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**OAK RIDGE
NATIONAL
LABORATORY**

MARTIN MARIETTA

Oak Ridge National Laboratory Implementation Plan for DOE Order 5820.2A

J. S. Baldwin
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C. M. Kendrick
L. D. Bates

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

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OAK RIDGE NATIONAL LABORATORY
ENVIRONMENTAL AND HEALTH PROTECTION DIVISION
WASTE MANAGEMENT OPERATIONS PROGRAM
WASTE MANAGEMENT COORDINATION OFFICE

OAK RIDGE NATIONAL LABORATORY
IMPLEMENTATION PLAN FOR
DOE ORDER 5820.2A

Date Published: April 28, 1989

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ACRONYMS AND INITIALISMS

AcDM	Activities Description Memorandum
ADM	Action Description Memoranda
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ARAR	Applicable or Relevant and Appropriate Requirements
ASME	American Society of Mechanical Engineers
BRC	below regulatory concern
CDR	conceptual design review
CERCLA	Comprehensive Environmental Compensation and Liability Act
CEUSP	Consolidated Edison Uranium Solidification Project
CFR	Code of Federal Regulations
CH	contact-handled
CIIDF	Class II Disposal Facility
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CWDF	Central Waste Disposal Facility
CY	calendar year
D&D	decontamination and decommissioning
DFDP	Defense Facilities Decommissioning Program
DOE	Department of Energy
DOT	Department of Transportation
DP	Defense Programs
DWMP	Defense Waste Management Plan
EARS	Environmental Activities Reporting System
EASC	Emergency Avoidance Solidification Campaign
EH	Environmental, Safety and Health
EHPD	Environmental and Health Protection Division
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Plan
EPA	Environmental Protection Agency
ER	Energy Research
FY	fiscal year
GCD	Greater Confinement Disposal
GCO	Generator Certification Official
GPP	General Plant Project
HEPA	high-efficiency particulate air (filter)
HQ	Headquarters
HSWA	Hazardous and Solid Waste Amendments
HWMA	Hazardous Waste Management Area
IAG	Interagency Agreement
ICM	Interim Corrective Measure
IDB	Integrated Data Base
IWMF	Interim Waste Management Facility
JIO	Joint Integration Office

ACRONYMS AND INITIALISM (contd.)

LI	Line Item
LLLW	liquid low-level waste
LLW	low-level waste
LLWDDD	Low-Level Waste Disposal Development and Demonstration (Program)
LRP	Long-Range Plan
LSA	low specific activity
LTHWSF	Long-Term Hazardous Waste Storage Facility
MUOM	monolithic uranium oxide material
NARM	naturally occurring and accelerator-produced radioactive material
NAS	neutron assay system
NDA	nondestructive assay
NDE	nondestructive examination
NE	Nuclear Energy
NEPA	National Environmental Policy Act
NG	newly generated
NQA	nuclear quality assurance
NRC	Nuclear Regulatory Commission
OMB	Office of Management and Budget
ORGDP	Oak Ridge Gaseous Diffusion Plant
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORR	Oak Ridge Reservation
PA	performance assessment
PAN	passive/active neutron
PGDP	Paducah Gaseous Diffusion Plant
PORTS	Portsmouth Gaseous Diffusion Plant
PWTP	Process Waste Treatment Plant
QA	quality assurance
RAP	Remedial Action Program
RAPIC	Remedial Action Program Information Center
RCRA	Resource Conservation and Recovery Act
R&D	research and development
RFA	RCRA Facility Assessment
RFI	Remedial Facilities Investigation
RH	remote-handled
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RTR	real-time radiography

ACRONYMS AND INITIALISM (contd.)

SAR	Safety Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SCFP	Surplus Contaminated Facilities Program
SCMP	Site Corrective Measures Program
SFMP	Surplus Facilities Management Program
SFMPO	Surplus Facilities Management Program Office
SGS	segmented gamma scan
SLB	shallow land burial
SLLW	solid low-level waste
SWMU	solid waste management unit
SWSA	solid waste storage area
TDHE	Tennessee Department of Health and Environment
TRU	transuranic waste
TSCA	Toxic Substance Control Act
TSD	treatment, storage, and disposal
WAC	Waste Acceptance Criteria
WACCC	Waste Acceptance Criteria Certification Committee
WAG	waste area grouping
WCCF	Waste Characterization and Certification Facility
WEAF	Waste Examination and Assay Facility
WHPP	Waste Handling and Packaging Plant
WIPP	Waste Isolation Pilot Plant
WOCC	Waste Operations Control Center

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EXECUTIVE SUMMARY

Department of Energy (DOE) Order 5820.2A was promulgated in final form on September 26, 1988. Within six months of the date of issuance of this Order, Heads of Field Elements are required to prepare and submit to appropriate Headquarters (HQ) program organizations an implementation plan, describing schedules, costs, and quality assurance activities for compliance with the requirements of this Order. This plan has been prepared and submitted to fulfill the requirement for Oak Ridge National Laboratory (ORNL).

This Plan addresses all applicable requirements of the Order pertaining to waste management activities affecting transuranic (TRU) and solid low-level waste (SLLW) and the decommissioning of radioactively contaminated facilities. The emphasis of this plan is on partial compliance or noncompliance and the schedules and costs of activities necessary to achieve full compliance with the requirements of the Order. The plan does not include compliance evaluation or cost and schedule estimates for activities affecting liquid, gaseous, hazardous or mixed waste.

This plan is organized into six sections and a supporting appendix. The first section provides basic information about the ORNL and the principal organizations involved in waste management activities. The following sections address requirements related to high-level, TRU, low-level waste (LLW), naturally occurring and accelerator-produced radioactive material (NARM), and the decommissioning of radioactively contaminated facilities.

Since ORNL produces no high-level wastes, this section of the report simply indicates that the Order requirements are not applicable. Because very small quantities of NARM waste are generated at ORNL, this type of waste is managed as LLW.

An Implementation Summary Table is provided following each of the remaining sections. In each table, partial compliance and noncompliance, schedules, and costs for achieving compliance are summarized in an abbreviated form. In many instances, the schedules and costs for achieving full compliance are not well known. Best estimates are provided when deemed appropriate. The Implementation Summary Tables will be updated and submitted annually, as required by the Order, in the ORNL Waste Management Plan. The Appendix, which contains the documentation required by the Order, will be updated annually and included as an appendix in the ORNL Waste Management Plan.

A summary of the overall ORNL compliance status and cost and schedule estimates is provided in Table 1. As illustrated in this table, ORNL waste management programs are not in full compliance with the 109 requirements found to be applicable to waste management activities, with 73 partial or noncompliance findings listed. To reach full compliance, it is anticipated that on the order of \$600M will be required over the next 25 years. These needs are in addition to the \$10-12M required annually to support routine waste management systems operations through generator charge-back programs. While compliance with the intent of the Order requirements is scheduled to be complete by FY 1994, there are certain areas, such as shipment of TRU wastes to the Waste Isolation Pilot Plant (WIPP) and the decommissioning of facilities, which will require expenditures through the year 2013. A summary of the anticipated expense funding requirements through the FY 1994 compliance period is provided in Table 2. Table 3 provides a listing of the capital equipment and facilities that are expected to be required between FYs 1989 and 1994 to support Order compliance, with the Waste Handling and Packaging Plant (WHPP) and Class II Disposal Facility (CIIDF) being the most significant facility needs. Estimates shown for FYs 1989-1991 are consistent with values submitted in Field Work Proposals. Less confidence is placed in estimates shown in Table 3 for later FYs.

Table 1. Summary of ORNL compliance status with DOE Order 5820.2A and estimated costs of Order implementation*

Order chapter	Order requirements compliance status				Estimated compliance date	Estimated cost of compliance	
	Noncompliance	Partial compliance	Compliance	Not applicable/TBD		Expense	Capital
1. High-level waste	0	0	0	17	b	b	b
2. Transuranic waste	1	26	18	13	FY 2013	\$120M	\$142M
3. Low-level waste	3	35	10	5	FY 1994	28M	63M
4. NARM waste	0	0	0	5	c	c	c
5. Decommissioning Program	<u>0</u>	<u>8</u>	<u>8</u>	<u>0</u>	<u>FY 2010</u>	<u>250M</u>	<u>10M</u>
TOTALS	4	69	36	40	FY 2013	\$398M	\$215M

*Does not include compliance evaluation or cost/schedule estimates for ORNL liquid, gaseous, or hazardous waste streams. Does not include costs associated with routine waste systems operations funded through generator charge-back program (\$10-12M annually).

^bNot applicable

^cIncluded with low-level waste.

Table 2. Estimated ORNL expense requirements for DOE Order 5820.2A compliance during 5-year compliance phase*

Order chapter	5-year compliance phase (\$000)					
	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994
1. High-level waste	0	0	0	0	0	0
2. Transuranic waste	3,000	3,400	3,400	3,500	2,100	1,700
3. Low-level waste	4,300	3,800	5,900	6,000	6,000	5,900
4. NARM waste	0	0	0	0	0	0
5. Decommissioning Program	<u>1,300</u>	<u>2,700</u>	<u>4,300</u>	<u>1,800</u>	<u>6,500</u>	<u>11,400</u>
TOTALS	8,600	9,900	13,600	11,300	14,600	19,000

*Does not include compliance evaluation or cost/schedule estimates for ORNL liquid, gaseous, or hazardous waste streams. Does not include costs associated with routine waste systems generation funded through generator charge-back program (\$10-12M annually).

Funding requests for FYs 1989-1991 have been made through the DP Interim Waste Operations and Defense D&D Programs, the ER Environmental Compliance Program, and the NE SFMP through official Field Work Proposals.

Table 3. Listing of ORNL capital projects required for DOE Order 5820.2A compliance

Order requirement	Project	Project type	Proposed year of funding	Total estimated cost (\$000)
2. Transuranic waste				
(a) Waste classification				
	Box assay equipment	CE	FY 1992	1,500
	Box RTR unit	CE	FY 1989	490
(b) Waste generation and treatment				
	CH-TRU Repackaging Facility	LI	FY 1993	6,000
	Waste Handling and Packaging Plant	LI	FY 1993	130,000
	Waste Handling and Packaging Plant	CE	FY 1989-93	1,000
(c) Temporary storage				
	TRU/SLW Storage Facility	GPP	FY 1989	425
	RH-TRU Storage Bunker-I	GPP	FY 1989	800
	CH-TRU Storage Facility	GPP	FY 1991	1,000
	RH-TRU Storage Bunker-II	GPP	FY 1993	500

XX

Table 3. Listing of ORNL capital projects required for
DOE Order 5820.2A compliance (contd.)

Order requirement	Project	Project type	Proposed year of funding	Total estimated cost (\$000)
3. Low-level waste				
(d) Waste characterization				
	Generator waste certification equipment	CE	FY 1989-94	2,500
(f) Waste treatment				
	SWSA 6 improvements	GPP	FY 1989	350
	SWSA 6 staging area	GPP	FY 1990	900
	Sludge volume reduction	GPP	FY 1990	900
	Resin drying unit	GPP	FY 1993	1,200
	Mixed waste treatment	GPP	FY 1994	650
(h) Waste storage facilities				
	Expand mixed waste storage	GPP	FY 1989	400
	Upgrade Building 7507	GPP	FY 1990	275
	Bulk mixed waste storage	GPP	FY 1990	900
	Upgrade K-25 storage facilities	GPP	FY 1993	425
(i) Disposal methods				
	Interim Waste Management Facilities	GPP	FY 1989	1,100
	GCD sito replacement	CE	FY 1991	900
	Class III,IV storage	GPP	FY 1990	1,000
	Greater than Class II long-term storage	LI	FY 1994	25,000
	Class II Disposal Facility	LI	FY 1992	25,000

Table 3. Listing of ORNL capital projects required for
DOE Order 5820.2A compliance (contd.)

Order requirement	Project	Project type	Proposed year of funding	Total estimated cost (\$000)
(k) Environmental monitoring	Groundwater monitoring network	GPP	FY 1989	735
	Hydraulic head measuring stations	GPP	FY 1989	300
	Monitoring systems upgrade	GPP	FY 1993	965
(m) Record keeping	Upgrade WOCC computer system	GPE	FY 1990	400
5. Decommissioning				
(d) Decommissioning projects	Equipment in support of decommissioning projects	CE	FY 1989-2010	10,000

Table 1 indicates that, of the 45 TRU waste management requirements determined to be applicable, ORNL complies with 18, partially complies with another 26, and does not comply with one. The one noncompliance results from the inability of some current TRU waste interim storage facilities to meet RCRA technical requirements. Construction of new compliant facilities to which the waste can be moved prior to the deadline will be difficult, because the near-term budget does not support compliance with the 1992 deadline. Negotiation with regulators on this issue is anticipated to begin in late FY 1989. The partial compliances generally indicate that ORNL complies to the extent of its current activities, which primarily involve newly generated (NG) contact-handled (CH) TRU waste. However, ORNL is not in a position to comply with respect to its future activities. Plans, programs, and even capital facilities are needed to provide compliance capabilities in these areas. As shown in Table 1, ORNL anticipates reaching full compliance with the TRU waste management requirements of DOE Order 5820.2A in the year 2013, or upon closure of WIPP. The costs to attain TRU waste compliance total approximately \$260M, including the construction of several waste storage and processing facilities. These costs do not include the remediation of ORNL buried TRU sites, as these are covered in the RAP and funded by the Environmental Restoration Program.

There are 53 requirements in this Order pertaining to the management activities affecting LLW. ORNL is in noncompliance with three requirements and in partial compliance with 35 requirements. Five requirements were determined to be not applicable to present LLW waste management activities but may become applicable in the future. ORNL is in full compliance with 10 requirements. ORNL's goal is to achieve full compliance with this Order by FY 1994. In order to accomplish this, significant costs will be incurred. Current estimates will require a funding level of \$32M in expense funds over the next five years. This total includes a \$14M funding level for the Low-Level Waste Disposal Development and Demonstration (LLWDDD) Program. Many activities are planned for managing LLW that extend beyond FY 1994. To implement these activities an additional \$59M will be required at a minimum. These projected costs do not include those costs incurred to support routine waste management operations. These costs are incurred by the waste generators. The promulgation of this Order occurred during a period of transition. ORNL is in the midst of implementing the LLWDDD Program strategy whereby previous shallow land burial (SLB) disposal practices have been phased out and replaced by disposal techniques designed for specific waste categories that have been developed using site specific dose-based performance objectives. The DOE-Oak Ridge Operations (ORO) Office is also in the midst of preparing an environmental impact statement (EIS) on proposed waste management activities at the Oak Ridge Reservation (ORR). During the EIS process the LLWDDD strategy will be evaluated by the public and by state and federal regulatory agencies. If shifts in strategy occur as the result of this review, ORNL's LLW management policies could be impacted significantly. ORNL expects to be in full compliance with this Order once the LLWDDD strategy and other LLW management program strategies are fully implemented. Achievement of this goal is highly dependent on the availability of DOE resources and the results of the current LLWDDD strategy development.

There are 16 requirements in this Order pertaining to the management activities affecting the decommissioning of radioactively contaminated facilities. ORNL is in partial compliance with eight requirements and full compliance with eight. The RAP at ORNL has already planned strategies for achieving full compliance with these requirements. ORNL has four programs responsible for the maintenance, surveillance, and decommissioning of currently inactive facilities. These facilities are scheduled to be decommissioned by FY 2010. In order to decommission these facilities on this schedule, significant costs will be incurred. Current estimates will require a funding level of \$250M in expense and \$10M in capital funds. Delays affecting the schedules for decommissioning these facilities will increase costs substantially. These costs do not include annual routine maintenance costs for these inactive facilities or the annual costs for maintaining compliance with the requirements of this Order.

INTRODUCTION

DOE Order 5820.2A, Radioactive Waste Management, was promulgated in final form on September 26, 1988. Within six months of the date of issuance of this Order, Head of Field Elements are required to prepare and submit to appropriate HQ program organizations an implementation plan. The main purpose of this implementation plan is to provide the status of compliance with applicable requirements of this Order and provide current plans or strategies for achieving full compliance, including associated schedules and costs. This plan has been prepared and submitted to fulfill the requirement for ORNL.

This plan addresses all applicable requirements of the Order pertaining to waste management activities affecting TRU and LLW and the decommissioning of radioactively contaminated facilities. ORNL does not generate high-level waste and therefore the requirements of this Order pertaining to the management of high-level waste are not addressed. ORNL does generate small volumes of waste containing NARM. These wastes are managed as permitted by this Order in accordance with the requirements for the management of LLW.

This plan is organized into four primary sections and a supporting appendix. The first section provides basic information about the ORNL site and the principal organizations at ORNL and DOE-ORO involved in waste management activities. The other primary sections address the management of TRU waste, LLW, and the decommissioning of radioactively contaminated facilities. These sections provide some general background information on the current status of activities affecting current waste management practices. Each section addresses all applicable requirements of the Order in terms of providing an evaluation of the requirement, the compliance status, current plans, and schedules and costs for achieving or maintaining compliance. This information is summarized in Tables 5, 6 and 7 at the end of Sects 3.0, 4.0 and 6.0. These tables will be updated and submitted annually, as required by this Order, in the ORNL Waste Management Plan. The Appendix, which contains the documentation required by this Order, will be updated annually and included as an appendix in the ORNL Waste Management Plan. Table 4 provides a listing and the number of requirements for each applicable section.

This plan addresses solid radioactive waste only. All waste management activities related to the TSD of liquid and gaseous radioactive, hazardous, mixed, and conventional wastes will be described in appropriate detail in the ORNL Waste Management Plan.

Table 4. Listing and number of requirements for each primary section

Requirements	Number
<u>Management of TRU Waste</u>	
Waste Classification	4
Waste Generation and Treatment	4
Waste Certification	11
Waste Packaging	3
Temporary Storage at Generating Sites	7
Transportation/Shipping to the WIPP	8
Interim Storage	8
WIPP	8
Buried TRU	4
Quality Assurance	1
<u>Management of LLW</u>	
Performance Objectives	4
Performance Assessment	3
Waste Generation	4
Waste Characterization	3
Waste Acceptance Criteria	5
Waste Treatment	4
Shipment	4
Long-Term Storage	4
Disposal	9
Disposal Site Closure/Post Closure	6
Environmental Monitoring	4
Quality Assurance	1
Records and Reports	2
<u>Management of Radioactively Contaminated Facilities</u>	
General	7
Facility Design	1
Post-Operational Activities	2
Decommissioning Project Activities	5
Quality Assurance	1

1. GENERAL SITE INFORMATION

1.1 GENERAL DESCRIPTION

The ORNL is one of three major operating facilities comprising the ORR located in East Tennessee. ORNL lies near the center of the ORR and is approximately 30 miles southwest of Knoxville and 10 miles south of the city of Oak Ridge.

