Road	61



SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: SWSA 1
2. SWMU ID NUMBER: 1.46
3. LOCATION: SWSA 1 is located in Bethel Valley at the foot of Haw Ridge, and the closest edge is approximately 25 ft (7.6 m) south of White Oak Creek (WOC). ORNL grid coordinates are N 20,980 and E 30,710.
4. DATES OF OPERATION: 1943 to 1944, with the earliest recorded burial being in April and May 1943.
5. SITE STATUS: The site was removed from service in 1944. It was replaced by SWSA 2. SWSA 1 was the first area used for burial of low-level radioactive solid wastes. Usage of SWSA 1 is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - SWSA 1 began operating in 1943. Both auger holes and trenches were reportedly used for waste burial. No records exist concerning what was buried at SWSA 1 or the exact locations where burial occurred. However, it is suspected that only a relatively small amount of activity (2000 to 4000 Ci) was buried here since fissionable material was conserved during this period and the operations did not include isotope separation and concentration during its use.

Physical Description - The SWSA occupies about one acre at the foot of Haw Ridge and beside an area formerly used for incinerating combustible waste. It is at the south edge of the ORNL Main Laboratory complex, and at its closest point, about 25 ft southeast of WOC. It appears that the specific location was selected primarily on the basis of its proximity to the Laboratory, with no consideration of the potential of waste leaking into nearby water systems. Surface runoff from the highest points on Haw Ridge crosses the SWSA enroute to WOC, making low-lying portions susceptible to marsh development. Groundwater occurs below the site at a comparatively shallow depth. In June 1950, water in the burial ground was reported 14.3 ft and 7.9 ft below the top of the well casings in the upper and lower parts of the burial ground respectively. The water table contour map of that time indicates that the water table slopes northward towards WOC. Therefore, groundwater moves in that general direction and discharges into the creek and is subject to monitoring via the ORNL surface water monitoring program.

Current Condition - The site is now grassed, surrounded by a chain fence with warning signs at regular intervals, and does not show signs of unusual erosion. The site also shows no signs of subsidence. A road has been built through the SWSA dividing it into two portions. The road services the south parking area adjacent to 4508 which now includes the High Temperature Materials Laboratory (HTML).

Radiological and Chemical Hazards - The radionuclide inventory at SWSA 1 is reported to be in the range of 2000 to 4000 Ci, as discussed above. Both the type of radionuclides and chemical hazards are unknown.

7. SECURITY PROTECTION SYSTEMS: SWSA 1 is in Bethel Valley and is accessible during daylight hours via Lagoon Road, as are many of the ORNL Melton Valley sites. It is surrounded by a chain fence with warning signs at regular intervals. During nonworking hours, it is within the ORNL limited access area. Improvements to this system are currently in the planning stage and should be implemented in FY 1988.
8. SURVEILLANCE ACTIVITIES: SWSA 1 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2) and include driveovers, walkovers, meter radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the SWSA surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: SWSA 1 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items, such as grass mowing, weed cutting, and fence repair. These are accomplished using programmed maintenance by the P&E Division. All of the above items are triggered by visual inspection. See Table 5 for a description of the routine maintenance items and frequencies. Nonroutine maintenance items are also performed as required. These corrective actions are triggered by evaluation of surveillance program activities (see Tables 7 and 8 of Sect. 5 for details of maintenance costs).
10. ANTICIPATED REPAIRS/IMPROVEMENTS: SWSA 1 is not anticipated to require any repairs or improvements of any significant nature.

SCMP SURPLUS SITE DESCRIPTION

1. Site Name: SWSA 3
2. SWMU ID NUMBER: 3.1
3. LOCATION: SWSA 3 is located in Bethel Valley about 0.6 mile (1 km) west of the ORNL complex and south of Bethel Valley Road. ORNL grid coordinates are N 21,760 and E 26,200.
4. DATE OF OPERATION: 1946 to 1951
5. SITE STATUS: The site was removed from service in 1951. It was replaced by SWSA 4. SWSA 3 is surrounded by a chain link fence, has a grass cover, is level, and has not suffered from subsidence in many years. Usage of SWSA 3 is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - SWSA 3 began operating in 1946. The site was used to store scrap metal as well as a landfill for the storage of low-level radioactive waste. Little is known about the kinds of waste stored at this site. Large items were stored above ground within the fenced in area. Alpha wastes were contained in drums and deposited in concrete-lined trenches and covered with concrete. Beta-gamma wastes were buried in unlined trenches and backfilled with soil. Trenches in the area were generally 15 ft (4.4 m) deep. It is estimated that 44,000 to 56,000 Ci of radioactive waste contained in a volume of 600,000 cubic ft of LLW was buried in SWSA 3.

Physical Description - The SWSA occupies about 7 acres (2.8 ha) in a fenced area. It is at the northwestern edge of the ORNL site. The site is flat and grassed. Surface runoff is generally toward the Northwest Tributary (NWT) of WOC. The site contains a groundwater table divide that results in groundwater flow east from the eastern half of the SWSA (toward the NWT) and west from the western half of the SWSA (toward Raccoon Creek). Geologic and hydrologic factors of this area favor a complex pattern of radionuclide movement. Fractures and solution cavities of the limestone represent potential pathways for groundwater movement and radionuclide migration.

Current Condition - The SWSA is now grassed, surrounded by a chain link fence with warning signs at regular intervals, and does not show any sign of subsidence or unusual erosion.

Radiological and Chemical Hazards - The radionuclide inventory at SWSA 3 is 44,000 to 56,000 Ci. The SWSA is a known source of Sr-90 release, although the quantities are relatively small (only a few percent of the annual Laboratory release). In 1964, well water samples were analyzed and indicated the presence of small amounts of trivalent rare earths (TRE) and H-3, as well as Sr-90. Well water samples collected in 1973

indicated Sr-90 levels of 3.0 dpm/mL. Soil samples analyzed in 1978 indicated levels higher than natural background. Release of Sr-90 from SWSA 3 via the NWT and Raccoon Creek has been clearly established, and monitoring of these two areas has been included as part of the SCMP M&S plan.