ORNL is a multi-program laboratory operated for the DOE by Martin Marietta Energy Systems, Inc. ORNL conducts R&D activities for other U.S. government agencies, as well as for private industry and institutional organizations. Currently, these research efforts are focused in the areas of (1) magnetic fusion, (2) nuclear fission, (3) biological and environmental basic and applied research, (4) conservation and renewable energy, (5) fossil energy, and (6) basic research in physical sciences. The diversity of these programs and the complement of unique research facilities that support these activities present equally diverse and unique environmental and waste management challenges.

1.2 WASTE MANAGEMENT

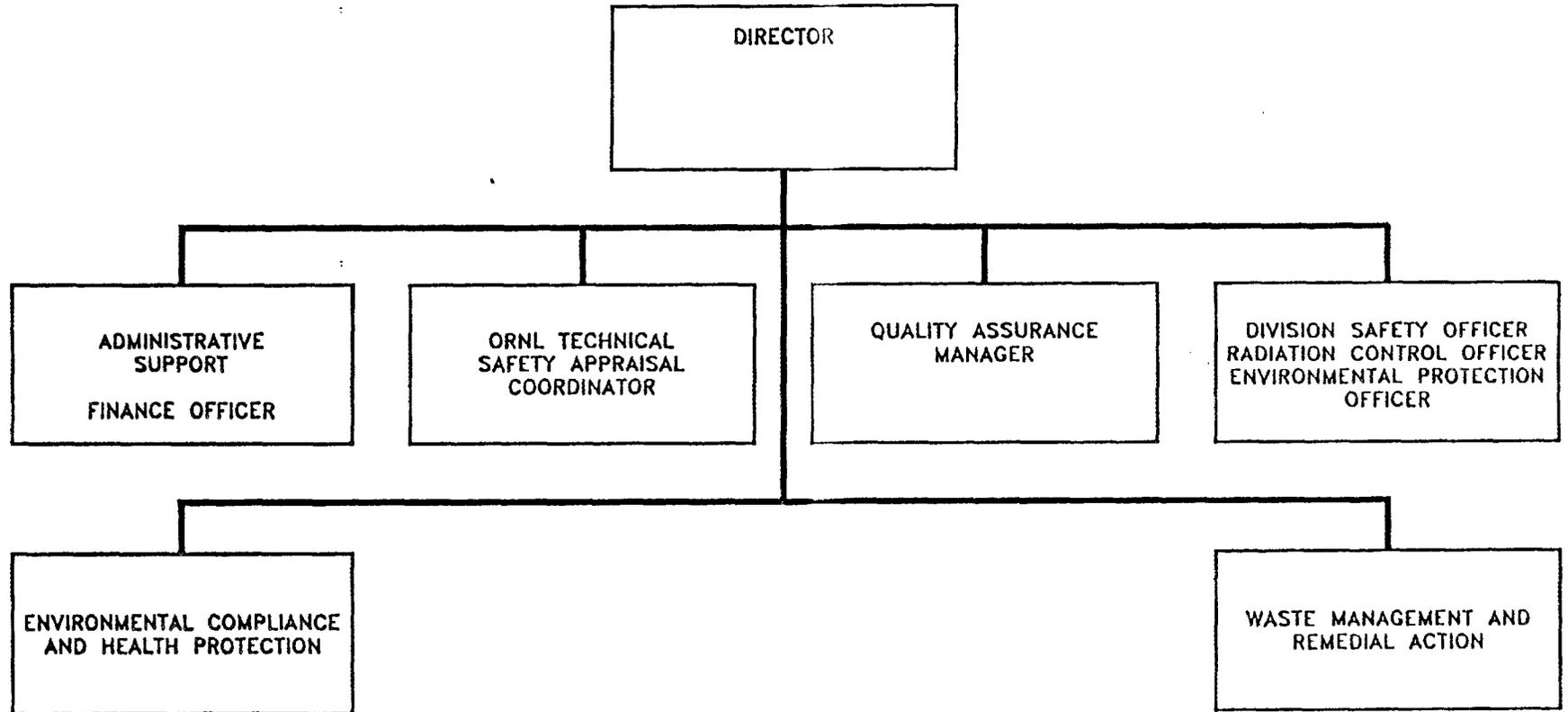
TSD of waste streams from the ORNL facilities have been the continuing responsibilities of DOE and its managing site contractors since the beginning of Laboratory operations. Since the start of operations at the ORNL site in 1943, significant changes have occurred in the scope of R&D efforts and the supporting waste management requirements. While early site development focused on direct support of defense programs during and following World War II, the unique facilities that were established formed the nucleus of the multi-discipline research laboratory that now exists. Many of the existing waste management sites and facilities have evolved from what would now be considered crude disposal practices. Early waste management practices left significant environmental concerns unsatisfied. Since the beginning of the 1980s, ORNL has made a conscientious effort to improve methods and to demonstrate improved technologies for managing radioactive waste from generation to final disposition.

Most functions supporting waste management activities at ORNL are provided by the EHPD. This Division is divided into two functional areas, one dealing with environmental compliance and health protection, and the other dealing with waste management and remedial actions (Fig. 1-3). Requirements of this order pertaining to the generation, handling, packaging, certification, treatment, storage, disposal, document control, and QA of TRU waste and LLW affect primarily the Waste Management Section (Fig. 2). The requirements pertaining to the decommissioning of radioactively contaminated facilities affect primarily the Remedial Action Section (Fig. 2). The DOE-ORO organizations that interface with the ORNL EHPD on waste management activities are illustrated in Fig. 4.

1.3 OVERVIEW OF CURRENT SOLID RADIOACTIVE WASTE MANAGEMENT ACTIVITIES

TRU waste management at ORNL is based on retrievable storage. Currently, there is no method for permanent disposal of this waste. The DOE Long-Range Master Plan for Defense Transuranic Waste has identified the WIPP, a deep geologic repository under construction in New Mexico, as the permanent disposal facility for TRU waste. Current TRU waste management activities at ORNL are predominantly interim storage activities with no on-site disposal. All retrievable storage facilities and operations related to managing TRU waste at ORNL are currently in compliance with applicable laws, regulations, and DOE orders except as noted in this Plan.

ENVIRONMENTAL AND HEALTH PROTECTION DIVISION



2

Fig. 1. Environmental and Health Protection Division

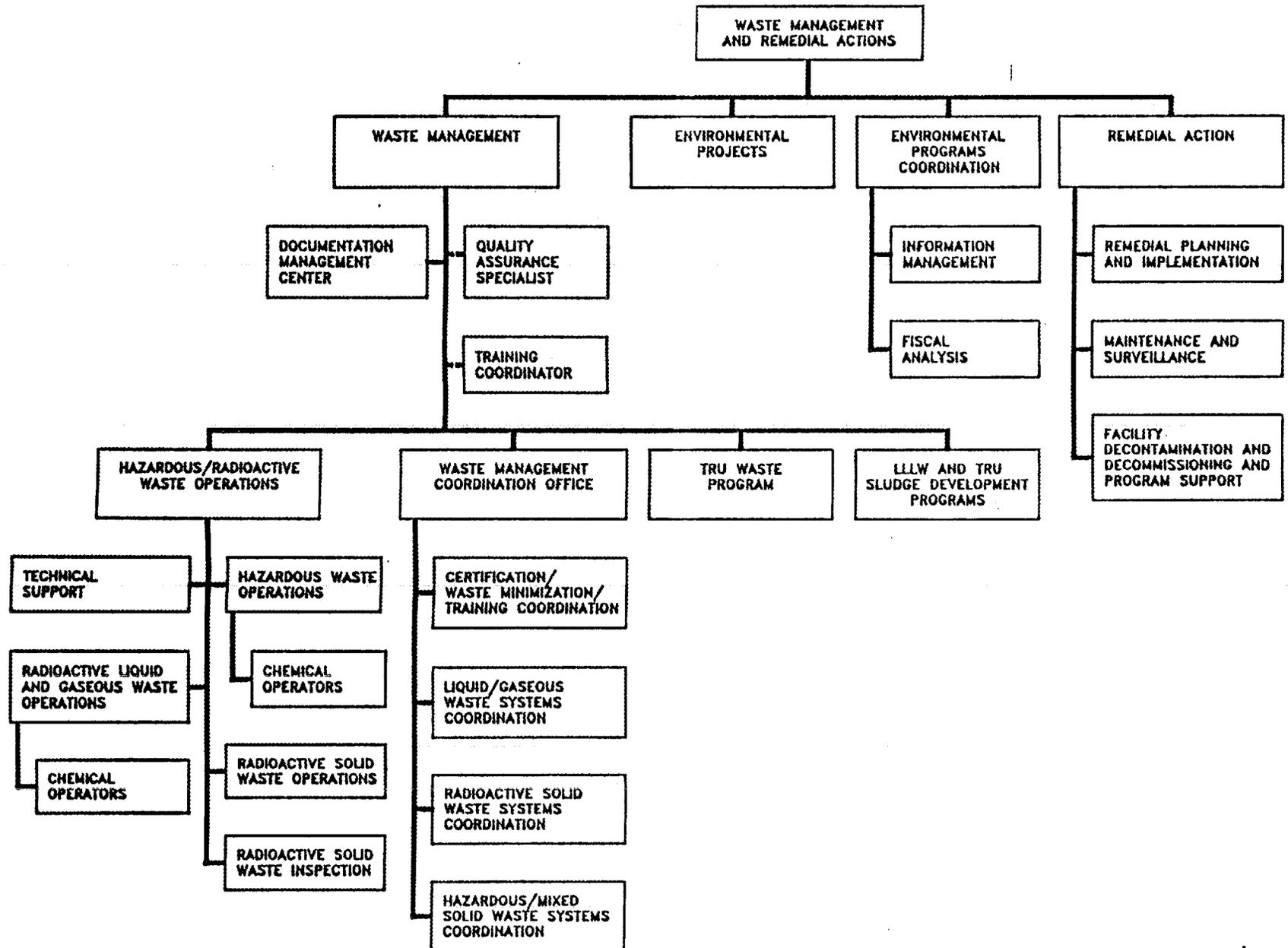


Fig. 2 Waste Management and Remedial Action Sections of the EHPD

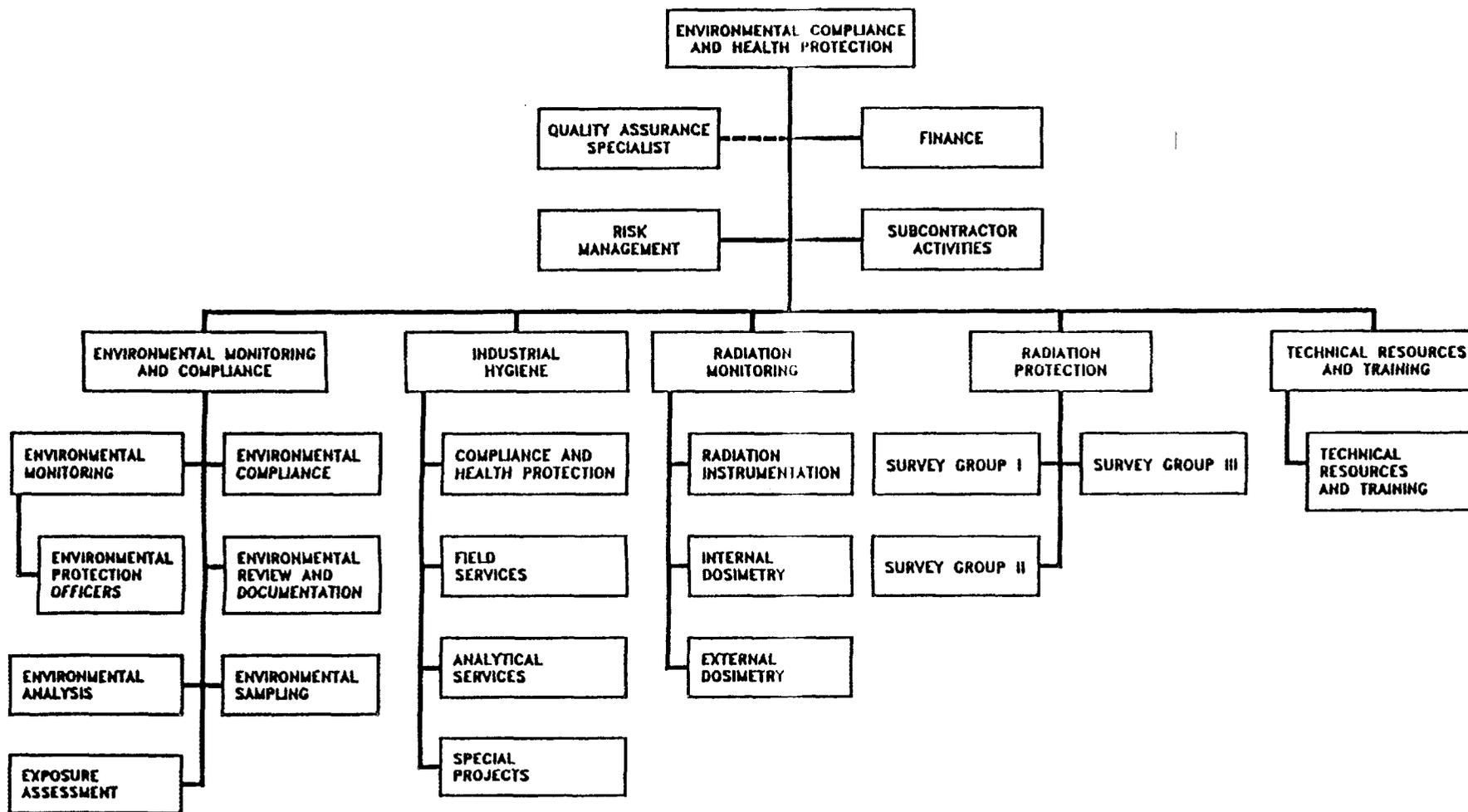


Fig. 3. Environmental Compliance and Health Protection Sections of the EHPD

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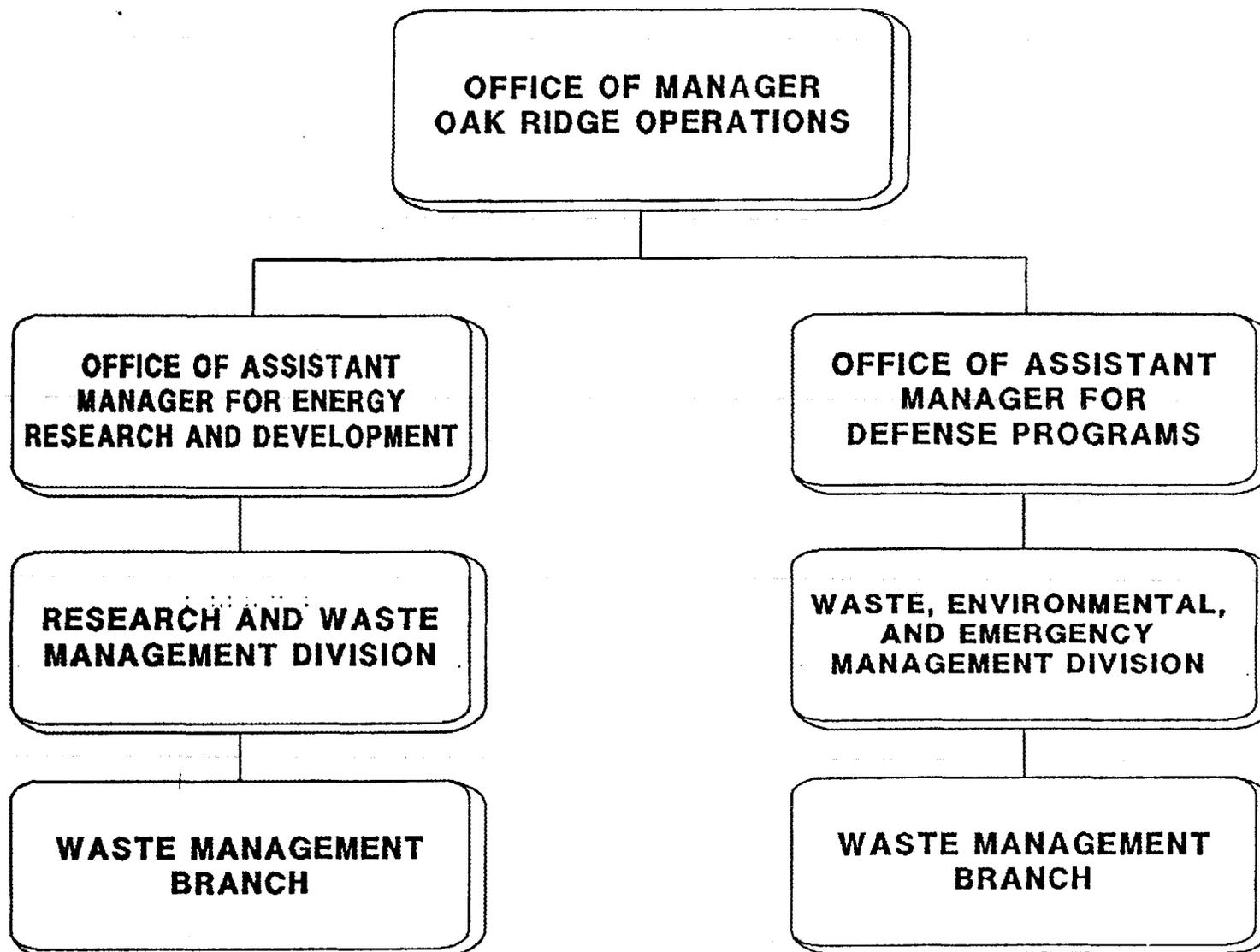


Fig. 4. DOE-ORO organizations that interface with the ORNL EHPD

In FY 1983, the DOE Office of Defense Waste and Transportation Management initiated funding for a CWDF that would provide LLW disposal capacity for the three plants on the ORR. In October 1984 the draft EIS for the CWDF was released for comment and received negative comments from federal and state regulatory organizations. The preferred alternative for the disposition of LLW on the ORR in the draft EIS was SLB. The draft EIS was withdrawn, and through discussions and agreements between the TDHE, EPA, DOE-ORO Office, and Energy Systems the effort for resolution on the CWDF concerns was initiated and identified as the LLWDDD Program. The primary objective of the LLWDDD Program is to provide technical and scientific information leading to the development of new and improved waste disposal facilities for the management of LLW generated on the ORR.

The LLWDDD Program has developed a strategy for managing LLW on the ORR. The strategy is explained in greater detail in Sect. 4.0. The proposed strategy is currently being evaluated and reviewed through the NEPA process. A draft EIS is being prepared on the waste management activities on the ORR. The draft EIS will assess the potential environmental impacts from waste management activities related to all three sites on the ORR: the Y-12 Plant, the ORGDP, and ORNL. The waste management activities to be assessed will be related to five different waste streams generated by these sites: (1) TRU waste, (2) LLW, (3) spent fuel, (4) hazardous waste, and (5) mixed waste. Two different types of waste management activities will be addressed: (1) proposed strategies for managing different types of wastes generated on the ORR and (2) the construction and operation of new facilities for managing LLW. ORNL is responsible for the design, construction, and operation of many of the facilities that will be assessed during the NEPA process for managing LLW on the ORR. These facilities are discussed in greater detail in Sect. 4.0. The ROD for this waste management EIS is expected about June 1990. The outcome of the ROD could drastically alter ORNL's current strategies for managing LLW and complying with this Order in terms of schedules and costs.

At ORNL four different programs are in place that are responsible for the decommissioning, decontamination, maintenance, and surveillance of inactive radioactively contaminated facilities. A brief description of each program is provided below. More detailed information for each program is provided in Sect. 6.0. The SFMP was established at ORNL in 1976 in order to provide collective management of all of the surplus sites under ORNL control on the ORR. The program originally contained both civilian- and defense-related facilities and was administered by the SFMP Office in Richland, Washington, through the DOE-ORO. In 1986, the administration of the civilian program was assumed by DOE-HQ and retained the SFMP identification. The Defense Surplus Facilities Program continues to be administered through Richland Operations Office and has assumed the DFDP title to differentiate it from its civilian counterpart. Both programs continue to be coordinated through DOE-ORO and are managed by the ORNL RAP in the EHPD. Currently 75 facilities at ORNL are managed under this program.

The SCFP and the SCMP at ORNL are funded by ER and DP. The purpose of the ER Program is to provide comprehensive management of activities which will develop new and improved facilities to meet high priority environmental needs. These programs provide ORNL with 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 SCFP and SCMP provide support to identifiable facilities which formerly served one or more of the many laboratory functions. Program activities include (1) maintenance and surveillance of facilities awaiting decommissioning, (2) planning safe and orderly facility decommissioning, and (3) implementing a program to accomplish facility disposition in a safe, cost effective, and timely manner.

2.0 MANAGEMENT OF HIGH-LEVEL WASTE

2.1 GENERAL BACKGROUND

This Order defines high-level waste as "the highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of TRU waste and fission products in concentrations requiring permanent isolation." ORNL does not reprocess spent nuclear fuel or solidify liquids resulting from the processing of spent nuclear fuel. Therefore the requirements for managing high-level waste in this Order are not applicable to ORNL.

3.0 MANAGEMENT OF TRANSURANIC WASTE

3.1 GENERAL BACKGROUND

ORNL activities routinely generate small quantities of TRU waste, which must be managed in accordance with applicable requirements and procedures. TRU waste is defined in DOE Order 5820.2A as radioactive waste which, without regard to source or form, at the end of institution control periods is contaminated with radionuclides that: (1) are transuranic (having atomic number >92), (2) are alpha-emitting, (3) have half-lives greater than 20 years, and (4) occur in concentrations greater than 100 nCi/g at the time of assay. Heads of field elements can also determine that other alpha-contaminated waste must be managed as TRU waste. Waste contaminated with ^{233}U , ^{226}Ra , ^{252}Cf , and ^{244}Cm in concentrations greater than 100 nCi/g are also handled as TRU waste at ORNL, although they have not been formally declared such by the ORO.

The DOE Long-Range Master Plan for Defense Transuranic Waste Management has identified the WIPP, a deep geologic repository under construction in New Mexico, as the permanent disposal facility for TRU waste. Specific objectives for management of ORNL TRU waste are (1) segregation and minimization of TRU waste, (2) certification and packaging to meet WIPP WAC, (3) safe interim storage, and (4) shipment to WIPP for disposal. The general strategy for management of ORNL TRU waste is illustrated in Fig. 5.

Since the Byproduct Definition subjected mixed (both radioactive and hazardous) TRU waste to the requirements of RCRA, ORNL has filed either permit applications or closure plans for its TRU waste facilities. New facilities that meet RCRA technical standards will be needed to replace those that must be closed.

TRU waste is categorized as either CH or RH, depending on the radiation level at the surface of the package. Waste exhibiting a surface dose rate of ≤ 200 mrem/h is handled as CH-TRU, whereas waste exhibiting a surface dose rate of >200 mrem/h is handled as RH-TRU.

TRU waste can further be characterized as either NG or stored. This designation is used both in defining financial liability for repackaging of unacceptable waste and for defining the appropriate requirements for certification. It is the responsibility of the generator to repackage nonconforming, NG TRU wastes. In addition, the requirements for certification of NG TRU are more specific than those for stored TRU. June 1986 has been established as the date of transition from stored to NG CH-TRU waste.

TRU WASTE MANAGEMENT STRATEGY												
WASTE CATEGORY	FISCAL YEAR											
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CH-TRU: NEWLY GENERATED												
						NOV 92						
						GENERATORS CERTIFY RTR, ASSAY AT WEAF						
						STORE AT 7826 & 7834						
STORED												
						STORE AT NEW CH-TRU STORAGE FACILITY						
										SHIP TO WIPP		
						STORE AT 7826 & 7834						
RH-TRU: NEWLY GENERATED CASKS												
						GENERATORS CERTIFY						
						STORE AT 7855 AND NEW RH-TRU BUNKERS						
STORED CASKS												
										REPACKAGE & CERTIFY AT WHPP		
BURIED CASKS												
										REPACKAGE & CERTIFY AT WHPP		
										SHIP TO WIPP		
SLUDGES												
										PROCESS, PACKAGE, & CERTIFY AT WHPP		
										SHIP TO WIPP		

Fig. 5. TRU waste management strategy for ORNL

Approximately 500 m³ (20,000 ft³) of CH-TRU waste is currently in storage at ORNL. The generation rate is estimated to be 15 m³/yr (530 ft³/yr). The CH-TRU waste in storage at ORNL has been placed predominantly in stainless or mild steel drums (55- or 30-gal). Three facilities (Bldgs. 7826, 7834, and 7823) located in SWSA 5 North are utilized for the staging/storage of CH-TRU drums.

Building 7826 is a one-story concrete block structure built approximately 85 percent below grade. It has 24 compartments or cells, each of which will accommodate 64 drums stacked in four layers with 16 drums per layer. A thin sheet of plywood is placed between each layer.

Building 7834 is very similar in design to Building 7826, except that it has removable concrete plugs and storage capacity for 80 drums in each of its 24 cells (with five-high-layering). Each of the cells of both facilities has a sump for monitoring any accumulated liquids. To date no evidence of release of radioactive or hazardous components has been detected.

Building 7823 is utilized for (1) staging of drums prior to NDA/NDE and (2) storage of some CH-TRU boxes. The facility is approximately 67 percent below grade and has a gable roof which is open at each end. The walls are curved, galvanized metal culvert sections, and the floor is of crushed rock.

Because 7823, 7826, and 7834 do not meet RCRA standards, their contents must be moved to a RCRA-permitted facility by 1992. A new CH-TRU storage facility must be built prior to that time. Compliance with this schedule will be difficult.

ORNL's certification program for CH-TRU waste is well developed. The NG CH-TRU certification plan has been approved by the WIPP WACCC. The second draft of the stored CH-TRU plan is currently being reviewed internally. The WEAFF (Bldg. 7824) plays a major role in the certification of CH-TRU waste. Located in SWSA 5 near the TRU storage facilities, the WEAFF provides the equipment and capability for the NDA and NDE of 55-gal drums of CH-TRU and LLW. The facility currently contains the NAS, SGS, RTR, computer equipment, handling equipment, temporary storage areas, weighing scales, and necessary services and equipment to operate safely. Installation of an RTR system for CH-TRU waste other than drums, including boxes up to 4x4x6 ft is under way. Plans to install assay equipment for these containers are being developed. A repackaging facility for CH-TRU waste is expected to be needed, especially since virtually all ORNL's packets of CH-TRU waste have been heat-sealed, vs. the recently specified twist-tape-and-cut method, prior to emplacement in drums.

Approximately 1300 m³ (47,000 ft³) of RH-TRU waste is currently stored at ORNL. A draft report (ORNL/TM-11050) has recently been issued documenting available characterization data for this inventoried waste. The RH-TRU generation rate is estimated at 5 m³/yr (153 ft³/yr). RH-TRU waste is packaged principally in concrete casks.

Currently generated concrete casks are stored in Building 7855 in SWSA 5 North. Building 7855 is a one-story facility containing four bays for cask storage with a total capacity for 108 casks. The back and sides of the facility are below grade. After it is filled, each bay is sealed with concrete blocks for shielding. The facility does contain sumps that provide sampling capability for any liquids that may accumulate.

Stainless steel wells (Bldgs. 7827 and 7829) are used to store waste packages with high external gamma exposure rates. The primary contents of the wells are segmented fuel elements and associated hardware. The classification of this material is undetermined. Another group of eight storage wells ("T-Wells") contains similar high activity material (nuclear fuel material) generated at the High Radiation Level Examination Laboratory (Bldg. 3525).

Up to 520,000 gal of sludge currently inventoried in active and inactive tanks is classified as TRU waste. This sludge will require mobilization/removal from the tanks, solidification, packaging, certification, and shipment to WIPP. Programs are currently under way to develop an appropriate solidification technology.

The Defense Long-Range Master Plan calls for the construction of the WHPP to process, package, and certify the RH-TRU sludges and solid waste. The wastes will be transferred into containers suitable for shipment to and disposal at WIPP. The facility is also intended to provide limited "central processing" capability for processing and certifying problem RH-TRU and special-case waste from other DOE sites. The WHPP is currently scheduled as an FY 1993 line item project with operation expected in FY 1999. The capital cost of this facility is expected to be in the range of \$130 million.

Prior to 1970, TRU contaminated solid waste was not segregated from other SLLW and was disposed by shallow land burial on-site. Approximately 6200 m³ (2.2 x 10⁵ ft³) of waste buried at ORNL is currently estimated to be TRU waste. Little information specific to buried TRU waste is available, although records show that some trenches containing alpha wastes were capped with a layer of concrete. Because of the commingling of waste types and the scarcity of information, closure of burial grounds cannot be based solely on the waste classification. Instead, site-specific considerations must dictate the approach to closure. Future corrective actions related to the buried TRU waste will be managed by the ORNL RAP.

Between 1970 and 1979, casks were retrievably buried in SWSA 5. Because RCRA requires this burial area to be closed by 1992, the buried casks must be exhumed and relocated to permitted storage facilities, which must be constructed. Accomplishment of these tasks within the specified time frame will be extremely difficult and will displace other high priority activities.

The CEUSP was terminated in 1986 with the generation of MUOM. The MUOM contains fissile materials with cadmium and gadolinium as neutron absorbers and is stored in canisters in Bldg. 3019. This material is tentatively planned to be shipped to WIPP for disposal.

3.2 REQUIREMENTS FOR THE MANAGEMENT OF TRANSURANIC WASTE

3.2.a Waste Classification

3.2.a.1 Segregation of TRU waste at the source.

Evaluation of Requirement. Administrative and process controls are used to segregate TRU wastes from other types of wastes at the generator site. Process flow charts are maintained by TRU waste generators, along with lists of all materials used in the processes, to prevent discarding recoverable materials, utilize process controls to segregate radioactive and hazardous materials before they become waste, and prevent including nonconforming items in the TRU waste containers. The process flow charts and materials lists are also used to determine whether hazardous materials, which would classify the waste as "mixed," are placed in the waste container. Permanent records are maintained for all discarded materials, and the radioactivity of all TRU waste packets is measured and recorded on waste manifests at the generator site. Generators are also trained to distinguish, segregate, and minimize different waste types. For CH-TRU waste, verification of the distinction between LLW and TRU waste is provided by assay at the WEAf, which is discussed further in Sections 3.2.a.2 and 3.2.a.3.

RH-TRU sludges will be processed on a batch basis at the WHPP, beginning in FY 1999, according to current plans. A determination of whether each batch qualifies as TRU waste will be made during the processing.

As discussed in Sect. 3.1, ORNL manages ^{233}U , ^{226}Ra , ^{244}Cm , and ^{252}Cf as TRU waste, with the expectation that they will be declared TRU by DOE-ORO. Recent evaluations have led to doubts that ^{244}Cm will officially be declared TRU. Thus, ORNL may have some waste currently stored as TRU, on a basis which includes ^{244}Cm , which may actually be LLW. This determination will be made prior to shipment to WIPP.

Current Plans. In the near term, ORNL will resolve the question of whether ^{244}Cm will be considered TRU and take steps to have the other isotopes in question formally declared TRU by DOE-ORO. Segregation of waste currently considered TRU on the basis of ^{244}Cm content will be performed prior to shipment to WIPP. Capabilities to verify the TRU classification of wastes stored as RH-TRU solids and sludges will be provided in the WHPP.

Schedules and Costs. Resolution of the TRU status of ^{244}Cm and formal declaration of ^{233}U , ^{226}Ra , and ^{252}Cf as TRU by DOE-ORO will be completed during FY 1990 at a cost of approximately \$10 K.

3.2.a.2 Applying lower concentration limits for TRU waste to contents of single waste packages only.

Evaluation of Requirement. The transuranic radionuclide concentration of drummed CH waste at the time of assay is compared to the lower concentration limit for TRU waste (100 nCi/g of waste) to determine whether the TRU waste definition is met. The concentration is determined by assay of the waste package contents using both a Passive/Active Neutron (PAN) and SGS assay systems. Both systems are located in SWSA 5 at the WEAf. The PAN unit uses the second-generation assay algorithm developed by personnel from the Los Alamos National Laboratory. It provides a nCi/g TRU concentration based upon the acquired active and passive neutron assay data. The SGS unit provides a total isotopic inventory of all gamma-emitting TRU isotopes (e.g., ^{241}Am and ^{237}Np), which is then evaluated and compared to the acquired passive neutron assay data. Based upon these evaluations and comparisons a total TRU isotopic concentration (nCi/g of waste) for the TRU waste package is calculated. The weight of the package is not used in calculating the TRU concentration, as specified in WIPP-DOE-069 and WIPP-DOE-137.

Current Plans. The new master algorithm which combines the acquired assay data obtained from both the PAN and SGS units is currently being developed. This new algorithm will automatically evaluate, compare, and combine the results obtained from the two CH-TRU drum assay systems. The system will be upgraded to replace the present LeCroy 3500 multichannel analyzer with an IBM-based system. This upgrade will allow the acquired gamma assay data to be used directly by the new master assay algorithm. Presently, the data must first be converted to IBM format and then analyzed using a separate, less-sophisticated assay algorithm.

Acquisition and installation of equipment to allow nondestructive assay of CH-TRU containers other than drums is being planned. The system will provide data similar to that obtained through the PAN and SGS instruments.

Assay capability will be provided for RH-TRU waste at the WHPP. A linear accelerator will be used for neutron activation and fission counting.

Schedules and Costs. Total cost of the upgrade for drummed CH-TRU waste, which will be completed in the fourth quarter of FY 1989, will be \$50K.

Equipment costs for the CH-TRU box assay system is estimated to be in the range of \$1.5 M. Additional costs associated with facility modification and installation will be approximately \$70K. This system is not expected to be in place before FY 1992.

The RH-TRU assay system will be provided in the WHPP, which is expected to become operational in FY 1999. Capital cost for the facility is estimated at \$130 M (included in Sect. 3.2.b.1).

Total cost for certifying stored CH- and RH-TRU waste is outlined in Sect. 3.2.b.1.

3.2.a.3 Transuranic radionuclides in concentrations of 100 nCi/g or less shall be considered LLW.

Evaluation of Requirement. As discussed in Sect. 3.2.a.2, ORNL uses NAS and SGS to classify its drummed waste as LLW or TRU. The NAS provides the total fissile mass, expressed in milligrams ²³⁹Pu equivalent, and the SGS identifies gamma-emitting isotopes. Together, these two instruments allow a determination of the upper limit for the TRU content (100 nCi/g of waste) in a drum and identify the gamma-emitting isotopes present. If the waste drum is classified as LLW, it is managed according to the requirements in the Chapter III of the Order.

Current Plans. See Sect. 3.2.a.2.

Schedules and Costs. See Sect. 3.2.a.2.

3.2.a.4 Mixed TRU waste.

Evaluation of Requirement. Only mixed TRU waste meeting the requirements of WIPP-WAC will be sent to WIPP, as specified in the ORNL TRU Waste Certification Document (ORNL/TM-10322). Data packages will list the kinds and concentrations of hazardous components in accordance with RCRA regulations. As stated in Sect. 3.2.a.1 above, process control charts and materials lists are used to determine whether TRU waste contains hazardous components. Some degree of verification is provided by RTR of all CH-TRU drums. Impenetrable items (lead) and liquids are detected by RTR, further investigated if needed, and recorded for each drum.

Current Plans. An RTR system will be installed for examination of CH-TRU waste packages other than drums, including boxes up to 4x4x6 ft to facilitate characterization of hazardous components. Little information is available on hazardous components of stored RH-TRU waste. Each cask will be inspected at the WHPP, and a laboratory will be included in the facility for testing and analysis as deemed appropriate. RH-TRU sludges will be sampled and analyzed for hazardous components on a batch basis prior to processing at the WHPP.

Schedules and Costs. Installation of the box RTR system is expected to be completed during FY 1989 at a cost of approximately \$560K. Budgets and schedules for construction and operation of the WHPP are given in Sect. 3.2.b.1.

3.2.b Transuranic Waste Generation and Treatment

3.2.b.1 Reduction of volume and/or radioactivity of TRU waste.