7. SECURITY AND PROTECTION SYSTEMS: SWSA 3 is in Bethel Valley outside the main plant complex fenced area. For this reason, it is individually fenced with a high chain link fence and is patrolled regularly by ORNL Laboratory Protection. Access to SWSA 3 is by controlled key.
8. SURVEILLANCE ACTIVITIES: SWSA 3 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Site surveillance activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the SWSA surface and its water diversion system remain in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a detailed definition of these activities).
9. MAINTENANCE ACTIVITIES: SWSA 3 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as grass mowing, weed cutting, and fence repair. These are accomplished using programmed maintenance by the P&E Division. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additionally, larger maintenance items are performed as required. All of the above items are triggered by visual inspection. Nonroutine maintenance items are also performed as required. These actions are triggered by the evaluation of surveillance program activities. Examples of this type activity are construction of water diversion systems and grouting of trenches to reduce radionuclide release.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: SWSA 3 will be evaluated in the Remedial Investigation/Feasibility Study (RI/FS) process planned for the ORNL RAP and a plan for final closure developed. No major repairs or improvements for this site are anticipated. However, the drain system used to divert water through the SWSA may require work to ensure that water does not pool at the eastern end of the site.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: SWSA 4
2. SWMU ID NUMBER: 4.3
3. LOCATION: SWSA 4 is located in Melton Valley about 0.5 mile (805 m) southwest of the main ORNL complex. The site is bounded on the northern side by Lagoon Road. ORNL grid coordinates are N 19,220 and E 28,180.
4. DATES OF OPERATION: February 1951 to 1959.
5. SITE STATUS: The site was removed from service in 1959. It was replaced by SWSA 5. Prior to that it was the primary SWSA at ORNL for about eight and one-half years. The site is grassed and surrounded by a two-strand barb wire fence. The site has suffered from subsidence in the past but is currently stable. SWSA 4 has long been known as a significant source of Sr-90 release from the Laboratory (at various times supplying between 35 to 50% of the total annual Laboratory release). Because of this, SWSA 4 has been the subject of much study and several corrective actions directed toward reducing the release of Sr-90. Because the majority of Sr released has been tied to stormflow, these have focused on water diversion systems which have reduced the Sr release by about 50% in recent years.
6. SITE DESCRIPTION:

Operations History - SWSA 4 began operating in 1951. LLW disposal was accomplished by normal trench burial for routine beta- gamma wastes. Trenches ranged from 14.8 to 118 m (50 to 200 ft) in length, 2.4 to 8.9 m (8 to 30 ft) in width, and 2.4 to 4.1 m (8 to 14 ft) in depth. Alpha-contaminated wastes were disposed of in trenches with the addition of a 0.44 m (1.5 ft) concrete slab poured over each trench. Higher activity waste and some "special" high activity waste were placed in concrete lined auger holes 0.3 to 0.6 m (1 to 2 ft) in diameter and approximately 4.4 m (15 ft) deep. Auger holes were also used for the "temporary storage" of material contaminated with fission products of short half life. About 50 of these auger holes are located in the northern part of SWSA 4 along Lagoon Road. These holes still have material in them. Little information exists to characterize the type, concentration, or quantity of radionuclides placed in SWSA 4 for any of its years of operation. Records were maintained but were destroyed by fire. During its period of operation, wastes from other AEC facilities were disposed of in SWSA 4, as well as wastes from the Laboratory. It is estimated that 90,000 to 120,000 Ci of waste was buried in this SWSA which contains about 2,000,000 cubic ft (57,000 cubic m) of waste.

Physical Description - The SWSA occupies a 23 acre (9.3 ha) site in Melton Valley. The site is underlain by Conasauga shale and is located within the WOC drainage basin. The site is bounded by Lagoon Road on the north and is currently fenced and grassed. The SWSA face is covered by a network of water diversion drainage ditches. The southern

edge of the SWSA is bounded by a seepage area which drains via a tributary into WOC. The eastern edge of the SWSA is bounded by a contaminated area known as the intermediate pond, where a pond was created in the 1940s by a dike across WOC. The contamination was created by the sediment left behind when the dike was breached after about two years of usage.

Current Condition - The site is now grassed, surrounded by a barb wire fence, with warning signs at regular intervals, and does not show signs of unusual erosion. The site also shows no signs of subsidence. The southern boundary of the SWSA is a noted seep area, and some bathtubbing occurs on the SWSA face in the western portion.

Radiological and Chemical Hazards - The radionuclide inventory at SWSA 4 is estimated to be 90,000 to 120,000 Ci, as discussed above. The major hazards associated with this SWSA are the seepage of radionuclides from the southern boundary. Efforts to divert surface water runoff have been successful in reducing the release of radionuclides in recent years. Contaminants measured have included Sr-90, Cs-137, Co-60, TRES, Ru-106, Po-210, and Pu-239. In addition, tritium, Sr-90, Co-60, Sb-125, and Cs-137 have been found in groundwater sampling of wells at the SWSA.

7. SECURITY PROTECTION SYSTEMS: SWSA 4 is in Melton Valley and is accessible during daylight hours via Lagoon Road, as are many ORNL Melton Valley sites. It is surrounded with a barb wire fence with warning signs at regular intervals and is a limited access area. During nonworking hours, it is within the ORNL limited access area. Improvements to this system are currently in the planning stage and should be implemented in FY 1988.
8. SURVEILLANCE ACTIVITIES: SWSA 4 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Site surveillance activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the SWSA surface and its water diversion system remain in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: SWSA 4 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as grass mowing, weed cutting, and fence repair. These are accomplished using programmed maintenance by the P&E Division. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs). Additionally, larger maintenance items are performed as required. All of the above items are triggered by visual inspection. Nonroutine maintenance items are also performed as required. These actions are triggered by the evaluation of surveillance program activities. Examples of this type activity are construction of water diversion systems and grouting of trenches to reduce radionuclide release.