Evaluation of Requirement. Technical and administrative controls at ORNL are directed toward reducing the gross volume of TRU waste generated and the amount of radioactivity requiring disposal wherever possible. Processes or proposed changes in processes are evaluated to determine if modification and optimization can be applied to reduce the amounts or radioactivity of waste generated. In many cases, volume reduction has been accomplished by improved packaging (better utilization of container space). The ORNL Waste Charge-back System has proven to be an excellent incentive to generators in achieving waste reduction. A generator training module on waste reduction has been prepared and is being incorporated into the training requirements for generators.

Current Plans. ORNL has a formal waste minimization program, which includes TRU waste. Additional emphasis is needed on source reduction of TRU waste. In the CH-TRU Repackaging Facility, which is being planned, consideration will be given to inclusion of an in-drum compactor. The WHPP will include cutting, compacting, and shredding operations to reduce the volume of solid RH waste. Reduction of void space will be a primary objective in RH-TRU repackaging. Extensive research and development is being conducted to support the processing of RH-TRU sludges at the WHPP. A high priority is being placed on volume reduction in the selection of the process.

Schedules and Costs. The ORNL Waste Minimization Program is expected to cost approximately \$600K in the solid waste area over the next five years. The CH-TRU Repackaging Facility is tentatively planned to be operational in FY 1994. Total (expense and capital) cost for planning and design of the facility is expected to be \$6.2M. Approximately \$1.5M total in operating costs will be required to repackage, certify, and ship ORNL's current inventory of stored CH-TRU waste between 1994 and 2005. The WHPP is expected to cost a total (expense and capital) of \$150M and become operational in FY 1999. Approximately \$7M/yr in operating costs will be required to repackage and certify stored RH-TRU solids and sludges at the WHPP and ship them to the WIPP between FY 1999 and 2013. Facility (capital) costs are summarized in Table 3.

3.2.b.2 Assaying TRU waste and characterization of hazardous waste.

See Sects. 3.2.a.2-3.2.a.4 and Sect. 3.2.b.1.

3.2.b.3 Treating the hazardous component in TRU waste.

Evaluation of Requirement. Information on the kinds and quantities of hazardous components in TRU waste is obtained through methods discussed in Sect. 3.2.a.4. Only trace (<1%) quantities of hazardous components, primarily lead and mercury (in mercury vapor lamps), are present. Treatment of the hazardous components is not feasible. However, source reduction is being implemented.

Current Plans. Continue current practice.

Schedules and Costs. ORNL is in compliance with this requirement.

3.2.b.4 Classified TRU waste.

Evaluation of Requirement. ORNL does not generate TRU waste that is classified for security reasons.

Current Plans. Not Applicable.

Schedules and Costs. Not applicable.

3.2.c Transuranic Waste Certification**3.2.c.1 Certification, storage, and shipment of TRU waste.**

Evaluation of Requirement. TRU waste generated and stored at ORNL is or will be certified according to WIPP WAC. Waste awaiting certification and waste that has been certified are stored on an interim basis and will be shipped to WIPP when it becomes operational.

Current Plans. Continue certifying and storing TRU waste on an interim basis for eventual shipment to WIPP.

Schedules and Costs. See Sect. 3.2.b.1.

3.2.c.2 Shipment of uncertified TRU waste to WIPP.

Evaluation of Requirement. ORNL does not currently have plans to request special permission to send uncertified TRU waste to WIPP.

Current Plans. Not applicable.

Schedules and Costs. Not Applicable.

3.2.c.3 Certification plan that conforms to WIPP WAC for TRU waste.

Evaluation of Requirement. ORNL has developed a base certification plan for NG CH-TRU waste (ORNL/TM-10322), which was approved by the WIPP WACCC in June 1986. Revision 1 was issued in late FY 1988, but has not yet been approved. The draft certification document for stored CH-TRU waste was issued in December 1988 for internal review. The certification plan for NG RH-TRU waste has been drafted and is scheduled for reissue in June 1989. All three of these plans have been previously reviewed by the WIPP WACCC. The schedule for issue of the plan for stored RH-TRU waste may be delayed until the mid-1990s to avoid costly changes due to evolving WIPP requirements.

Current Plans. ORNL will continue development of TRU certification documents as outlined above and obtain WIPP WACCC approval. In addition, certification plans will be required to meet transportation requirements.

Schedules and Costs. Revisions of certification documents for NG and stored CH-TRU and NG RH-TRU have been or will be issued during FY 1989. The plan for stored RH-TRU is expected to be completed in the mid 1990s. Completion of these tasks and preparation of certification plans to meet transportation requirements are expected to cost about \$150K.

3.2.c.4 Certification plan and quality control measures.

Evaluation of Requirement. The certification plans and procedures contain or will contain the necessary controls and measures to ensure that each element of the ORNL certification program is performed as described. The base certification plan outlines in detail the QA requirements with reference to WIPP-DOE-120.

Current Plans. Continue to develop, revise, and implement the certification documents as described in Sect. 3.2.c.3.

Schedules and Costs. See Sect. 3.2.c.3.

3.2.c.5 WIPP approval of certification and associated QA plans.

See Sect.3.2.c.3.

3.2.c.6 WIPP WACCC submission of plans to New Mexico's Environmental Evaluation Group.

Not applicable to ORNL.

3.2.c.7 Resolution of Environmental Evaluation Group's comments.

Not applicable to ORNL.

3.2.c.8 Approved certification and associated QA plans implemented using specific documented procedures.

Evaluation of Requirement. Each CH-TRU waste generator at ORNL has specific written operating procedures that implement the WIPP-WACCC-approved certification and QA requirements of ORNL/TM-10322. TRU waste management certification procedures are also in place to cover WEAFF operations.

Current Plans. As additional certification documents are approved, generators' procedures will be revised as necessary to implement certification and QA requirements.

Schedules and Costs. Costs of developing generators' procedures (approximately \$150K) will be borne by the individual generators. No doubt the implementation of these requirements will substantially increase their operating costs.

3.2.c.9 WIPP WACCC audit certification programs and grant certifying authority to sites.

Evaluation of Requirement. Although this requirement applies primarily to WIPP, ORNL will provide support to the audit team, as required.

Current Plans. Provide support to the audit team, as required.

Schedules and Costs. Costs incurred in support of WIPP WACCC audits are included in the total Certification Program costs in Sect. 3.2.b.1

3.2.c.10 WIPP WACCC reporting and tracking of audit findings.

Not applicable to ORNL.

3.2.c.11 Resolution of audit findings.

Evaluation of Requirement. The ORNL TRU waste certification program and associated procedures, documents, and records have been audited and reviewed by WIPP WACCC audit teams, and ORNL was granted certifying authority for NG CH-TRU waste in June 1986. However, a 1988 audit produced several findings and observations which remain to be resolved.

Current Plans. Resolve outstanding audit findings, which include establishment of an effective document control system.

Schedules and Costs. Approximately \$100K will be required to establish an effective document control system for the TRU Waste Program and resolve the remaining findings by the end of FY 1990.

3.2.d Transuranic Waste Packaging

3.2.d.1 NG TRU waste placed in noncombustible packaging that meets DOT requirements.

Evaluation of Requirement. Currently, all NG CH-TRU waste is placed in DOT 7A, Type A, 55-gal drums (Type 17H stainless steel drums). NG RH-TRU waste is placed in concrete casks that do not meet DOT requirements.

Current Plans. In the future, some CH-TRU waste may be placed in the DOT- and WIPP-approved Standard Waste Box that has been designed specifically for the TRUPACT II carrier. NG RH-TRU waste will be repackaged in DOT-approved containers in the WHPP.

Schedules and Costs. Included in Sect. 3.2.b.1.

3.2.d.2 Prevention of pressure buildup in Type A containers.

Evaluation of Requirement. All drums currently used to package CH-TRU waste at ORNL are equipped with either permeable lid gaskets or HEPA vent filters located in the drum lids to prevent pressure buildup.

Current Plans. Pressure relief devices will be utilized in repackaging CH-TRU waste.

Schedules and Costs. See Sect. 3.2.b.1.

3.2.d.3 Marking, labeling, and sealing of TRU waste packages designed for WIPP

Evaluation of Requirement. All ORNL waste packages destined to be shipped to the WIPP will be marked, labeled, and sealed in accordance with the WIPP WAC, EPA, and DOT requirements, as defined in the WIPP-DOE-069, 40 CFR 262, Subpart C, and 49 CFR 172, Subparts D, E, and 49 CFR 173, Subpart I, where applicable, prior to shipping.

Current Plans. Current Plans call for CH-TRU waste packages to be sealed by the waste generators with verification by visual inspection and RTR at the WEAFF. WIPP and DOT labels and documentation shall be prepared and/or attached by ORNL Waste Management Section personnel. Sealing, marking, and labeling of RH-TRU packages will be done at the WHPP.

Schedules and Costs. All transportation requirements shall be completed prior to shipment of the waste packages to the WIPP. At the present time, ORNL plans to begin CH-TRU shipments to WIPP in FY 1994 and RH-TRU shipments in FY 1999. Costs accrued for NG waste will be charged to the waste generators. Costs for preparing and shipping stored waste are included in Sect. 3.2.b.1.

3.2.e Temporary Storage at Generating Sites

3.2.e.1 Segregation of TRU waste.

Evaluation of Requirement. All CH-TRU waste drums are clearly identified and physically segregated from LLW drums to the extent practical. In areas such as loading docks and staging and inspection areas, both LLW and TRU waste drums are temporarily stored. Consistent utilization of different packaging makes LLW readily distinguishable from TRU. In addition, each TRU waste and LLW drum has a unique identification number and is accompanied by a waste manifest describing the contents. As discussed in Sect. 3.2.a.1, ^{24}Cm , long considered a TRU isotope at ORNL, may in the future be deemed nonTRU, thus potentially changing the TRU classification of a number of drums.

Data from the generators is relied upon at this point to distinguish RH-LLW from RH-TRU waste. RH-TRU casks are stored separately from other types of waste.

Current Plans. See Sect. 3.2.a.1.

Schedules and Costs. See Sect. 3.2.a.1.

3.2.e.2 Commingling of certified and uncertified TRU waste.

Evaluation of Requirement. Certified and uncertified CH-TRU waste drums are stored in the same buildings, but are not commingled. The disposition (accepted, rejected, hold) is clearly marked on each drum in storage. Accepted drums are marked with green paint or green electrical tape, rejected drums are marked with red paint or red electrical tape, and drums to be held are marked with white paint or white electrical tape. The drums marked "hold" contain HEPA filters, the certification procedure for which is being investigated. In addition, attached to all TRU waste drums is a permanent, stamped metal tag with a unique identification number.

Certified and uncertified RH-TRU casks are also stored together but each cask is clearly identified and traceable to documentation establishing whether the waste is certified. All RH-TRU waste will be repackaged in the WHPP, where the waste in its final package will be officially certified.

Current Plans. ORNL has plans for constructing new interim storage facilities. These new interim storage facilities will be designed and operated in a manner such that certified TRU waste is not commingled with uncertified TRU waste.

Schedules and Costs. A \$425K TRU/SLLW Storage Facility is to be constructed as an FY 1989 GPP to store a small number of CH-TRU boxes and stage SLLW drums prior to shipment or on-site disposal. A CH-TRU Storage Facility is planned as a FY 1991 GPP at an estimated capital cost of \$1M. Two RH-TRU bunkers are planned. One has been identified as an FY 1989 GPP costing \$800K. The other will likely be constructed as an FY 1992 or 1993 GPP with an estimated capital cost of \$500K. Estimated expense costs to plan and support development of these facilities total \$150K, as shown in the summary table.

3.2.e.3 Storage areas protected from unauthorized access.

Evaluation of Requirement. TRU waste at ORNL is stored in the northern portion of SWSA 5, which is a limited access area. Only personnel directly involved with waste management activities are permitted in the area. The storage area is surrounded by a fence and is accessible by a vehicle only through a card gate.

Current Plans. ORNL has plans for constructing new buildings for the temporary storage of TRU waste. These buildings will either be located in a limited access area or will be provided with access controls.

Schedules and Costs. Costs for preventing unauthorized access to the new storage facilities is included in the capital cost of and varies with the project. Access controls for the TRU/SLLW Storage Facility will require virtually nothing, while the RH-TRU Bunkers (I) project includes \$30K for this purpose.

3.2.e.4 Monitoring TRU waste periodically.

Evaluation of Requirement. Due to the nature and the design of the temporary storage facilities for TRU waste, little monitoring capability exists. Some of the storage facilities contain sumps that provide sampling capability for any liquids that accumulate within the facilities, and health physics technicians measure radioactivity levels prior to the conduct of activities in the storage areas. RH-TRU sludges are stored in tanks within stainless steel lined vaults with leak detection capabilities.

Current Plans. The new facilities planned for the temporary storage of CH- and RH-TRU waste will be monitored in conformance with requirements.

Schedules and Costs. See Sect. 3.2.e.2.

3.2.e.5 Storage facilities designed to minimize possibility of accidental release.

Evaluation of Requirement. Existing facilities have been subjected to safety evaluations and were constructed to appropriate design criteria for their contents. No evidence of leaks of radioactive contents has been detected through the routine monitoring performed for the storage facilities.

Current Plans. The new facilities planned for the temporary storage of CH- and RH-TRU waste will be designed, constructed, maintained, and operated in a manner to minimize the possibility of fire, explosion, or accidental release of radioactive and/or hazardous constituents of the waste to the environment.

Schedules and Costs. See Sect. 3.2.e.2.

3.2.e.6 Contingency plan for TRU waste storage facilities.

Evaluation of Requirement. Current storage facilities which are planned to be operated after 1992 have a contingency plan as part of their RCRA Part B application. This plan is designed to mitigate the impacts of fire, explosion, or release of radioactive or hazardous materials. Facilities planned to be closed by 1992 do not have specific contingency plans; however, the aforementioned plan is practically applicable to them as well. In addition, ORNL has a general contingency plan that applies to all RCRA facilities.

Current Plans. Contingency plans for responding to adverse impacts that may cause accidental release of waste constituents will be developed for planned TRU storage facilities.

Schedules and Costs. Contingency plans for planned facilities will be developed as an element of their RCRA Part B permit applications prior to facility operation. The cost is estimated at \$50K.

3.2.e.7 ALARA principle applied to TRU waste storage.

Evaluation of Requirement. All facilities used to store TRU waste are concrete block structures, partially or almost entirely below-grade. TRU waste with very high beta-gamma radiation is placed in stainless-steel-lined storage wells which rest on concrete and are surrounded by soil. Concrete plugs are used to seal the wells. ALARA is a constant goal for facility operation, e.g., RCRA requirements for daily waste inspection were modified to retain lower personnel exposures.

Current Plans. The new facilities planned for storage of CH-and RH-TRU waste will be constructed from materials that will provide the necessary shielding required to keep radiation exposures in conformance with the ALARA principles.

Schedules and Costs. See Sect.3.2.e.2.

3.2.f Transportation/Shipping to the Waste Isolation Pilot Plant

3.2.f.1 TRU waste shipments comply with DOE and DOT regulations, pursuant to DOE 1540.1.

Evaluation of Requirement. The ORNL Transportation/Shipping Department operates under the auspices of DOE Order 1540.1. All Hazardous and Radioactive Materials, Substances and Wastes shipped from ORNL comply with applicable Federal, State, and local regulatory requirements as well as DOE Orders and Martin Marietta Energy Systems, Inc., Policies and Procedures. Compliance with Federal regulations includes waste packaging and transportation requirements in 10 CFR Nuclear Regulatory Commission, 40 CFR Protection of the Environment, and 49 CFR Hazardous Material Regulations and the Federal Motor Carrier Safety Regulations.

Current Plans. Extend current practice to shipments to WIPP.

Schedules and Costs. Transportation costs for stored CH-and RH-TRU waste are included in Sect. 3.2.b.1.

3.2.f.2 Carrier system and Type B packaging.

Evaluation of Requirement. ORNL will utilize the TRUPACT II for CH-TRU shipments and the package authorized by DOE for RH-TRU.

Current Plans. Utilize TRUPACT II for CH-TRU shipments and the DOE-authorized package for RH-TRU.

Schedules and Costs. Packaging and shipment costs are outlined under Sect. 3.2.b.1.

3.2.f.3 Information required on shipping papers.

Evaluation of Requirement. Upon shipping TRU waste to WIPP, shipping papers will provide all the information required by WIPP, DOT, and EPA. See Sect.3.2.f.1.

Current Plans. Provide shipping papers as required.

Schedules and Costs. Costs for providing shipping papers are included in Sect. 3.2.b.1.

3.2.f.4 Distribution of shipping papers.

Evaluation of Requirement. Upon shipping TRU waste to WIPP, ORNL will provide the specified copies of shipping papers.

Current Plans. Distribute shipping papers as specified.

Schedules and Costs. Costs for distributing shipping papers are included in Sect. 3.2.b.1.

3.2.f.5 Appropriate EPA and State authorizations/permits as applicable.

Evaluation of Requirement. ORNL has all required authorizations and permits for current shipments.

Current Plans. No further authorizations are anticipated to be needed. Any required notifications will be made prior to shipment.

Schedules and Costs. See Sect. 3.2.b.1.

3.2.f.6 Placarding of shipments.

Evaluation of Requirement. ORNL currently placards all waste shipments as required by applicable DOT regulations (see Sect. 3.2.f.1).

Current Plans. Upon shipping TRU waste to WIPP, properly placard TRU waste shipments.

Schedules and Costs. See Sect. 3.2.b.1.

3.2.f.7 "Exclusive use" vehicles and tracking communication systems.

Evaluation of Requirement. ORNL currently uses "exclusive use" vehicles, as defined in 49 CFR 172, Subpart F, for all shipments of waste and intends to do so for TRU waste shipments. Tracking of TRU waste shipments from ORNL to WIPP will be accomplished using TRANSCOM which is located in Oak Ridge, Tennessee.

Current Plans. Comply with this requirement.

Schedules and Costs. ORNL intends to comply with this requirement when shipments to WIPP are initiated. Associated costs are included in Sect. 3.2.b.1.

3.2.f.8 Transportation management and operations plan to be developed by Albuquerque Operations Office.

Not Applicable to ORNL.

3.2.g Interim Storage**3.2.g.1 Designation of interim storage sites.**

Evaluation of Requirement. ORNL maintains and operates a number of TRU waste storage facilities where certified and uncertified waste are clearly identified. Currently ORNL receives no TRU waste from off-site generators. However, once the WHPP begins operation, some waste will be received and processed from off-site generators.

Current Plans. Since current storage facilities are inadequate to meet projected needs, ORNL plans to construct new temporary storage buildings for TRU waste. These buildings will be designed and constructed specifically for that purpose. See Sect. 3.2.e.2.

Schedules and Costs. See Sect. 3.2.e.2.

3.2.g.2 RCRA regulations applied to new interim storage facilities for TRU waste.

Evaluation of Requirement. ORNL has plans for four new interim storage facilities for TRU waste, as discussed in Sect. 3.2.e.2. RCRA Part B permit applications have been prepared and submitted for two, the TRU/SLLW Staging Facility and the RH-TRU Waste Storage Bunker. Plans for the facilities are in compliance with items a.-j.

Current Plans. RCRA permit applications shall be prepared for the remaining two planned storage facilities, which shall also be designed, constructed, and operated to comply with items a.-j.

Schedules and Costs. Costs for complying with requirements in facility design and construction have been included in Sect. 3.2.e.2. Operating costs will be charged back to waste generators. Cost of preparation of additional RCRA permit applications is expected to be approximately \$50K, as discussed in Sect. 3.2.e.6.

3.2.g.3 Items listed in Sect. 3.2.g.2 above reviewed for consistency with existing interim storage facilities.

Evaluation of Requirement. Existing TRU waste storage facilities have RCRA interim status and have been reviewed for compliance with the items in Sect. 3.2.g.2. Part B permit applications have been submitted for those existing facilities that appear to meet RCRA requirements. However, several facilities were determined not to meet the requirements; closure plans were submitted for these facilities.

Current Plans. New facilities are planned to replace the current inadequate TRU storage facilities. RCRA requires that utilization of these inadequate facilities be ceased and closure initiated by November 1992. The delay of the opening of WIPP has extended the period of needed storage at ORNL beyond this 1992 deadline. Near-term budgets support neither new facility development nor exhumation of buried casks from one inadequate facility in this time frame. All new facilities will be designed, constructed, and operated in accordance with all applicable RCRA regulations and the requirements of this Order.

Schedules and Costs. See Sect. 3.2.e.2 for costs of new facilities. Closure of inadequate facilities is expected to cost approximately \$1M between FYs 1990 and 1994.

3.2.g.4 Alteration of certified waste package.

Evaluation of Requirement. CH-TRU waste is packaged and certified in 30- or 55-gal stainless steel drums and then placed in interim storage facilities that are designed and constructed in a manner to avoid alteration of the package or the waste from anthropogenic or environmental effects.

Current Plans. RH-TRU waste, once certified, will be stored in interim facilities that are designed to prevent alteration of the waste and waste package. CH-TRU waste will continue to be stored as described above.

Schedules and Costs. New interim storage facilities will be designed and constructed for CH- and RH-TRU waste. See Sect. 3.2.e.2.

3.2.g.5 Receipt of data packages from off-site generators.

Evaluation of Requirement. ORNL does not currently receive TRU waste from off-site generators. Waste is planned to be received from off-site generators and processed at the WHPP, beginning after FY 1999.

Current Plans. Off-site generators' data packages will be stored and utilized to generate the final data package at the time of shipment.

Schedules and Costs. Included in Sect. 3.2.b.1.

3.2.g.6 Requirements for off-site generators and shippers of certified TRU waste.

Evaluation of Requirement. See Sect. 3.2.g.5.

Current Plans. Off-site generators will be responsible for describing the waste form.

Schedules and Costs. Off-site generators will bear these costs.

3.2.g.7 Requirements for reshippers of certified TRU waste from off-site generators.

Evaluation of Requirement. See Sect. 3.2.g.5. Since ORNL will not only store, but also repackage TRU waste generated off-site, not all the responsibilities outlined in this requirement are appropriate, e.g., ORNL, not the originator, will be responsible for certifiability of waste container procurement documentation.

Current Plans. Assignment of responsibilities with regard to off-site waste to be processed at the WHPP will be documented in the certification plan for the WHPP and approved by WIPP WACCC prior to implementation.

Schedules and Costs. See Sect. 3.2.b.1.

3.2.g.8 Agreements between off-site generators and interim storage sites.

Evaluation of Requirement See Sect. 3.2.g.7.

3.2.h Waste Isolation Pilot Plant

Sects. 3.2.h.1-3.2.h.8 are not applicable to ORNL.

3.2.i Buried transuranic-contaminated waste

3.2.i.1 Closure of inactive TRU waste burial sites in accordance with NEPA, CERCLA, SARA, and other applicable requirements.

Evaluation of Requirement. ORNL has 12 suspect buried TRU waste sites. Knowledge regarding waste inventories is generally incomplete, and it is difficult to specifically locate the TRU-contaminated waste within the large waste disposal areas. The ORNL sites include primarily burial grounds and waste pits and trenches in which TRU wastes were co-disposed with other waste materials. Therefore, ORNL is implementing a comprehensive RAP to address the broader aspect of environmental contamination concerns in compliance with all applicable environmental regulations and DOE orders. Compliance with the requirements for buried TRU waste will be achieved through this program.

ORNL is in compliance with the criteria. ORNL participated in the development of the referenced document and has produced internal documents which were used as the basis of the ORNL-specific portions of the DOE document.

Current Plans. No additional specific plans are required beyond the implementation of the ORNL RAP, through the DOE Environmental Restoration Program.

Schedules and Costs. Specific schedules or costs are not available for buried TRU sites exclusively. Schedules for RI/FS activities on individual WAGs are currently being negotiated with regulatory authorities in the preparation of an IAG which is expected to be complete during FY 1989. This IAG will be updated annually to reflect current priorities and agreements. In addition, projections of cost and schedule for the overall RAP are updated annually in the ORNL Environmental Long-Range Plan. The total scope of the RAP is currently estimated at approximately \$1.3 billion to be completed by approximately year 2010.

3.2.i.2 Characterization and verification activities applied to buried TRU waste sites.

Evaluation of Requirement. ORNL has initiated a RI/FS program under requirements of RCRA 3004(u). This program is being implemented for approximately 160 individual SWMUs which have been divided into 13 WAGs. An individual RI Plan will be developed and a remedial investigation will be conducted on each of the 13 WAGs. Several of these WAGs contain potential buried TRU sites. The buried TRU will be characterized and determinations of potential migration and impacts will be assessed as part of this process. Appropriate sampling/analysis/monitoring techniques are addressed in individual RI plans which are reviewed and approved by DOE, TDHE, and EPA - Region IV. In addition, a generic sampling quality control document has been developed by Martin Marietta Energy Systems, Inc., and is approved by EPA-IV for use in RI/FS activities.

Current Plans. ORNL will continue the RI/FS for sites containing buried TRU, as part of the DOE Environmental Restoration Program, as funding constraints allow.

Schedules and Costs. See Sect. 3.2.i.1.

3.2.i.3 Closure strategies for buried TRU waste sites.

Evaluation of Requirement. See Sect. 3.2.i.2. In addition to remedial investigation planning and implementation, the comprehensive RI/FS will also include Alternative Assessments, Corrective Measures Studies, Interim Corrective Actions (Operable Units), etc., as appropriate to define and evaluate closure options for each WAG. These assessments and studies will include consideration for the unique nature of any buried TRU wastes and will accommodate those considerations in the alternative/action selections. Although alternatives for individual sites will be more detailed and site-specific than the three generic criteria in this requirement, they will evolve from consideration of those basic options. Specific studies to be completed will determine the nature and effectiveness of enhanced monitoring, in situ stabilization technologies, and exhumation risks and benefits for waste sites containing buried TRU. Any exhumation of buried TRU will also include appropriate disposal of the material in WIPP.

Current Plans. ORNL will continue the RI/FS for sites containing buried TRU, as part of the DOE Environmental Restoration Program, as funding constraints allow.

Schedules and Costs. See Sect. 3.2.i.1.

3.2.i.4 Site Closure Plans for buried TRU waste sites.

Evaluation of Requirement. See Sects. 3.2.i.2-3.2.i.3. The comprehensive RI/FS program will result in the development of closure strategies for each of the WAGs. These strategies will be documented in Alternative Assessment type documents and in compliance with the NEPA requirements for federal facilities. In order to ensure absence of a potential conflict of interest, site characterization and closure assessment documentation will be submitted by ORNL for preparation of a NEPA-equivalent Feasibility Study by an independent DOE contractor. All aspects of the program including characterization, technology demonstration, alternatives evaluation, risk assessment, etc., will be submitted for approval by the TDHE and the EPA - Region IV in accordance with the IAG currently under development to ensure regulatory compliance. Activities requiring permitting will be coordinated through this process as well as periodic technical exchanges between ORNL, DOE, and regulatory agencies. Waste retrieval options will be considered and, as practicable and justified, evaluated and implemented in accordance with these criteria. ALARA will be an appropriate requirement for consideration in evaluation of all closure options. Budget and schedule projections and updates will be provided and all appropriate post-closure monitoring will be included in technical as well as budgetary evaluations, as identified and appropriate.

Current Plans. ORNL will continue the RI/FS and follow-up closure activities, as part of the DOE Environmental Restoration Program, for sites containing buried TRU as funding constraints allow.

Schedules and Costs. See Sect. 3.2.i.1.

3.2.j Quality Assurance

3.2.j.1 QA, DOE Order 5700.6B, and ANSI/ASME NQA-1.

Evaluation of Requirement. Transuranic waste management activities are being performed under active QA programs. However, significant upgrades to these programs must be made in accordance with the applicable requirements of ANSI/ASME NQA-1, as mandated by DOE Order 5700.6B. The requirements and responsibilities for implementation of the ORNL QA program are defined in the ORNL QA Manual. QA requirements are mandated from the Martin Marietta Energy Systems, Inc., Policy Procedure GP-5 to the Energy Systems QA Manual and ultimately to the ORNL QA Manual. Specific QA plans are written for the design and construction of new TRU waste handling and disposal facilities in accordance with the requirements of the ORNL QA Program.

Current Plans. ORNL will continue to bring all TRU waste activities into compliance with QA requirements. Several new facilities designed for storing and repackaging TRU waste are scheduled for construction over the next five years. QA documents will be required for the construction and operation of these facilities.

Schedules and Costs. The estimated costs for upgrading the QA program and preparing QA documents for the new facilities is \$200K. The sustained effort to maintain compliance with these QA standards will add an ongoing substantial increment to the base operating costs.

Table 5. Implementation summary for management of transuranic waste

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
a. Waste Classification					
(1) Partial Compliance	Administrative and process controls are used to segregate TRU waste at generation. ²³³ U, ²²⁶ Ra, ²⁵² Cf, and ²⁴⁴ Cm are managed as TRU waste at ORNL.	Determine whether ²⁴⁴ Cm shall continue to be considered TRU, and formally declare ²³³ U, ²²⁶ Ra, and ²⁵² Cf TRU.	FY 1990	10K	a
(2) Partial Compliance	TRU radionuclide concentration of drummed CH at the time of assay is utilized. Container mass is not used to calculate specific activity. ORNL does not yet have the capability to assay boxed CH- or RH-TRU waste.	Upgrade new master algorithm for drummed CH-TRU. Install box CH-TRU assay system. Include assay capabilities for RH-TRU in WHPP. ^b	FY 1992	120K	1.5M
(3) Partial Compliance	c	c	c	c	c
(4) Partial Compliance	Process flow sheets, materials lists, and RTR provide data on hazardous components that will be included in the data package sent with the waste to WIPP.	RTR is being installed for CH-TRU boxes. RH-TRU will be characterized at WHPP. ^c	FY 1989	70K	490K
b. Waste Generation and Treatment					
(1) Partial Compliance	Technical and administrative controls, including charge-back of waste costs and generator training, are utilized to reduce waste.	Expand TRU waste minimization focus. Construct and operate repackaging facility for CH-TRU and WHPP for RH-TRU treatment, certification and shipment.	FY 1994 2005 2013	600K 1.7M 125M	a 6M 130M
(2) Partial Compliance	d	d	d	d	d
(3) Compliance	Treatment of hazardous components is not feasible; however, source reduction is being implemented.	Continue current practice.	a	a	a
(4) a	ORNL does not generate TRU waste that is classified for security reasons.	a	a	a	a

^aNot applicable.^bSee b. (1).^cSee a. (2).^dSee a. (2-4).

Table 5. Implementation summary for management of transuranic waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
c. Waste Certification					
(1) Partial Compliance	TRU waste is or will be certified according to the WIPP WAC, placed in interim storage, and eventually shipped to WIPP.	Construct and operate facilities to repackage and certify CH- and RH-TRU waste and eventually ship to WIPP.	b	b	b
(2) Compliance	ORNL does not intend to send uncertified TRU waste to WIPP.	a	a	a	a
(3) Partial Compliance	ORNL's NG CH-TRU Certification Plan has been approved by WIPP WACCC. Stored CH-TRU and NG RH-TRU plans have been reviewed by WIPP WACCC.	Revise CH-TRU and NG RH-TRU documents. Issue stored RH-TRU document. Prepare certification plans for transportation.	FY 1994	150K	a
(4) Partial Compliance	Certification plans contain or will contain controls to ensure adherence to plan.	e	e	e	e
(5) Partial Compliance	e	e	e	e	e
(6) a	a	a	a	a	a
(7) a	a	a	a	a	a
(8) Partial Compliance	Generators' procedures are in place to implement the approved NG CH-TRU Certification Plan.	Revise generators' procedures as needed to implement additional certification plans as approved.	FY 1994	150K	a
(9) Compliance	Support will be provided to audit teams as required.	a	a	a	a
(10) a	a	a	a	a	a
(11) Partial Compliance	Several findings were reported by the last WIPP WACCC audit.	Establish document control system, and resolve remaining findings.	FY 1990	100K	a

*See c. (3).

Table 5. Implementation summary for management of transuranic waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
d. Waste Packaging					
(1) Partial Compliance	All NG CH-TRU waste is packaged in noncombustible containers that meet DOT requirements.	NG RH-TRU waste will be repackaged in the WHPP.	b	b	b
(2) Partial Compliance	Some pressure relief devices have been utilized.	Utilize pressure relief devices in repackaging.	b	b	b
(3) Partial Compliance	All waste to be shipped to WIPP will be sealed, marked, and labeled in accordance with applicable requirements.	Generators will seal and Waste Management will mark and label CH-TRU containers. RH-TRU sealing and labeling will be done at WHPP.	b	b	b
e. Temporary Storage at Generating Sites					
(1) Partial Compliance	All CH-TRU drums are clearly identified and physically segregated from LLW to the extent practical. RH-TRU casks are separately stored.	f	f	f	f
(2) Partial Compliance	TRU and LLW containers are stored in the same buildings but are clearly distinguished.	Provide upgraded RCRA-permitted storage facilities to meet requirements of the Order.	FY 1994	150K	2.75M
(3) Partial Compliance	Access is controlled for current TRU storage facilities.	Access controls will be included as needed in new storage projects.	g	g	g
(4) Partial Compliance	Limited monitoring is performed to detect releases.	New storage facilities will provide improved monitoring capabilities.	g	g	g
(5) Compliance	Existing facilities constructed to appropriate design criteria and subjected to safety evaluations.	New storage facilities will be designed, constructed, and operated to minimize potential for accidents.	g	g	g
(6) Partial Compliance	ORNL has a general RCRA contingency plan, as well as specific contingency plans for facilities planned to be kept operational after 1992, but no specific plans exist for facilities to be closed.	Develop contingency plans for planned facilities.	FY 1993	50K	a
(7) Compliance	Facility design and operation helps keep exposures ALARA.	ALARA principles will be incorporated into design and operation of new facilities.	g	g	g

¹See a. (1).²See e. (2).

Table 5. Implementation summary for management of transuranic waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
f. Transportation/Shipping to WIPP					
(1) Compliance	Current ORNL shipment practices are in compliance with applicable federal regulations.	Extend current practices to TRU waste when shipments to WIPP begin.	b	b	b
(2) Compliance	a	ORNL will utilize the TRUPACT II for CH-TRU and the DOE-authorized package for RH-TRU.	b	b	b
(3) Compliance	a	ORNL will provide required shipping papers.	b	b	b
(4) Compliance	a	ORNL will distribute shipping papers as specified.	b	b	b
(5) Compliance	ORNL has required current authorization/permits for shipments.	Additional authorizations/permits will be obtained if necessary.	b	b	b
(6) Compliance	ORNL properly placards all current shipments.	ORNL will properly placard TRU waste shipments when they begin.	b	b	b
(7) Compliance	a	ORNL will utilize "exclusive use" vehicles and the TRANSCOM tracking system.	b	b	b
(8) a	a	a	a	a	a

Table 5. Implementation summary for management of transuranic waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
g. Interim Storage					
(1) Partial Compliance	Current interim storage buildings are sufficient for current waste inventory but inadequate to meet projected needs.	Construct new storage facilities. ^f	g	g	g
(2) Partial Compliance	RCRA permit applications have been prepared for two planned storage facilities.	Prepare RCRA permit applications for the remaining facilities. All four new facilities will be designed and operated in compliance with items a-j.	g	g,h	g
(3) Noncompliance	Permit applications have been submitted for existing facilities meeting RCRA requirements. Existing facilities not meeting requirements will be closed.	Close inadequate existing facilities. Construct new facilities.	FY 1994 g	1M g	a g
(4) Compliance	Current storage facilities protect the certification status of the waste.	Continue to store certified waste in such a manner that the certification is unaltered.	g	g	g
(5) Partial Compliance	Currently, ORNL receives no TRU waste generated off-site.	After WHPP becomes operational, store and process data packages from off-site generators and use them to prepare final data packages.	b	b	b
(6) Compliance	i	i	b	b	b
(7) Partial Compliance	Currently ORNL receives no TRU waste generated off-site.	Not all responsibilities outlined in this requirement will apply, since ORNL will not only store, but also repackage TRU waste generated off-site.	2013	b	b
(8) Partial Compliance	j	j	j	b	b
h. WIPP					
(1-8) ^a	Requirements h. (1-8) are applicable to WIPP.	a	a	a	a

^fSee e. (6).^gSee g. (5).^hSee g. (7).