10. ANTICIPATED REPAIRS/IMPROVEMENTS: SWSA 4 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include water diversion system, installation of deer control methods in Sr-90 contaminated areas, and fence upgrade/repair. In addition, improvements will be made as determined necessary by evaluation of surveillance program data.



SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: SWSA 5
2. SWMU ID NUMBER: 5.7
3. LOCATION: Latitude 35.91401, Longitude 84.31295. The site is located on a hillside east of WOC, between SWSA 4 and Melton Branch, ORNL Grid coordinates are N 17,820 and E 29,560.
4. DATES OF OPERATION: 1959 to 1973
[TRU retrievable storage and Waste Examination and Assay Facility (WEAF) remain in operation.]
5. SITE STATUS: The site was removed from service in 1973. It was replaced by SWSA 6. Prior to that it was the primary solid waste disposal area at ORNL from 1959 until retired. SWSA 5 is divided into two major areas providing different solid waste storage functions; SWSA 5/South, used for trench burial of routine solid compactible LLW, and SWSA 5/North, still actively used for retrievable storage of transuranic waste. This M&S program addresses SWSA 5/South. Usage of SWSA 5 was, and is, controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - SWSA 5 began operating in 1959. LLW disposal was accomplished by normal trench burial. Trenches in the area vary in length from about 12 to 150 m (40 to 500 ft). They are about 4.4 m (15 ft) deep and 3.5 m (12 ft) wide. The trenches are located at right angles to the strike of the shale to minimize collapse of trench walls. This means that most trenches are located parallel to the hill slope. An area in the south central portion of the SWSA was utilized for disposal of segregated alpha contaminated waste which was trench buried and then covered with a slab of concrete. Auger holes were utilized for the disposal of higher activity and fissile waste to the west of the alpha disposal area. No disposal records are available for the alpha disposal area. An estimated 3.09×10^6 ft³ (86,520 cubic m) of waste are buried here. Major radionuclides in SWSA 5/South are Sr-90, Cm-244, Pu-238, Ru-106, Cs-137, Co-60, and H-3. The total inventory is $<2.1 \times 10^5$ Ci.

Physical Description - The SWSA is a fenced area of about 80 acres (32.3 ha). Land use totals about 50 acres (20.2 ha). SWSA 5/South is a moderately sloping hillside with grass cover, is fenced, and contains several unpaved access roads. The SWSA face is covered with a network of water diversion drainage ditches.

Current Condition - The SWSA has recently been suffering from a subsidence problem and more than 400 truckloads of dirt have been used in backfilling in FY 1987. When this backfill has been completed, the general condition of the SWSA will be brought back to acceptable.

Radiological and Chemical Hazards - SWSA 5 represents a major source of Sr-90 and H-3 release from the Laboratory to the environment. In addition, measurable amounts of Cm-244 and Pu-238 have been released. This has been caused by infiltration of precipitation and has been aggravated because of poor trench orientation. Corrective actions were taken in the form of a water diversion system. Water from SWSA 5 drains southeast into Melton Branch, and most of the surface water runoff is monitored at Station 4 on Melton Branch.

7. SECURITY PROTECTION SYSTEMS: SWSA 5 is in Melton Valley and is in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, SWSA 5 will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: SWSA 5 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, meter radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the SWSA surface and its water diversion system remain in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a detailed description of these activities and their costs).
9. MAINTENANCE ACTIVITIES: SWSA 5 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as grass mowing, weed cutting, and water diversion system clearing. These are accomplished using programmed maintenance by the P&E Division. Additionally, larger maintenance items are performed as required; examples of this are subsidence repair and water diversion system repair. All of the above items are triggered by visual inspection. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Nonroutine maintenance items are also performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of the water diversion system is an example of this type activity performed earlier, and the currently proposed deer control fence around the seep area to the south of SWSA 5 is a current example.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: SWSA 5 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include subsidence and water diversion system repair, and installation of a deer control fence. In addition, improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Pit 1
2. SWMU ID NUMBER: 7.5
3. LOCATION: Pit 1 is located just west of SWSA 4 in Melton Valley. ORNL grid coordinates are N 18,830 and E 26,850.
4. DATES OF OPERATION: July through October 1951, as part of the LLW disposal system and 1962 through 1964 as a drain for the Decontamination Facility (7819). Pit 1 was filled and paved over in 1981.
5. SITE STATUS: The site was removed from service for the last time in 1964. It was replaced by Pit 2 in 1952. The pit was filled with Conasuaga shale and paved over in 1981. Pit 1 had known seeps downgradient, and the primary radionuclide known to leak was Ru-106.
6. SITE DESCRIPTION:

Operations History - Pit 1 began operating in July 1951. Operation for disposal of concentrated LLW ceased in October 1951. At the time of its construction, it was believed that it would be leak tight (much as a tank). Therefore, its operation was terminated when radionuclides (primarily Ru-106) were discovered to be leaking from the pit, although in much lower concentration than found in LLW. In 1962, Pit 1 began again to receive waste, this time in the form of decontamination solutions from the Decontamination Facility (7819). This continued into 1964 at which time the site was permanently retired. From July to October 1951, Pit 1 received 123,000 gal (465,600 L) of concentrated LLW containing about 390 Ci of Cs-137 and Ru-106. No estimate of volumes and Ci received from 7819 is available.

Physical Description - Pit 1 is located just west of SWSA 4. It was 100 ft (30 m) long by 20 ft (6 m) wide and 15 ft deep. The pit was filled in and covered with asphalt in 1981.

Current Condition - Currently, Pit 1 is covered with asphalt. It has a known seep downgradient and there is a known leak site from the 7819 drainage line just to its north. The asphalt cover is in relatively good shape.

Radiological and Chemical Hazards - Pit 1 had known leakage of radionuclides downgradient (primarily Ru-106). The primary radionuclides disposed of at this site are Cs-137 and Ru-106 with minor amounts of U and Pu. The first waste received at the pit was very alkaline (pH 12.5). The nature of the waste that was discharged into the pit from 7819 is unknown; however, the total radionuclide inventory was probably low. The impact of decontamination compounds on the mobility of the waste is unknown.