Table 5. Implementation summary for management of transuranic waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
i. Buried TRU Waste					
(1) Compliance	ORNL helped develop the referenced document and has developed additional internal documents to be used in complying with this requirement.	Continue implementing the ORNL RAP, through DOE ER Program.	a	a	a
(2) Compliance	Potential buried TRU waste sites will be investigated and evaluated under the RI/FS program according to the requirements of RCRA 3004(u).	Continue RI/FS for sites containing TRU wastes, as part of DOE ER Program.	k	k	k
(3) Compliance	Closure strategies will be developed under the RI/FS program. ¹	Continue RI/FS for sites containing TRU wastes, as part of DOE ER Program.	k	k	k
(4) Compliance	m	Continue RI/FS for sites containing TRU waste, as part of DOE ER Program.	k	k	k
j. Quality Assurance					
(1) Partial Compliance	TRU waste management activities are being performed under active QA programs. However, significant upgrades to this program must be made in accordance with applicable elements of ANSI/ASME NQA-1 and DOE Order 5700.6B.	Continue to bring all TRU waste activities into compliance. New facilities will be brought on-line with NQA-1 programs in place.	1992	200K	a
TOTALS			FY 2013	129M	141M

¹TBD. The total scope of the ORNL RAP is estimated at \$1.3 billion, to be completed by year 2010.

²See i. (2).

³See i. (2-3).

3.3 SUMMARY FOR TRU WASTE COMPLIANCE

Table 5 itemizes ORNL's compliance status with each requirement of DOE Order Chapter II. Of the 45 TRU waste management requirements determined to be applicable, ORNL complies with 18, partially complies with another 26, and does not comply with one.

The one noncompliance results from the inability of some current TRU waste interim storage facilities to meet RCRA technical requirements. Utilization of these inadequate facilities must cease and closure must be initiated by November 1992, according to RCRA. Although closure plans have been prepared for these facilities, the delay of the opening of WIPP extends the period of needed storage at ORNL beyond the deadline. Construction of new compliant facilities to which the waste can be moved prior to the deadline will be difficult. One of the current facilities is a retrievable burial area for RH-TRU concrete casks. Removal of these casks prior to November 1992 will be virtually impossible. The near-term budget does not support compliance with the 1992 deadline. Negotiation with regulators on this issue is anticipated to begin in FY 1989.

The partial compliances generally indicate that ORNL complies to the extent of its current activities, which primarily involve NG CH-TRU waste. However, ORNL is not in a position to comply with respect to its future activities. Plans, programs, and even capital facilities are needed to provide compliance capabilities in these areas. As shown in Table 5, ORNL anticipates reaching full compliance with the TRU waste management requirements of DOE Order 5820.2A in the year 2013, or upon closure of WIPP. The costs to attain TRU waste compliance total approximately \$260M, including the construction of several waste storage and processing facilities. These costs do not include the remediation of ORNL buried TRU sites, as these are covered in the RAP and funded by the Environmental Restoration Program.

The strategy for the ORNL TRU Waste Management Program revolves around the eventual disposal in the WIPP and thus focuses on characterizing, packaging, and certifying the waste to meet WIPP WAC and transportation requirements and storing the waste until it can be accepted by WIPP. Due to the recent specification of the twist-tape-and-cut method of sealing waste packets, which is not the method predominantly used at ORNL, virtually all of ORNL's CH-TRU waste (approximately 2,400 drums) will require repackaging prior to shipment. A new capital facility and several years will be required to accomplish this task. As previously noted, an additional interim storage facility is also required for CH-TRU waste. RH-TRU waste will be processed, packaged and certified at the WHPP, beginning in FY 1999. Several interim storage facilities are needed to house RH-TRU casks. Waste reduction and ALARA are primary considerations for both CH- and RH-TRU waste management.

4.0 MANAGEMENT OF LOW-LEVEL WASTE

4.1 GENERAL BACKGROUND

During 1984, DOE-ORO released for comment an EIS on the SLB of LLW on the ORR. The EIS received many negative comments and was withdrawn. Thereafter, through negotiations with DOE-ORO, Martin Marietta Energy Systems, Inc., TDHE, and EPA, the LLWDDD Program was formed. The purpose of the LLWDDD Program is to develop a comprehensive strategy for managing LLW waste on the ORR based on the current status of state and federal regulations and in anticipation of this Order. The strategy relies on the concept of waste segregation to provide needed control of the concentration and isotopic composition of LLW before final disposition. The approach to managing the segregated wastes depends on the level of contamination present. This approach is based on the performance assessment of the disposal site and the technology used for the disposal of the waste. The LLWDDD Program has proposed five classes of LLW to be managed on the ORR.

- (1) **BRC Waste** - LLW that is suitable for disposal in a sanitary/industrial landfill facility and will not expose any member of the public to an effective dose equivalent of more than 4 mrem/yr at the time of disposal.
- (2) **Class I Waste** - LLW that is suitable for disposal using sanitary/industrial landfill technology and will not expose any member of the public to an effective dose equivalent of more than 10 mrem/yr at the time of disposal.
- (3) **Class II Waste** - LLW primarily containing fission product radionuclides with half lives of 30 years or less that is suitable for disposal in engineered facilities designed to isolate the waste from the environment and public for a period of time sufficient to allow for the decay of radionuclides to such a level that any member of the public will not be exposed to an effective dose equivalent of more than 10 mrem/yr.
- (4) **Class III Waste** - LLW consisting of radionuclides that have long half lives and will be disposed of in facilities having intruder protection.
- (5) **Class IV Waste** - LLW not suitable for disposal on the ORR and which would require either treatment to reduce the level of contamination to a level consistent with any of the other four waste classifications or shipment to an off-site LLW disposal facility.

ORNL is the major generator of Class II waste on the ORR.

The use of SLB at ORNL in the past was viewed as an adequate, safe practice that was in full compliance with DOE Orders. Over the years, environmental regulations have been steadily evolving at both the state and federal level such that SLB is no longer the preferred option for disposing of ORNL's LLW. Since June 1986, all LLW disposal at ORNL has occurred using varying degrees of GCD techniques, such as concrete silos, lined and/or concrete encapsulated auger holes below-grade or above-grade tumulus disposal. Both the below-grade GCD techniques and the above-grade tumulus disposal technology have been used, in a demonstration mode, in ORNL's only active facility for the disposal of LLW, SWSA 6. Based upon initial assessments of the above-grade and below grade LLW disposal techniques, the current status of environmental regulations, the LLWDDD Strategy, and the requirements of this Order, the above-grade tumulus technology has been selected as the preferred method for the management of ORNL's Class II Waste.

ORNL's LLW is currently disposed of in SWSA 6. Estimates indicate that up to ten years of disposal capacity exists using current below-grade GCD techniques and assuming current waste volume generation rates. However, since hazardous and mixed wastes were disposed of in SWSA 6 prior to May 1986, portions of SWSA 6 are now regulated under the RCRA Section 3004(u). Additional regulatory compliance requirements have become applicable to the LLW disposal site. Regulatory compliance requirements under RCRA will cause the cessation of all below-grade LLW GCD sometime in the early 1990s. At present, an ICM is being applied to those areas in SWSA 6 that received hazardous and/or mixed wastes between November 8, 1980 and May 6, 1986. A Closure Plan/Post Closure Application was submitted to TDHE and the EPA in response to this action.

Under Section 3004(u), RCRA requires that operators of RCRA-permitted TSD facilities provide information on releases from SWMUs to the EPA. A RFA has been submitted to the EPA to satisfy the first phase of this regulatory compliance requirement. SWSA 6 was categorized as a SWMU in this assessment. A RFI has been submitted to the EPA. The purpose this RFI is to characterize the extent of releases from SWSA 6. This investigation is currently underway. The RFI will be followed by a CMS which will determine the need for, and extent of, remedial measures required to mitigate any continuing contaminant releases to the environment. This in turn will be followed by CMI phase which will implement the remedial measures specified in the CMS and lead to the closure of SWSA 6.

Closure activities in SWSA 6 under RCRA are expected to occur during FY 1991 through FY 1993 depending on the number and complexity of corrective measures to be implemented. In anticipation of this event and according to the LLWDDD strategy, ORNL proposes to construct a Class II IWMF in the unused southwest portion of SWSA 6 which is not RCRA regulated. This facility will consist of six above-grade tumulus units having a total disposal capacity of up to six years at current generation rates. Waste placed in this facility will be certified under a new certification program using the WAC developed by conducting a performance assessment specific to this site.

Starting in FY 1997, ORNL proposes to operate a CIIDF, in West Bear Creek Valley, that will provide more than 50 years disposal capacity. This facility will consist of above-grade tumulus pads, performance monitoring and containment systems, and supporting ancillary facilities including a waste stabilization facility, an administration and heavy equipment storage building, and a guard house. A new state-of-the-art WCCF will be operated in conjunction with the CIIDF to assure that waste disposed of in this facility meets the WAC developed during the EIS for waste management activities on the ORR. ORNL is in the initial stages of planning for the development of facilities required to store and package Class III and IV waste. According to the LLWDDD strategy, Y-12 has been given the responsibility for developing facilities to dispose of Class III waste. These facilities will probably not become operational until about FY 1997. In the interim, ORNL will have to design and construct facilities to store this class of waste. The LLWDDD strategy also has determined that Class IV waste is not suitable for disposal on the ORR. DOE-ORO is responsible for making off-site disposal of Class IV waste available to ORNL. However, a date for initiating off-site shipments has not been determined nor a site selected. ORNL will be responsible for storing this waste in the interim. An evaluation is currently being conducted to assess annual waste generation rates, waste forms, nuclide content, and container size, and dose rate for this class of waste to provide input for the planning and design of this facility. The off-site shipment of this waste will require compliance with DOT requirements, and it is estimated that much of this waste will require recertification and repackaging. A facility will also be required to fulfill this need. A general overview of the LLW management strategy for ORNL is provided in Fig. 6.

Since RCRA was promulgated in 1976, a 1984 decision granted EPA authority to regulate all hazardous waste and DOE authority to regulate all "radioactive" waste generated at DOE facilities. Mixed waste is a waste that may be classified as being both hazardous and radioactive. Therefore mixed waste generated at ORNL is being managed under RCRA requirements and is being stored until treatment facilities or permanent disposal facilities become available. The LTHWSF has the capacity to store 350 55-gal drums and is located in the HWMA with other hazardous waste storage facilities. This facility, designed to achieve zero release, is inspected annually by both the EPA and TDHE to verify compliance with RCRA regulatory requirements. Mixed waste with low radionuclide concentrations is currently stored in the LTHWSF. It complies with the applicable requirements of this Order. New facilities planned for the storage of mixed waste, as described below, will be designed, constructed, and operated in compliance with all applicable requirements of this order.

Adequate storage capacity for mixed waste, until appropriate treatment and disposal facilities become available, is critically short at ORNL. Two planned capital projects will help alleviate this problem in the short term. A new mixed waste storage facility is to be constructed. This facility will have the capacity to store 500 55-gal drums of mixed waste. Another new facility is to be constructed will be designed to handle modest amounts of bulk mixed waste such as soils and construction debris. ORNL does not have an existing or a planned facility for handling RH mixed waste. The potential need for such a facility is being considered.

Refer to Table 3 for a listing of capital projects planned for the management of LLW and mixed waste.

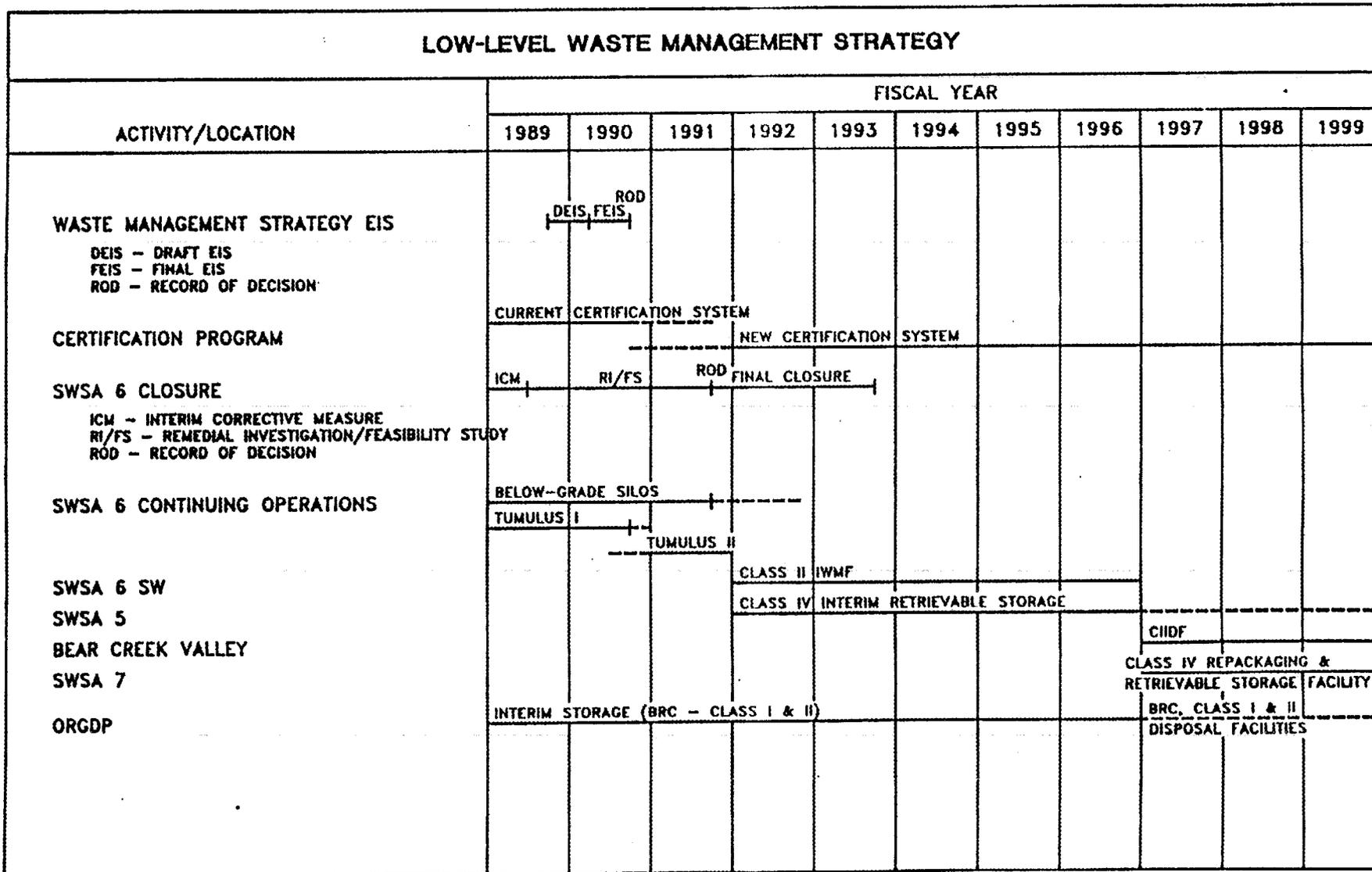


Fig. 6. LLW management strategy for ORNL

4.2 5820.2A REQUIREMENTS FOR THE MANAGEMENT OF LOW-LEVEL WASTE

4.2.a Performance Objectives

4.2.a.1 Protect public health and safety in accordance with standards specified in applicable EH Order and other DOE Orders.

Evaluation of Requirement. DOE Order 5400.3, "Radiation Protection for Public and the Environment," is expected to be issued the first half of this year. The Order is expected to require the annual dose limit for members of the public from all exposure modes and all DOE sources of radiation to be 100 mrem effective dose equivalent and 500 mrem for any tissue. Doses in excess of 25 mrem in a given year are expected to be required to be reported by the DOE Field Office to the relevant Program Office(s) and to the Deputy Assistant Secretary for Environment (EH-20). Also included is the requirement to comply with 40 CFR 61 that requires exposure to emissions of radionuclides to air from DOE facilities to not exceed 25 mrem/year to the whole body and 75 mrem/year to the critical organ of any member of the public, excluding radon-220 and radon-222 and their decay products. Also included is compliance with 40 CFR 141 for private and public drinking water supplies downstream of DOE facilities. 40 CFR 141 requires that drinking water produce an annual dose equivalent to the whole body or any internal organ no greater than 4 mrem.

Current Plans. Although DOE Order 5400.3 has not been issued, compliance with the expected requirements of the Order will be assured as part of satisfying requirements a. (2-4) and b. (1-3) of the LLW chapter. The specific requirements associated with 40 CFR 61 and 40 CFR 141, as well as other standards, will be addressed in the assessments mandated by requirements b. (1-2).

Schedule and Costs. See Sects. 4.2.b.1-4.2.b.2.

4.2.a.2 Radiation releases and dose limits.

Evaluation of Requirement. Current operations' compliance with this requirement is unknown at this time. Past disposal and waste management facilities with potential for causing doses to exceed the performance objectives are being addressed by the RAP. Future operations will comply with the performance objective.

Current Plans. ORNL intends to subdivide SWSA 6 such that historical waste disposal locations will be incorporated into the RAP to reduce the potential for public doses to acceptable levels. Future (post FY 1992) operations at SWSA 6 will comply with the performance objective. The performance assessment prepared for requirement b. (1) and the waste management systems performance assessment prepared for requirement b. (2) will demonstrate compliance with this requirement. New facilities are planned for the certification and treatment of LLW. These facilities will be constructed in a manner that ensures compliance with the performance objectives of this Order. The interim storage facility at ORGDP will be incorporated into the waste management performance assessment for the ORR.

Schedule and Costs. See Sects. 4.2.b.1-4.2.b.2

4.2.a.3 Inadvertent intruder doses.

Evaluation of Requirements. Whether ORNL's present waste disposal practices comply with this requirement is not known, since inadvertent intruder protection for those practices have not been evaluated. Closure of present and future waste disposal facilities will comply with the requirements for intruder protection. Protection of the intruder will be addressed as part of the compliance with requirement b. (1).

Current Plans. Intruder protection will be addressed as part of complying with requirement b. (1). Deficiencies in existing intruder protection plans will result in changes in closure plans to assure compliance with this requirement.

Schedule and Budget. See Sect. 4.2.b.1

4.2.a.4 Protect groundwater resources, consistent with Federal, State, and local requirements.

Evaluation of Requirements. Federal requirements for the protection of groundwater resources from the management of low-level radioactive waste are to be incorporated into 40 CFR 193. The proposed rule is expected to be published in the Federal Register after approval by OMB. Depending on the interpretation of the proposed rule, groundwater will be protected so that the annual dose to an individual or the public cannot exceed 25 mrem or 4 mrem effective dose equivalent from the ingestion of 2 L/d of drinking water. Groundwater protection requirements for the State of Tennessee have not been established. Interim guidance suggests that groundwater will need to be protected so that the annual dose to an individual cannot exceed 4 mrem effective dose equivalent from the ingestion of 2 L/d of drinking water. Local requirements for the protection of groundwater have not been established.

Past practices have resulted in contamination of groundwater above the levels associated with the proposed dose limits for an individual using groundwater beneath the disposal sites. These sites will be addressed by RAP. Future practices will provide protection to groundwater.

Current Plans. The IWMF in SWSA 6 will be designed and constructed to protect groundwater resources. The IWMF is intended to provide the needed experience for new facilities that will provide protection to groundwater resources at future facilities at SWSA 7 and Bear Creek Valley. See Sects. 4.2.b.1-4.2.b.3.

Schedule and Budget. See Sects. 4.2.b.1-4.2.b.3

4.2.b Performance Assessment

4.2.b.1 Preparation of performance assessments for disposal sites to demonstrate compliance.

Evaluation of Requirements. SWSA 6 does not comply with this requirement.

Current Plans. There are currently three disposal-related activities ongoing or planned for SWSA 6. GCD silos will continue to be used for RH LLW >1 R/h until the line item facilities are available in the FY 1997 time frame. There is a tumulus disposal operation currently being used for wastes that cannot be stored at K-25. Another tumulus (Tumulus II) is planned for FY 1990 and will operate until the IWWMF is operational in CY 1991. The IWWMF will be a tumulus-type operation in a separate area of SWSA 6 and will be used until the new line item disposal facilities are available in SWSA 7 and West Bear Creek Valley.

Current operating disposal facilities that will remain operational until the line item facilities are available will require a complete performance assessment. These are limited to the GCD silos and the IWWMF. The current operating disposal facilities that will cease operation by the end of CY 1991 will not require a complete performance assessment. Existing data, particularly monitoring data, will be evaluated to determine whether the disposal facility meets the performance objectives.

Design of radiological performance assessment will analyze existing data, identify exposure scenarios, select simple models of site performance and perform screening calculations. A similar analysis will be prepared for the CIIDF proposed in Bear Creek Valley. The results will be used to identify additional data needs, exposure scenarios, and detailed site performance models. The results of the detailed analysis will be evaluated and documented to demonstrate compliance with this requirement.

Schedule and Cost. Performance assessments for the facilities identified above will be performed over the next five years. Dates for completion of performance assessments for specific facilities are tentative. The IWWMF and GCD silo operations have been assigned the highest priority and are scheduled for completion in FY 1991. ORNL's cost for completion of the performance assessments is estimated to be \$500K.

The schedule for completing the performance assessments is provided below.

IWWMF	FY 1991
GCD silo	FY 1991
SWSA 7	FY 1994
West Bear Creek Valley	FY 1994

4.2.b.2 Waste management systems performance assessment.

Evaluation of Requirement. ORNL is not presently in compliance with this requirement; however, a single waste management systems performance assessment is required for the ORR, which will include ORNL.

Current Plans. A waste management systems performance assessment team will be established within the LLWDDD core program and will be responsible for conducting the waste management systems performance assessment for the ORR, which will include ORNL. All solid, liquid, and gaseous TSD facilities involved in radioactive waste management activities will be included.

Schedule and Budget. The framework and criteria for conducting waste management systems performance assessments will be established by September 30, 1989. The costs and schedule for completing and updating the ORR waste management systems performance assessments will be established at that time and included in the next issuance of the waste management plan for each for the Energy Systems sites. It is anticipated that this assessment will require at least \$500K and take up to 2 years to complete.

4.2.b.3 Use of monitoring results to evaluate facility performance and validate models.

Evaluation of Requirement. Monitoring of facility and disposal site performance is presently being performed at ORNL on a reconnaissance level and for ORNL wastes being stored at ORGDP. Results for monitoring programs are routinely reviewed, evaluated and reported. Several disposal technologies within SWSA 6 are not monitored individually. These disposal technologies will be phased out by FY 1992. The disposal technologies that are planned for continued use beyond FY 1992 (GCD silos) will require installation of performance monitoring systems. Tumulus I and II monitoring systems comply with this requirement.

Current Plans. Current Plans are to continue monitoring facility and disposal site performance on a reconnaissance level. Existing monitoring activities at SWSA 6 will be used to evaluate compliance of the tumuli operations with the radiological performance objectives. Detailed monitoring data will be gathered for GCD silo areas remaining operational post FY 1992.

Schedule and Budget. Tumulus I operations will be evaluated by FY 1990 at a cost of \$50K. GCD silo operations will be evaluated by FY 1992 at a cost of \$100K.

4.2.c Waste Generation

4.2.c.1 Technical and administrative controls for waste reduction.

Evaluation of Requirement. In current operations, the waste reduction program at ORNL encompasses all categories of waste and encourages source and volume reduction through these techniques.

Current Plans. The waste minimization program will be receiving additional emphasis. An individual has been assigned to the program full time. Initial efforts will focus on creating a more rigorous SLLW certification program, developing waste minimization requirements and implementing the generator training module. The ORNL has been exchanging information with the newly created DOE-HQ Waste Reduction Steering Committee. A waste minimization plan for generators will be developed in FY 1989 in accordance with DOE Order 5400.1.

Schedules and Costs. The waste minimization program will become fully operational by FY 1994 at a projected cost of \$500K.

4.2.c.2 Waste generation reduction.

Evaluation of Requirement. The ORNL waste reduction program includes goal-setting and monitoring through the divisional waste minimization representatives organization, incentives through the charge-back program, and periodic reports.

Current Plans. An individual incentive program, operated as a general employee suggestion campaign for waste reduction is planned in FY 1989. Waste minimization reports are prepared on an annual basis. The waste minimization plan, originally prepared in FY 1985 and revised most recently in 1987, will be updated again during FY 1989. An audit program for waste minimization will be established as a part of future revisions to the program.

Schedules and Costs. Specific projects have been identified in the annual waste minimization report and will be addressed on a priority basis with available funds. See Sect. 4.2.c.1.

4.2.c.3 Waste Segregation.

Evaluation of Requirement. Each ORNL generator currently segregates uncontaminated wastes from LLW, a practice which is reinforced by the charge-back system wherein the cost to the generator for LLW management is greater than the cost of uncontaminated waste management. A few areas still generate "suspect" waste which shows no elevated surface radiation levels, but is considered to be LLW because of its generation history (e.g., coming from an area known to be contaminated, etc.).

Current Plans. The category of "suspect" waste will be eliminated through revision to the SLLW certification program.

Schedules and Costs. A demonstration project is under way in the Isotopes production area, aimed at providing data for improving the certification program including the elimination of suspect waste. The SLLW certification program which will enable ORNL to remove the category will be implemented in late FY 1990 or early FY 1991. The estimated cost is \$300K.

4.2.c.4 Waste Minimization.

Evaluation of Requirement. One of the facets of the ORNL waste minimization program is the use of project planning documentation to identify candidate waste streams. Waste management plans, which include a section describing planned minimization techniques, are required in advance of project initiation. See Sects. 4.2.c.1-4.2.c.2.

Current Plans. The current program will be continued.

Schedules and Costs. See Sect. 4.2.c.1.

4.2.d Waste Characterization

4.2.d.1 Proper waste segregation through waste certification.

Evaluation of Requirement. The current SLLW certification program depends heavily on generator estimates and administrative or process controls to provide appropriate waste characterization. The documentation for these estimates, including the generator's description of each individual waste packet in a given waste container, provides a summary of the available characterization data throughout the waste management process.

Current Plans. Planned improvements to the certification program will provide more objective and reproducible data on waste characterization, relying less on administrative or process controls and incorporating more measurement techniques.

Schedules and Costs. A demonstration project, begun in FY 1988, will provide information on the applicability of characterization techniques and the appropriate mechanism for implementing improvements. The SLLW certification program which will provide enhanced characterization data will be implemented in late FY 1990 or early FY 1991. While current budget planning is incomplete, it is anticipated that \$1,500 in expense funds and \$2,000K in capital funds will be needed to bring the certification program into compliance by FY 1994.

4.2.d.2 Waste characterization data to be recorded on a waste manifest.

Evaluation of Requirement. The ORNL documentation for SLLW characterization, consisting of the Request for Disposal form and the Log-In Data Sheet, contain all of the information listed as being required on the manifest. These documents are completed by the generator, health physics, and waste management operations personnel, and accompany the waste containers throughout the process.

Current Plans. Improvements to the record keeping procedures for information retrieval and data reliability are planned.

Schedules and Costs. The program which will provide enhanced characterization data will be implemented in late FY 1990 or early FY 1991. The estimated cost of providing these enhancements is \$50K.

4.2.d.3 Direct and indirect characterization methods.

Evaluation of Requirement. Since this requirement specifies either materials accountability or some type of measurement, ORNL is not currently in compliance with this provision. The diversity of and inconstancy in radionuclide concentrations in ORNL waste streams make this difficult to achieve, although projects are underway to develop and implement measurement capabilities.

Currently, the LLW certification program relies heavily on process knowledge to determine the radionuclide concentration in wastes. The Generator Certification Officials or generators themselves are responsible for estimating the radionuclide concentrations.

NOTE: Use of process knowledge to estimate radionuclide concentrations is the one method allowed under NRC regulations that is not specifically mentioned in this Order.

Current Plans. There is a demonstration project underway to determine the capability and applicability of direct and indirect measurement techniques to the certification of LLW at ORNL. Additional demonstration and development projects will be pursued as necessary to incorporate measurement protocols into the certification program.

Schedules and Costs. Following instrument procurement, set-up, calibration, and testing, data from the demonstration project should begin to be collected in late FY 1989 or early FY 1990. See Sect. 4.2.d.1 for schedules and costs for achieving full compliance.

4.2.e Waste Acceptance Criteria

4.2.e.1 Off-site shipment.

Evaluation of Requirement. ORNL does not currently ship LLW off-site to any field organization for TSD. ORNL does not routinely receive LLW from off-site generators.

Current Plans. According to the LLWDDD Strategic Plan, ORNL will eventually ship Class IV LLW off-site. The receiving site has not yet been determined. This waste will be shipped in accordance with the requirements established by the operations office having responsibility for operations of the receiving facility.

Schedules and Costs. Not applicable.

4.2.e.2 Treatment, storage, and disposal facilities.

Evaluation of Requirement. Draft WAC have been developed for the proposed CIIDF by the LLWDDD Core Program. WAC for SWSA 6 have been developed but need to be modified to meet the requirements of this Order.

Current Plans. WAC will be modified for the existing disposal facilities in SWSA 6 and developed for the IWMF in SWSA 6. The draft Class II WAC for disposal and supporting ancillary facilities proposed for siting in West Bear Creek Valley will be finalized contingent on the EIS process. WAC will be developed before the Class III/IV Retrievable Storage Facility in SWSA 5 becomes operational. The WAC for these facilities will be submitted to the DOE-ORO Office.

Schedules and Costs. Final issuance of WAC for the facilities above will be dependent on the ROD for the DOE-ORO Waste Management EIS. The ROD for this EIS is anticipated to occur in June 1990. The costs for developing WAC for the facilities above is estimated to be \$150K and the task will be completed by FY 1992 for existing facilities.

4.2.e.3 Implementation of certification program to assure compliance with WAC.

Evaluation of Requirement. The ORNL LLW certification program is capable of assuring that currently applicable WAC are being met. The current program has several levels of checks to assure that WAC are met; review of waste manifests, examination of waste drums using RTR, GCO certification, and internal audits.

Current Plans. The WAC will continue to be developed as performance assessments are completed, operations are changed, and additional requirements are imposed. The certification program will monitor those changes and adapt as needed. The new program will incorporate additional checks and measurements to ensure segregation of SLLW by defined LLWDDD class concentration limits.

Schedules and Costs. A draft certification strategy incorporating the known new requirements will be published by the end of FY 1989. See Sect. 4.2.d.1.

4.2.e.4 Audit of generator certification LLW programs.

Evaluation of Requirement. The Waste Management Operations Section at ORNL may, under the current structure, perform audits of the generator certification program, either of its own accord, or through the ORNL Quality Department.

Current Plans. As centralized waste management facilities are developed on the ORR, operators of these new facilities will have the responsibility to perform audits of generator certification programs. Current planning documents allow for a disposal site to have the authority to audit a certification program back through all handling facilities to the point of generation.

The FY 1992 line item CIIDF will include a new and improved Waste Characterization and Certification Facility. This new facility will house state-of-the-art equipment for the examination and assay of containerized SLLW.

Schedules and Costs. Not applicable.

4.2.e.5 Required waste acceptance criteria.

Evaluation of Requirement. Allowable quantities/concentrations of specific isotopes allowable for handling, processing, storage and disposal for ORNL facilities will be determined by means of an EIS on proposed waste management activities at the ORR. Criticality safety requirements are evaluated when managing fissile waste. ORNL does not handle classified waste on a routine basis. If classified waste is disposed of in ORNL facilities, it is handled on a case by case basis. ORNL waste is currently segregated by external radiation dose. Thermal energy generation of LLW generated at ORNL has been evaluated and determined not to pose a significant risk in routine waste management activities. No restrictions have been placed on internal heat generation of waste at ORNL. WAC applicable to ORNL-generated waste place restrictions on the presence of harmful gases and vapors. No free liquids are permitted when disposing of SLLW. The chemical and structural stability of waste packages, radiation effects, microbial activity, chemical reactions and moisture content have all been taken into consideration when developing WAC for ORNL LLW handling facilities. Chelating and complexing agents, and free liquids are not permitted when disposing of SLLW at ORNL.

Current Plans. ORNL will continue to dispose of LLW using the current WAC. When the ROD is reached for the EIS on proposed waste management activities at the ORR, ORNL will begin using the quantities/concentrations specified for specific radioisotopes contained in the EIS to segregate SLLW into the LLWDDD classes. WAC will be developed for each new TSD facility.

Schedules and Costs. See Sect. 4.2.e.2.

4.2.f Waste Treatment

4.2.f.1 Waste treated in manner to meet performance objectives.

Evaluation of Requirement. Currently, only two methods for treating LLW at ORNL are practiced: compaction and cement grouting. Compaction achieves volume reduction and increases waste form stability. Cement grouting is performed to minimize and fill void space to achieve waste form stability and prevent contact with water. Small scale box compaction facilities already exist on-site.

Current Plans. ORNL does not have specific performance objectives for the disposal facilities currently in use. Specific performance objectives are being developed (see Sect. 4.b.2.1). ORNL will use cement grouting as a standard practice to achieve waste form stability and to minimize void space when possible, considering ALARA principles for worker exposure. Compaction and cement grouting of waste is used currently on a limited basis and will become part of the standard method of handling waste starting with the operation of the IWMF.

Schedules and Costs. A grouting station is planned for construction as part of the SWSA 6 staging area upgrade. This grout facility will be used for waste destined for the IWMF. A sludge drying facility is scheduled for construction. This facility will dry sludge from the PWTP. A waste stabilization facility is planned for the CIIDF (see Sect. 4.2.f.3). Supercompaction of ORNL waste will be performed by commercial vendors and these costs (savings) will be charged to the generators. Costs for designing and constructing these facilities will require \$750K in expense and \$4,000K in capital funds.

4.2.f.2 Waste treatment techniques used to increase life and improve long-term facility performance.

Evaluation of Requirement. ORNL believes the waste treatment methods described in the preceding requirement will improve long term facility performance by increasing waste form stability. Volume compaction will have the positive effect of increasing the longevity of the disposal facility, while cement grouting may increase the volume and thereby decrease the capacity. ORNL believes that increasing the structural stability of the waste form will be cost-effective in the long-term.

Current Plans. ORNL is currently using waste treatment techniques to reduce volume, provide a more stable waste form, and prevent rain water from coming into contact with the waste. See Sect. 4.2.f.1.

Schedules and Costs. The majority of Class II waste generated at ORNL will be treated in this manner by October 1991 and all Class II waste will be treated in this manner by October 1996. See Sect. 4.2.f.1.

4.2.f3 Development of large scale waste treatment facilities.

Evaluation of Requirement. ORNL currently has no plans for developing large scale solid waste treatment facilities. However, a small scale waste stabilization facility is proposed for construction as part of the FY 1992 line item CIIDF.

Current Plans. A waste stabilization facility is included in the plans for the proposed CIIDF. This facility will contain grout handling equipment which will be used to infill voids within waste packages. Additional WAC will be developed for waste packages that are to be stabilized using this facility. The Feasibility Study for the proposed CIIDF contains preliminary construction designs and cost estimates for this facility. The required safety documentation for the waste stabilization facility will be completed before operations commence (September 1996).

Schedules and Costs. Not applicable.

4.2.f4 Waste treatment facility documentation.

Evaluation of Requirement. Before any new waste treatment or stabilization facility is permitted to start operations at ORNL, certain required documentation must be in place and approved by designated personnel or committees.

Current Plans. Standard operating and maintenance procedures will be developed for the IWMF grouting station and the waste stabilization facility described in the preceding requirement, before operations commence. All personnel who work and or are permitted to enter this facility will be properly trained and qualified. Appropriate training and qualifications will be determined and documented before the facility initiates operations. Monitoring and emergency response plans will be developed before operations in this facility commence. The waste manifest system will be used to track all waste entering and leaving the waste stabilization facility (see Sects. 4.2.m.1-4.2.m.2).

Schedules and Costs. The plans, procedures, and training referred to above will be developed for the IWMF grouting station by October 1991 and the CIIDF waste stabilization facility by October 1994. The estimated cost is \$100K.

4.2.g Shipment

4.2.g.1 Off-site shipment of LLW minimized.

Evaluation of Requirement. Currently, ORNL does not send any LLW off-site for disposal. Contracts with outside companies to provide waste treatment call for the return of the waste to ORNL following treatment. The only exception to this is in the management of liquid scintillation counting wastes. These are mixed wastes and are incinerated by a licensed and approved commercial disposal company.

Current Plans. In the LLWDDD categorization, Class IV wastes are those that are inappropriate to manage on the ORR. Class IV wastes will be shipped off-site for disposal. Since the cost of off-site shipment and handling will be much greater than the on-site management cost, there will be incentive to keep shipments to a minimum. Current plans outline a process to minimize the generation of Class IV waste and to provide treatment for those Class IV wastes that are generated.

Schedules and Costs. Off-site shipments of Class IV LLW will occur some time after 1992. An exact date has not been determined. The estimated cost for preparation of the required documentation is \$250K.

4.2.g.2 Annual forecast for off-site shipments

Evaluation of Requirement. ORNL does not ship LLW off-site to any field organization for disposal.

Current Plans. According to the LLWDDD Strategic Plan, ORNL will eventually ship Class IV LLW off-site. When a site has been selected, ORNL will be able to comply with this requirement by using its historical data base and generator projections to estimate annual volumes of waste which will be sent off-site. This forecast will be submitted annually in the third quarter of the fiscal year to the field organization(s) managing the designated off-site disposal facility.