7. SECURITY PROTECTION SYSTEMS: Pit 1 is in Melton Valley and is accessible during daylight hours via Lagoon Road, as are many ORNL Melton Valley sites. It is surrounded with a barb wire fence with warning signs at regular intervals. During nonworking hours, it is within the ORNL limited access area. Improvements to this system are currently in the planning stage and should be implemented in FY 1988.
8. SURVEILLANCE ACTIVITIES: Pit 1 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Site surveillance activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that asphalt cover remains in good repair and that the site surface and ground and surface water contamination stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Pit 1 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: Pit 1 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Pit 2
2. SWMU ID NUMBER: 7.6a
3. LOCATION: Pit 2 is located just southwest of Pit 1 in Melton Valley. ORNL grid coordinates are N 17,670 and E 26,010.
4. DATES OF OPERATION: Between 1952 and 1962 as part of the LLW disposal system. Pit 2 was backfilled in 1963 and paved over in 1970. Between 1952 and 1954, Pit 2 was the primary method of disposal of LLW. In January 1955, Pit 3 became the initial discharge point for LLW. Finally, in April 1956, Pit 4 was added to the system. During this period, Pit 2 was always operated in conjunction with Pits 3 and 4, with Pit 3 continuing as the primary discharge point.
5. SITE STATUS: The site was removed from service in 1962. The pit was backfilled with soil and graded between late 1962 and late 1963, and an asphalt cover was added in 1970. Pit 2 had known seeps downgradient to the west and southwest. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - Pit 2 began operating in 1952. Waste was initially transported to the site via truck and then via the LLW Transfer Line. During its operation as a single entity from 1952 through 1954, Pit 2 received about 1,294,443 gal (4,900,00 L) of liquid waste containing 16,600 Ci of beta activity. After 1955, when Pit 2 began receiving overflow from Pit 3, it is not possible to determine the amounts of radioactivity it received. Between 1959 and 1961, Pits 2, 3, and 4 received large discharges of Ru-106. During this period, an interceptor trench was dug on the west side of Pit 2 and the seepage pumped back to Pit 2. During 1961, when isotope-specific discharges from the pits area drainages were routinely reported, several hundred curies per month of Ru-106 were discharged in both streams (East and West Weir). This led ultimately to a curtailment of Ru transfer to the pits. The following major radionuclide inventory is estimated for pits 2 through 4 together:

Cs-137 184,000 Ci,
 Ru-106 230,000 Ci,
 Sr-90 42,000 Ci, and
 TRE 70,000 Ci.

Physical Description - Pit 2 is located on a hillside southwest of Pit 1. The pit had the shape of a frustum of an inverted rectangular pyramid, 200 ft by 100 ft at the ground surface and 15 ft deep. At a depth 12 feet from its bottom, the pit had a capacity of 1,000,000 gal. The pit was backfilled in 1962 and 1963 and covered with asphalt in 1970.

Current Condition - Currently, Pit 2 is covered with asphalt. It has known seeps to the west and southwest.

Radiological and Chemical Hazards - Pit 2 had known leakage of radionuclides downgradient to west and southwest (primarily Ru-106, which has now decayed). Stream surveys conducted in drainages in the area indicate past contamination by Sr-90 and Co-60.

7. SECURITY PROTECTION SYSTEMS: Pit 2 is in Melton Valley in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, Pit 2 will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Pit 2 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Pit 2 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: Pit 2 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Implementing deer control measures in the area is an example of a potential improvement at the site. Additional improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Pit 3
2. SWMU ID NUMBER: 7.6b
3. LOCATION: Pit 3 is located just northeast of Pit 2 in Melton Valley. ORNL grid coordinates are N 17,840 and E 26,290.
4. DATES OF OPERATION: Between 1955 and 1961 as part of the LLW disposal system. Pit 3 was backfilled in and paved over in 1963. Between January 1955 and April 1956, Pit 3 was operated in conjunction with Pit 2. In April 1956, Pit 4 was added to the system and the three pits were operated as a unit with Pit 3 being used as the initial discharge point for LLW.
5. SITE STATUS: The site was removed from service in 1961. The pit was backfilled with soil, graded, and covered with asphalt in 1963. Pit 3 had known seeps downgradient to the east. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - Pit 3 began operating in 1955. Waste was transported to the site via the LLW Transfer Line. Because Pit 3 operated in conjunction with either Pit 2 or Pits 2 and 4, it is not possible to describe the amount of LLW and activity it received alone. Between 1959 and 1961, Pits 2, 3, and 4 received large discharges of Ru-106. During this period, an interceptor trench was dug on the west side of Pit 2, and the seepage pumped back to Pit 2. During 1961, when isotope-specific discharges from the pits area drainages were routinely reported, several hundred curies per month of Ru-106 were discharged in both streams (East and West Weir). This led ultimately to a curtailment of Ru transfer to the pits. The following major radionuclide inventory is estimated for pits 2 through 4 together:

Cs-137 184,000 Ci,
 Ru-106 230,000 Ci,
 Sr-90 42,000 Ci, and
 TRE 70,000 Ci.

Pit 3 developed seeps downgradient to the east of its drainage area. These seeps were not as severe as those of Pit 2 or those found later from Pit 4.

Physical Description - Pit 3 is located just northeast of Pit 2. The pit had the same shape and dimensions as Pit 2 (frustum of an inverted rectangular pyramid, 200 ft by 100 ft at the ground surface and 15 ft deep). At a depth 12 feet from its bottom, the pit had a capacity of 1,000,000 gal. The pit was backfilled and covered with asphalt in 1963.

Current Condition - Currently, Pit 3 is covered with asphalt. It has known seeps to the east and downgradient.

Radiological and Chemical Hazards - Pit 3 had known leakage of radionuclides downgradient to east (primarily Ru-106 which has now decayed). Stream surveys conducted in drainages in the area indicate past contamination by Sr-90 and Co-60.

7. SECURITY PROTECTION SYSTEMS: Pit 3 is in Melton Valley and is in a limited access area. It is surrounded with a barb wire fence with warning signs at regular intervals. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, Pit 3 will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Pit 3 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Pit 3 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: Pit 3 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Implementing deer control measures in the area is an example of a potential Improvements at the site. Additional improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Pit 4
2. SWMU ID NUMBER: 7.6c
3. LOCATION: Pit 4 is located downhill and just south of Pit 2 in Melton Valley. ORNL grid coordinates are N 17,280 and E 25,970.
4. DATES OF OPERATION: Between 1956 and 1961 as part of the LLW disposal system. Pit 4 was backfilled in 1976 and paved over in 1980. During its operation, Pit 4 was operated in conjunction with Pits 2 and 3, with Pit 3 being used as the initial discharge point for LLW.
5. SITE STATUS: The site was removed from service in 1961. The pit was backfilled with soil and graded in 1976 and covered with asphalt in 1980. Pit 4 had known seeps downgradient to the east and west. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - Pit 4 began operating in 1956. Waste was transported to the site via the LLW Transfer Line. Because Pit 4 operated in conjunction with Pits 2 and 3, it is not possible to describe the amount of LLW and activity it received alone. Between 1959 and 1961, Pits 2, 3, and 4 received large discharges of Ru-106. During this period, an interceptor trench was dug on the west side of Pit 2 and the seepage pumped back to Pit 2. Also, interceptor trenches were dug on the east and west sides of Pit 4, and LLW was pumped back to Pit 4. During 1961, when isotope-specific discharges from the pits area drainages were routinely reported, several hundred curies per month of Ru-106 were discharged in both streams (East and West Weir). This led ultimately to a curtailment of Ru transfer to the pits. The following major radionuclide inventory is estimated for Pits 2 and 4 together:

Cs-137 184,000 Ci,
 Ru-106 230,000 Ci,
 Sr-90 42,000 Ci, and
 TRE 70,000 Ci.

Pit 4 had the poorest performance of the three pits operated at this site. However, since it was last in the chain of three to receive LLW via overflow, it did not receive much waste volume.

Physical Description - Pit 4 is located just south of Pit 2. The pit had the same shape and dimensions as Pit 2 (frustum of an inverted rectangular pyramid, 200 ft by 100 ft at the ground surface and 15 ft deep). At a depth 12 feet from its bottom, the pit had a capacity of 1,000,000 gal. The pit was backfilled in 1976 and covered with asphalt in 1980.

Current Condition - Currently, Pit 4 is covered with asphalt. It has known seeps to east and west.

Radiological and Chemical Hazards - Pit 4 had known leakage of radionuclides downgradient to east and west (primarily Ru-106 which has now decayed). Stream surveys conducted in drainages in the area indicate past contamination by Sr-90 and Co-60.

7. SECURITY PROTECTION SYSTEMS: Pit 4 is in Melton Valley and is in a limited access area. It is surrounded with a barb wire fence with warning signs at regular intervals. However improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, Pit 4 will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Pit 4 surveillance activities are the responsibility of the Waste Management Operations Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Pit 4 maintenance activities are the responsibility of the Waste Management Operations Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: Pit 4 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Implementing deer control measures in the area is an example of a potential improvement at the site. Additional improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: Trench 5
2. SWMU ID NUMBER: 7.7
3. LOCATION: Trench 5 is located in Melton Valley on a ridgetop perpendicular to strike just east of Pits 2, 3, and 4. ORNL grid coordinates are N 17,470 and E 26,760.
4. DATES OF OPERATION: Between 1960 and 1966 as part of the LLW disposal system. Trench 5 was paved with an asphalt cover in 1970.
5. SITE STATUS: The site was removed from service in 1966 when hydrofracture replaced the seepage pits and trenches as the method of LLW disposal at the Laboratory. The trench was paved with an asphalt cover in 1970. Trench 5 had no known groundwater seeps. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - Trench 5 began operating in 1960. Waste was transported to the site via the LLW Transfer Line. It had the best performance history of all the pits and trenches sites. It was pretreated with copper sulfate and sodium sulfide to reduce Ru mobility problems and pretested for seepage rate using water. The trench received and estimated 9,500,000 gal (36,000,000 L) of LLW. The following major radionuclide inventory is estimated for Trench 5:

Cs-137	205,600 Ci,
Ru-106	6,385 Ci,
Sr-89&90	96,750 Ci, and
Co-60	3,045 Ci.

Physical Description - Trench 5 is located on a ridgetop perpendicular to strike just east of Pits 2, 3, and 4 in Melton Valley. The trench is 300 ft (90 m) long by 3 ft wide and is 15 ft deep. As constructed, it had an earthen cover. The trench was paved with an asphalt cover in 1970.

Current Condition - Currently, Trench 5 is covered with asphalt. It has no known point source groundwater seeps. The asphalt cover needs resealing; otherwise, the trench seems in good repair.

Radiological and Chemical Hazards - Trench 5 had no known groundwater seeps or other visual leakage. Its radionuclide inventory is described above.

7. SECURITY PROTECTION SYSTEMS: Trench 5 is in Melton Valley and is in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, Trench 5 will be within the newly-created controlled-access Melton Valley Security area.

8. SURVEILLANCE ACTIVITIES: Trench 5 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Trench 5 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: Trench 5 will be evaluated during the RI/FS process planned for the ORNL RAP (RAP) and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: Trench 6
2. SWMU ID NUMBER: 7.8
3. LOCATION: Trench 6 is located in Melton Valley on a ridgetop just south of SWSA 4. ORNL grid coordinates are N 18,680 and E 27,980.
4. DATES OF OPERATION: Between September 10 and October 10, 1961, as part of the LLW disposal system. Trench 6 operated only about one month due to severe seepage downgradient to its south. It was paved with an asphalt cover in 1981.
5. SITE STATUS: The site was removed from service in 1961 when severe seepage was noted to its south. The trench was paved with an asphalt cover in 1981. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - Trench 6 operated in late 1961. Waste was transported to the site via the LLW Transfer Line. The trench was pretreated with copper sulfate to reduce Ru mobility problems and pretested for seepage rate using water. The trench received an estimated 130,000 gal of LLW. The following major radionuclide inventory is estimated for Trench 6:

Cs-137	665	Ci,
Ru-106	501	Ci,
Sr-89	145	Ci, and
Co-60	24	Ci.

Physical Description - Trench 6 is located on a ridgetop just south of SWSA 4 in Melton Valley. The trench is 500 ft (154 m) long by 3.3 ft (1 m) wide and constructed in almost a U-shape. As constructed, it had an earthen cover. The trench was paved with an asphalt in 1981.

Current Condition - Currently, Trench 6 is covered with asphalt. It had a major groundwater seep directly south of the center of its U-shape. The seep leaked primarily Ru-106, which has now decayed away. The asphalt cover needs resealing; otherwise, the trench seems in good repair.

Radiological and Chemical Hazards - Trench 6 had a known groundwater seep which leaked primarily Ru-106, which has since decayed away. Its radionuclide inventory is described above.

7. SECURITY PROTECTION SYSTEMS: Trench 6 is in Melton Valley in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, Trench 6 will be within the newly-created controlled-access Melton Valley Security area.

8. **SURVEILLANCE ACTIVITIES:** Trench 6 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. **MAINTENANCE ACTIVITIES:** Trench 6 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. **ANTICIPATED REPAIRS/IMPROVEMENTS:** Trench 6 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: Trench 7
2. SWMU ID NUMBER: 7.9
3. LOCATION: ORNL grid coordinates are N 17,440 and E 27,600. Trench 7 is located on a hillside east of Trench 5 and west of OHF.
4. DATES OF OPERATION: Trench 7 was built in 1962 and used until 1966. It was paved asphalt in 1970.
5. SITE STATUS: The site was removed from service in 1966. It was replaced by a different technology; hydrofracture at the Old Hydrofracture Facility (OHF) site. Trench 7 was built in two 100 ft long sections so that a leak in one section would not preclude continuing operation with the other section. The site was pretreated with 50,000 gal of 4% sodium hydroxide apparently to enhance the adsorption of Sr-90. Trench 7 was paved with asphalt in 1970. Several interim corrective actions were taken at Trench 7 in 1985 and 1986 in an effort to reduce the discharge at a groundwater seep on the east side of its drainage area. These actions included expansion of the 1970 asphalt cap, excavation and sealing of the waste transfer line just north of the trench, and installation of a grout curtain on the eastern and northern perimeter of the site. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan)
6. SITE DESCRIPTION:

Operations History - Trench 7 began operating in 1962. Waste was transported to the site via the LLW Transfer Line. During its operation, the trench received about 9,500,000 gal (36,000,000 L) of liquid waste containing the following major radionuclide inventory:

Cs-137 231,000 Ci,
Ru-106 3,400 Ci,
Sr-90 48,000 Ci, and
Co-60 1,500 Ci.

Trench 7 developed a seep on the eastern side of its drainage area.

Physical Description - Trench 7 is located on a hillside above WOC. It is 200 ft (60 m) long by three ft wide and was built in two 100 ft long segments to provide for independent operation of each in the event of leakage of the other. The trench was covered with asphalt in 1970.

Current Condition - Currently, Trench 7 is covered with asphalt. It has a known seep to the east and a known LLW leak upslope just to the north.

Radiological and Chemical Hazards - In general, Trench 7 performed quite well during its operation. However, several areas of surface radioactivity are known. Trench 7 was known to leak minor amounts of Ru-106 on its eastern side via seep RS7. In addition, a leak in the LLW line bringing waste to the trench occurred in 1966 about 200 ft above the northern end of the trench, along what is now an extension to the access road. This spill, which contained about 100 Ci of activity, was covered with fill dirt and left. The spill area is known to contain mainly Cs-137, Cm-144, and about 10 Ci of Sr-90. This spill site is also considered a SWMU (see SWMU 7.4c). Several radionuclides have been found in groundwater in the Trench 7 area, including H-3, Tc-99, Co-60, and Sr-90. Only Sr-90, which was well above maximum permissible concentration (MPC), and Co-60 which approached MPC. The total quantity of Sr-90 released from Trench 7, however, is less significant than other ORNL sources.

7. SECURITY PROTECTION SYSTEMS: Trench 7 is in Melton Valley and is in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, SWSA 5 will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Trench 7 surveillance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, meter radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Trench 7 maintenance activities are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. Table 5 describes the type and frequency of routine maintenance activities and Tables 7 and 8 of Sect. 5 describes the cost of maintenance activities. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: Trench 7 will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Implementing deer control measures in the area is an example of a potential improvement at the site. Additional improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: HRE Fuel Wells
2. SWMU ID NUMBER: 7.2
3. LOCATION: The site is located just south of Trench 5 in Melton Valley on a ridgetop. ORNL grid coordinates for the seven wells are:

S1 N 17,293 and E 26,728
S2 N 17,289 and E 26,716
S3 N 17,285 and E 26,704
S4 N 17,284 and E 26,693
S5 N 17,287 and E 26,681
S6 N 17,291 and E 26,669
S7 N 17,295 and E 26,658

4. DATES OF OPERATION: The site was commissioned in 1964.
5. SITE STATUS: The site is on a hillside near Trench 5 and is marked by plaques at each well location. No problems are apparent. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - In 1964, 7 auger holes, S1 through S7, one ft in diameter by 17 ft deep were drilled at the site to hold residual fuel solution from the Homogeneous Reactor. The fuel had been stored in the Homogeneous Reactor Chemical Decay tanks. Each auger hole received about 135 gal of liquid waste in the form of a 4 molar sulfuric acid solution, and the wells were filled to ground level with soil and marked with a plaque.

Physical Description - The site is located on a ridgetop just south of Trench 5. The only thing noticeable at the site is the brass plaques marking the site of each storage well.

Current Condition - Currently, the site shows no noticeable sign of problems of any kind.

Radiological and Chemical Hazards - Each fuel well received 135 gal of 4 molar sulfuric acid solution containing about 10 lb of uranium and fission products, Sr-90, and Ru-106. No surface hazards are known to exist.

7. SECURITY PROTECTION SYSTEMS: The site is in Melton Valley and is in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, it will be within the newly-created controlled-access Melton Valley Security area.

8. SURVEILLANCE ACTIVITIES: The site surveillance activities are conducted along with those for Trench 5 and are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that contamination of ground and surface waters stay within acceptable levels and that any surface contamination is marked (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: The site maintenance activities are conducted along with those for Trench 5 and are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as grass and weed control. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: This site will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, no repairs are anticipated. Improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Lines and Leak Sites - Gauging Station northwest of Building 7852.
2. SWMU ID NUMBER: 7.4a
3. LOCATION: This leak site is located along the old LLW transfer line in Melton Valley about 200 ft (61 m) west of WOC along the portion of the LLW line that leads to the OHF. ORNL grid coordinates are N 17,680 and E 28,000. This site is also known as Leak Site 2.
4. LEAK DATE(S): The first leak at the site occurred July 9, 1970. Some evidence suggests that a second leak may have occurred later.
5. SITE STATUS: The site was entombed in 1983. The asphalt cap appears to be in good shape today, and the site status today is the same as it was following the entombment. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - The site was surveyed in 1973 and surface contamination was observable all the way to WOC. During July and August 1973, about 3,415 cubic ft of contaminated soil were removed from the site and disposed of in SWSA 6. However, a 1979 survey revealed additional contamination, and the site was entombed in 1983. In this effort, the site was first isolated by digging down to the LLW line on either side of the leak area and installing permanent pipe caps. The line was cut, short sections of pipe removed, the entrained water collected for disposal, and the open ends sealed. Over 100 cubic yds of contaminated soil and vegetation were removed, herbicide was applied to the areas to be paved, the area was refilled with a bentonite cap, followed by clean soil, and an asphaltic cap applied.

Physical Description - The leak site resulted from a leak in the section of LLW transfer line which carried waste from the Trench 7 area to the OHF. The leak occurred at a mechanical, neoprene-gasketed joint. The leak site drops 15 ft (4.6 m) over a distance of 100 ft (30 m). The waste had seeped from the pipe coupling and had reached ground surface, where it had spread laterally over a small area. Today, the leak site has been entombed and remains in a stable state.

Current Condition - Currently, the leak site is covered with asphalt. The asphalt cover appears in good shape. The leak site will be surveyed in FY 1988 to determine the extent of any surface contamination.

Radiological and Chemical Hazards - Wastes handled in the LLW transfer system include major radionuclides such as Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some Pu, U and TRU isotopes were also present in the waste streams from certain sources. Contamination was

removed at the leak site so that there was no significant release of radiation to WOC. Soil samples ranged from 2 Ci/g to 3.7 Ci/g. Over 3000 cubic ft (84 cubic m) of contaminated soil was removed. A second survey in 1979 revealed additional contamination, suggesting either additional leakage or inadequate removal of contaminated soil. At 3 ft above the ground surface, beta-gamma activity ranged from 240 mR/h to 800 mR/h along the line. The site was subsequently entombed with a multilayered cover. The radionuclide inventory remaining at the leak site is not known.

7. SECURITY PROTECTION SYSTEMS: The leak site is in Melton Valley in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, this site will be within the newly created controlled access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Surveillance activities for the leak site are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities).
9. MAINTENANCE ACTIVITIES: Maintenance activities for the leak site are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: The leak site will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Lines and Leak Sites - Pit 6 Southeast (Site 1)
2. SWMU ID NUMBER: 7.4b
3. LOCATION: This leak site is located along the old LLW transfer line in Melton Valley about 150 ft southeast of Pit 6. ORNL grid coordinates are N 18,363 and E 27,976. This site is also known as Leak Site 1.
4. LEAK DATE(S): The leak was first reported in July 1973. The leak apparently occurred at some earlier date.
5. SITE STATUS: The site was entombed in 1983. The asphalt cap appears to be in good shape today, and the site status today is the same as it was following the entombment. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - The site was surveyed in 1973 and it was determined that the waste had reached the ground and spread laterally for several feet. Surface contamination movement to the southwest was observable in the direction of surface runoff. Beta-gamma exposure rates measured at 3 ft above the ground surface ranged from 240 mR/hr to 1 R/hr, with the majority of the radiation localized in a 20 ft by 20 ft area. Analysis of soil samples showed that the surface soil in the immediate vicinity of the leak was significantly contaminated with mixed fission products. Radionuclide concentrations in the samples ranged from .01 to 50 microCi/g of beta-gamma activity with gross alpha levels up to 1 nCi/g. The beta-gamma activity was primarily Cs-137 and Sr-90. The primary alpha emitter was Cm-244, with minor amounts of Am-241, Pu-238, and Pu-239. In 1983, entombment of the site began. The site was first isolated by digging down to the line on either side of the leak area and installing permanent pipe caps. The line was cut, short sections of pipe removed, and the entrained water collected for disposal, and the open ends sealed. Over 100 cubic yds of contaminated soil and vegetation were removed, herbicide was applied to the areas to be paved, the area was refilled with a bentonite cap, followed by clean soil, and an asphaltic cap applied.

Physical Description - The leak site resulted from a leak in the section of LLW transfer line which carried waste from the Trench 6 area to Trench 7. The leak site was located in an area of gradual topographic relief (with a slope of 15% to the southwest. No dimensions are available for the volume occupied by the leak, and the amount of waste leaked is not known. Today, the leak site has been entombed and remains in a stable state.

Current Condition - Currently, the leak site is covered with asphalt. The asphalt cover appears in good shape. The leak site will be surveyed in FY 1988 to determine the extent of any surface contamination.

Radiological and Chemical Hazards - Wastes handled in the LLW transfer system include major radionuclides such as Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some Pu, U and TRU isotopes were also present in the waste streams from certain sources. Activity in soil samples taken from the site are described above under Operations History. The radionuclide inventory remaining at the leak site is not known.

7. SECURITY PROTECTION SYSTEMS: The leak site is in Melton Valley in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, this site will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Surveillance activities for the leak site are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Maintenance activities for the leak site are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: The leak site will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include those to the asphalt cover. Improvements will be made as determined necessary by evaluation of surveillance program data.

SCMP SURPLUS SITE DESCRIPTION

1. SITE NAME: LLW Lines and Leak Sites - End of Trench 7 Access Road
2. SWMU ID NUMBER: 7.4c
3. LOCATION: This leak site is located along the old LLW transfer line leading to Trench 7 in Melton Valley about 200 ft north of Trench 7. The site of the leak currently lies under the Trench 7 access road extension, about halfway between Trench 7 and the current staging area for well diggers.
4. LEAK DATE(s): The leak was first reported in April 1966.
5. SITE STATUS: The top several inches of soil at the site were removed and the contamination was covered with approximately 5 ft (1.5 m) of clean soil. The area was contoured to prevent leaching by surface water. Recently, the site has been surveyed and significant Sr-90 uptake has been found in the trees in the area. A letter report on this subject is in preparation and corrective action of this problem will be determined in FY 1988. Usage of the Pits and Trenches area is controlled by the Operations Division WMO Group (T. F. Scanlan).
6. SITE DESCRIPTION:

Operations History - A section of plastic pipeline ruptured causing the leak at the site. Approximately 3,000 gal (11,356 L) of waste spilled on the soil at the leak site. The total activity was estimated to be about 100 Ci and consisted mainly of Cs and Ce and about 10 Ci of Sr-90. As described above, several inches of soil were removed and the leak site was covered with soil and contoured to prevent erosion.

Physical Description - The leak site resulted from the rupture of a plastic section of pipeline in the section of LLW transfer line which carried waste from the Trench 6 area to Trench 7. The leak site is located about 100 ft above Trench 7 and currently lies under the Trench 7 access road extension. No dimensions are available for the volume occupied by the leak site. The amount of waste leaked was estimated at 3,000 gal (11,356 L).

Current Condition - Currently, the leak site lies under the Trench 7 access road extension. A recent scouting survey of the site has revealed significant Sr uptake in the trees in a broad area. Corrective action of the site will be evaluated in FY 1988.

Radiological and Chemical Hazards - Wastes handled in the LLW transfer system include major radionuclides such as Sr-90, Cs-137, Ru-106, Co-60, and various rare earths. Some Pu, U and TRU isotopes were also present in the waste streams from certain sources. A total activity of about 100 Ci was estimated for this spill, consisting mainly of Cs, Ce, and about 10 Ci of Sr. Sr uptake in the trees in the area is the primary hazard to personnel.

7. SECURITY PROTECTION SYSTEMS: The leak site is in Melton Valley in a limited access area. However, improvements to this system are currently in the planning stage and should be implemented in FY 1988. At that time, this site will be within the newly-created controlled-access Melton Valley Security area.
8. SURVEILLANCE ACTIVITIES: Surveillance activities for the leak site are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include driveovers, walkovers, radiological surveys, surface water monitoring, and groundwater monitoring to ensure that the asphalt surface remains in good repair and that contamination of ground and surface waters stay within acceptable levels (see Tables 3 through 5 of Sect. 2 and Tables 7 and 8 of Sect. 5 for a more detailed definition of these activities and their costs).
9. MAINTENANCE ACTIVITIES: Maintenance activities for the leak site are the responsibility of the WMO Group acting for the SCMP M&S task (see Fig. 2). Activities include routine items such as weed control and repair of the asphalt covers. See Table 5 for a description of the routine maintenance items and frequencies and Tables 7 and 8 of Sect. 5 for details of maintenance costs. Additional nonroutine maintenance items are performed as required. These corrective actions are triggered by evaluation of surveillance program activities. Construction of a water diversion (or control) system is an example of this type activity.
10. ANTICIPATED REPAIRS/IMPROVEMENTS: The leak site will be evaluated during the RI/FS process planned for the ORNL RAP and a plan for final closure developed. During the interim period, anticipated repairs, to be conducted as required, include remediation of the Sr uptake problem and installation of deer control measures to prevent deer contamination in the area. Other improvements will be made as determined necessary by evaluation of surveillance program data.

INTERNAL DISTRIBUTION

- | | | | |
|--------|-------------------|--------|-------------------------------|
| 1. | J. F. Alexander | 22. | G. W. Oliphant |
| 2. | M. E. Baldwin | 23-26. | P. T. Owen |
| 3. | B. A. Berven | 27. | D. C. Parzyck |
| 4-8. | T. W. Burwinkle | 28. | T. H. Row |
| 9. | H. M. Butler, Jr. | 29. | T. F. Scanlan |
| 10-11. | K. W. Cook | 30. | F. E. Sharples |
| 12. | H. R. Gaddis | 31. | L. E. Stratton |
| 13. | D. F. Hall | 32. | J. H. Swanks |
| 14. | D. D. Huff | 33. | J. R. Trabalka |
| 15. | L. C. Lasher | 34. | D. L. Van Dusen |
| 16. | J. R. Lawson | 35. | L. D. Voorhees |
| 17. | L. E. McNeese | 36. | Laboratory Records-RC |
| 18. | T. E. Myrick | 37-38. | Laboratory Records |
| 19. | E. Newman, Jr. | 39. | ORNL Patent Section |
| 20. | C. E. Nix | 40. | ORNL Central Research Library |
| 21. | R. E. Norman | 41. | ORNL Y-12 Technical Library |

EXTERNAL DISTRIBUTION

42. Office of Assistant Manager for Energy Research and Development, U.S. Department of Energy, Oak Ridge Operations, P. O. Box E, Oak Ridge, Tennessee 37831.
- 43-44. Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, Tennessee 37831.