Schedules and Costs. Off-site shipment of Class IV LLW is scheduled to begin some time after 1992. An exact date has not been determined. The costs for implementing this requirement are not applicable at this time.

4.2.g.3 Approval for shipment from off-site receiving facility.

Evaluation of Requirement. This requirement is being met for any receiving facility currently used for management of ORNL LLW (e.g., off-site treatment facilities, ORNL disposal facilities) through the generator-prepared certification documents (i.e., Log-In Data Sheet, Request for Disposal form).

Current Plans. Improvements are planned for the certification program. As the WAC evolve, or as additional management facilities are used, the program will be changed as necessary.

Schedules and Costs. See Sect. 4.2.d.1.

4.2.g.4 Off-site shipments in compliance with labeling requirements of DOE Order 1540.1.

Evaluation of Requirement. ORNL currently transports LLW on a limited scale on public highways for storage in buildings at the ORGDP and to commercial vendors for compaction. All LLW shipments leaving ORNL for shipment on public highways meet all applicable DOT regulations and the labeling requirements specified in DOE Order 1540.1.

Current Plans. Continue current practice.

Schedules and Costs. ORNL is currently implementing this requirement and intends to do so in the foreseeable future. The cost associated with implementing this requirement are incurred by the generator.

4.2.h Long-Term Storage.

4.2.h.1 LLW shall be stored by appropriate methods to achieve the performance objectives stated in this Order.

Evaluation of Requirement. Currently ORNL is storing three categories of LLW on an interim basis. One type of waste is being stored in the K-25 building at the ORGDP. This waste consists of the clarifier dewatered sludge from the PWTP (Building 3544). This waste meets the WAC for storage at ORGDP. The second type of LLW being stored is greater than Class C waste. This waste is being stored retrievably in stainless steel wells in SWSA 5. The third type of LLW being stored is the EASC waste. This waste is being stored in concrete casks on a gravel pad located adjacent to the New Hydrofactory Facility.

Current Plans. Waste Management Systems performance assessments will need to be conducted on each of these storage facilities to determine if the performance objectives of this Order are being achieved. See Sect. 4.2.b.2.

Schedules and Costs. Over the next 5 years the costs for storing these waste streams is estimated to be \$400K. Facilities will need to be expanded for increasing storage capacity. The cost associated with these activities is estimated to be \$2,000K.

4.2.h.2 Maintenance of records for LLW in storage.

Evaluation of Requirement. Records are kept and accompany each waste package from generator to interim storage or final disposal. Depending on the final disposition of each waste package, two or three waste manifests are required. Waste packages designated for interim storage require three different waste manifests one designated specifically for storage. Records are kept on permanent file with ORNL Waste Management Operations office.

Current Plans. The existing hardware and software utilized in LLW record keeping will be upgraded.

Schedules and Costs. The costs associated with compliance to this requirement is incurred by the generator.

4.2.h.3 Documentation for development and operation of waste storage facility.

Evaluation of Requirement. The storage facilities referenced in Sect. 4.2.h.1 above do not have all of the documentation in place to meet this requirement.

Current Plans. Each storage facility will be assessed to determine what additional documentation will be necessary to prepare to meet the terms of this requirement.

Schedules and Costs. The assessment and preparation of the required documentation will occur over the next three years. The costs for preparation of the necessary documentation is estimated to be \$300K.

4.2.h.4 Storage to allow for nuclide decay.

Evaluation of Requirement. ORNL stores carcasses of animals in research programs to allow for nuclide decay at generator sites. After an appropriate length of time to allow for nuclide decay, the carcasses are shipped off-site for incineration.

Current Plans. In the future, ORNL may ship animal carcasses to the TSCA incinerator located at the ORGDP located on the ORR.

Schedules and Costs. The costs associated with shipping and incinerating animal carcasses using the TSCA incinerator are incurred by the generator.

4.2.i Disposal

4.2.i.1 Achieve performance objectives consistent with performance assessment.

Evaluation of Requirement. Performance assessments will be conducted on those portions of active disposal sites at ORNL operated after FY 1992. This will include the GCD concrete silo and auger hole areas. Performance assessments will also be conducted on the proposed IWMF in the southwest portion of SWSA 6 and the CIIDF proposed for siting in West Bear Creek Valley.

Current Plans. Upon completion of these performance assessments, evaluations will be conducted to determine if the disposal methods achieve the performance objectives stated in this Order. Those methods found to be unsuitable will be discontinued. The performance assessment for the CIIDF will be conducted as part of the EIS process covering the waste management strategy for the ORR. The EIS process will determine what disposal methods for LLW will achieve the stated performance objectives.

Schedules and Costs. Over the next three years, more development work in the design and construction of the GCD silos and auger holes will be required. Costs will require \$750K in expense and \$2,000K in capital funds.

4.2.i.2 Performance assessment model, engineered modifications, and specific waste classifications.

Evaluation of Requirement. The primary method for disposing of Class II waste generated at ORNL post FY 1991 will be above-grade tumulus disposal. Below-grade greater confinement concrete silos may be used for disposal for selected waste forms. These two methods for disposing of Class II waste on the ORR will be implemented according to a proposed strategy based on waste segregation and certification, site specific performance assessments, site selection, and alternative disposal technology demonstrations and assessments. To meet the stated performance objectives of this Order, engineered structures for the containment and disposal of Class II waste on the ORR is essential.

Current Plans. ORNL currently disposes of LLW using engineered structures for containment and disposal. The engineered structures provide varying degrees of success in meeting the performance objectives stated in this Order.

Schedules and Costs. See Sect. 4.2.e.2.

4.2.i3 Oversight and Peer Review Panel for consistency of performance assessments performed on DOE sites.

Evaluation of Requirement. The Oversight and Peer Review Panel for Low-Level Waste Disposal Performance Assessments has been selected. ORNL has a representative on this panel.

Current Plans. The Waste Management Section of the EHPD will be available to assist and respond to requests for information that will enhance the performance assessment process.

Schedules and Costs. The schedule for completing the performance assessments pertinent to existing and proposed ORNL disposal operations is presented under Sect. 4.2.b.1.

4.2.i4 Disposition of Greater than Class C waste as defined in 10 CFR 61.55.

Evaluation of Requirement. Disposal of Greater than Class C waste has not occurred since 1987. At this time, ORNL does not intend to dispose of Greater than Class C waste on the ORR. Since 1987, ORNL has placed all Greater than Class C waste in retrievable storage wells located in SWSA 5.

Current Plans. According to the LLWDDD Strategy, Greater than Class C waste is a subset of the Class IV waste category. The LLWDDD Strategy proposes to send Class IV waste off-site for final disposition starting sometime after 1992. Until a site becomes available, ORNL will retrievably store this waste. ORNL is currently planning to expand the retrievable storage well area in SWSA 5 as a contingency measure in the event that a site does not become available to receive Class IV waste by 1992.

Schedules and Costs. The stainless steel retrievable storage well area will be expanded in SWSA 5. The Class III/IV repackaging and retrievable storage facility are tentatively planned for construction. Preliminary estimates are in the range of \$25M. An estimated \$500K will be required for development design and planning.

4.2.i5 Improved stability of disposal site, package handling, improved health and safety protection of personnel.

Evaluation of Requirement. Cardboard or fiberboard boxes are not used to package or transport LLW at ORNL. Void spaces are minimized whenever possible or practical with due consideration to worker exposure. The WAC for LLW at ORNL expressly forbids the presence of free liquids, ignitable, corrosive, reactive wastes, toxic gases, and pyrophorics in all solid waste packages.

Current Plans. ORNL is in compliance with this requirement. ORNL continually reevaluates the WAC for LLW with respect to site stability, package handling, and worker safety.

Schedules and Costs. NDA/NDE techniques are used to monitor generator packages with respect to Sect. 4.2.e. These costs are incurred by the generator.

4.2.i.6 BRC as defined by Federal regulations.

Evaluation of Requirement. The EPA's Office of Radiation Programs is in the process of developing a standard which will delineate levels of radiation which are BRC. This standard is not expected to be promulgated until the early 1990s. ORNL's annual volume of LLW that may fall in the BRC class is estimated to be 10,000-20,000 ft³/year. This volume is small compared to the Y-12 projection of approximately 300,000 ft³.

Current Plans. Energy Systems has discussed the BRC concept with the TDHE and the EPA. The TDHE is receptive to the concept, but desires more information and time for assessment. Energy Systems is continuing to pursue this concept. A BRC disposal demonstration is planned by the LLWDDD Core Program and Y-12 using waste from Y-12.

Schedules and Costs. Costs for conducting this demonstration will be incurred by the LLWDDD Core Program. The demonstration is scheduled for initiation by October 1989. See Sect. 4.2.e.2.

4.2.i.7 Disposal site selection.

Evaluation of Requirement. Site selection criteria have been developed and applied in selecting sites on the ORR for the disposal of LLW (CIIDF site). Site selection on the ORR was performed in conjunction with planned waste confinement technologies. Sites selected for planned waste confinement technologies on the ORR were chosen based on hydrogeologic criteria that would assure protection of groundwater resources to meet the standard of 4 mrem whole body dose equivalent and organ dose equivalent. Site selection criteria include the potential for natural hazards such as floods, erosion, tornadoes, earthquakes, volcanoes, etc., and address impacts on current and projected populations, land use resource development plans, and nearby public facilities, accessibility to transportation routes and utilities, and the location of waste generators, certification and waste processing facilities.

Current Plans. Support will be provided to the ORR waste management EIS effort to ensure compliance with this requirement.

Schedules and Costs. The costs associated with this continued support is estimated to be \$200K over this and next year.

4.2.i.8 Disposal facility and disposal site design.

Evaluation of Requirement. Conceptual design criteria for proposed waste containment technologies were established prior to selection of new disposal sites on the ORR. Based on characterization data obtained from the proposed new sites, design criteria are modified if necessary to assure conformance with DOE policy and the requirements of this Order. The design criteria are based on projected waste volumes, waste characteristics, and desired facility and disposal site performance. Disposal units for proposed new disposal sites on the ORR have been designed consistent with disposal site hydrology, geology, and waste characteristics. The new proposed disposal unit designs and disposal sites will be evaluated in accordance with the NEPA.

Current Plans. A draft EIS is currently in preparation. This EIS will assess the impact of constructing new facilities to dispose of SLLW on the ORR, and will present the overall strategy for managing waste on the ORR.

Schedules and Costs. Project development for the IWMF and CIIDF will cost \$500K over the next two years. The estimated cost for the construction of the CIIDF and associated ancillary facilities is \$25,000K.

4.2.i.9 Disposal facility operations.

Evaluation of Requirement. Operating procedures are in place for active disposal operations at ORNL that are intended to protect the environment, health and safety of the public and facility personnel; ensure the security of the facility; and minimize the need for long-term control. The closure/post closure plan for SWSA 6 will be developed through the RI/FS process. ORNL does not mark disposal excavations with permanent identification markers, instead all disposal excavations are surveyed and the data kept in a permanent master file. Groundwater quality monitoring wells are marked with permanent identification markers. Operating procedures are in place and include training for disposal facility operating personnel, emergency response plans, and the reporting of unusual occurrences according to DOE Order 5000.3. A conscious effort is made at all times to place waste in disposal units in a manner that minimizes void space. Cement grouting of void space is used in many instances. Current waste disposal operations are conducted in a manner that prohibits the disturbance of inactive disposal units.

Current Plans. ORNL plans to discontinue the disposal of waste in excavations. Active disposal excavations will be closed under the requirements of RCRA Section 3004(u). Operating procedures and training programs will be upgraded. ORNL will continue to comply with the other stipulations of this requirement.

Schedules and Costs. ORNL will upgrade operating procedures and training programs over the next two years at an estimated costs of \$200K.

4.2.j Disposal Site Closure/Post Closure

4.2.j.1 Development of site-specific comprehensive closure plans.

Evaluation of Requirement. The first disposal site anticipated to be closed under this Order will be the IWMF tentatively to be constructed in the southwest portion of SWSA 6. The capacity of this proposed disposal site is expected to be depleted by 1997. Closure of this site is expected to commence shortly thereafter. The IWMF site will be closed in conjunction with RCRA 3004(u) (see Sect. 4.2.j.5). A preliminary closure/post closure strategy will be developed and evaluated, for the proposed Class II Disposal Facility to be located tentatively in Bear Creek Valley, as part of the EIS process which is currently being prepared on the proposed waste management activities at the ORR.

Current Plans. Closure/post closure plans will be developed for the Class II IWMF and the CIIDF during detailed facility design.

Schedules and Costs. A closure/post closure plan for the Class II IWMF will be developed during FY 1992. The cost of developing this plan is estimated to be \$250K. The Closure/Post Closure Plan for the CIIDF will require \$250K and will be prepared in FY 1994.

4.2.j.2 Residual radioactivity levels for surface soils.

Evaluation of Requirement. A committee has been formed consisting of personnel from the ORNL RAP and the DOE-ORO to develop ARARs for residual radioactivity levels in soils from remediation activities. These residual radioactivity levels for soils will either meet or be set below existing DOE requirements.

Current Plans. Continue to develop ARARs for residual radioactivity levels in soils. Incorporate residual radioactivity requirements in development of closure plans under requirement j. (1).

Schedules and Costs. See Sect. 4.2.j.1.

4.2.j.3 Application of corrective measures to attain performance objectives.

Evaluation of Requirement. Maintenance and surveillance, and performance monitoring systems are in place to determine if corrective measures are required for disposal sites or individual units. Corrective measures are being planned for active GCD silo unit operations.

Current Plans. Implement corrective actions for SWSA 6 GCD silos and other disposal units as required.

Schedules and Costs. The corrective actions for the SWSA 6 GCD silos will be completed by FY 1992 at an estimated cost of \$2,000K.

4.2.j.4 Inactive disposal facilities, sites, and units.

Evaluation of Requirement. The three primary regulatory statutes that apply to remediation activities at ORNL are the NEPA, the CERCLA, including the SARA, and the RCRA, including the HSWA of 1984. EPA Region IV elected to enforce requirements for remedial actions at ORNL through its RCRA Corrective Action authority.

Current Plans. Continue to comply with RCRA, CERCLA, and NEPA requirements for remedial activities at ORNL.

Schedules and Costs. Schedules and costs related to ORNL remedial action activities are controlled by RAP and are not included within the scope of this Implementation Plan.

4.2.j.5 Review of closure plans by appropriate field organization.

Evaluation of Requirement. DOE-ORO currently reviews and must give approval to all documentation related to remediation or closure activities affecting inactive, active, or new disposal facilities, sites, and units.

Current Plans. Continue current practice.

Schedules and Costs. See Sect. 4.2.j.1.

4.2.j.6 Termination of monitoring and maintenance activity.

Evaluation of Requirement. ORNL does not have final approved closure/post closure plans for any of its disposal facilities, sites, or units. The discontinuance of any monitoring, and maintenance and surveillance activities for closed facilities, sites, or units will be in conformance with existing DOE and other applicable regulatory requirements.

Current Plans. See Evaluation of Requirement for Sect. 4.2.j.1 above.

Schedules and Costs. See Sect. 4.2.j.1.

4.2.k Environmental Monitoring

4.2.k.1 LLW TSD facilities monitored in conformance with DOE Orders 5481.1 and 5820.2A, Chapter III, paragraphs 3k. (2-4).

Evaluation of Requirement. Various environmental programs at ORNL monitor the performance of operational LLW TSD facilities to conform with DOE Order 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements, and meet the requirements of paragraphs 3k. (2-4). All TSD facilities becoming operational after September 1988 shall have monitoring programs meeting the requirements of this Order.

For the purpose of this section of the Order, environmental monitoring programs can be broadly classified within two groups: operational facility monitoring and post-5820.2A non-operational monitoring. Most of the presently operational storage and disposal facilities have specific monitoring program designed to meet the requirements of paragraphs 3k. (2-4); those facilities that do not have adequate monitoring are being evaluated and monitoring programs should be in place by 1991 if funding is provided. A general environmental monitoring program conducted at ORNL provides substantial sampling and monitoring support to facilities with and without specific monitoring programs. TSDs which become non-operational after implementation of this Order will have specific programs designed for them in conjunction with the general monitoring program.

Current Plans. The entire environmental monitoring program at ORNL is undergoing review and will culminate in a revised EMP meeting the requirements of DOE Order 5400.xy, Radiological Effluent Monitoring and Environmental Surveillance. The revised EMP will cover all activities at ORNL, not just those related to LLW TSD. The revised EMP and its associated program will coordinate all environmental monitoring and surveillance activities at ORNL to: (1) assure compliance with all Federal, State, and DOE requirements for the prevention, control, and abatement of environmental pollution, (2) assess facility performance, (3) monitor the adequacy of containment and effluent controls, and (4) assess impacts of releases from ORNL facilities on the environment. As a result, ORNL's plan for compliance with 5400.xy implicitly ensures compliance with the environmental monitoring requirements of DOE Order 5820.2A. A draft EMP is planned for issuance in late 1989, with the final EMP issued in 1990 and its associated program in place 1990-1991. All TSD facilities becoming operational and non-operational after September 1988 shall have monitoring programs meeting the requirements of this Order.

Schedules and Costs. The proposed schedule for issuance of a draft revised EMP is late 1989. Costs for implementing the plans and strategies called for in the EMP are estimated to require \$2,000K in expense and \$2,000K in capital funds. Full compliance will be achieved by FY 1994.

4.2.k2 Environmental monitoring program features

Evaluation of Requirement. Most TSD units have monitoring programs to measure unit performance. These programs are designed to detect and measure effluent releases, radionuclide migration, and changes in the disposal facility/site parameters which may affect performance. Trench disposal is no longer used at ORNL for radioactive waste disposal; therefore, disposal unit subsidence of post-5820.2A trenches is not an issue. However, when tumulus facilities are closed they will be inspected for, among other things, cap integrity. TSDs that do not have monitoring programs designed to measure the four items specified in this requirement will undergo evaluation in 1989-1990 and, where deficiencies are noted, should have adequate programs in 1991 if funding is provided.

Current Plans. See Current Plans in Sect. 4.2.k.1.

Schedules and Costs. See Schedules and Costs in Sect. 4.2.k.1.

4.2.k3 Environmental media that may be monitored for all TSD facilities.

Evaluation of Requirement. Present environmental monitoring programs evaluate pre-operational facility characteristics to determine monitoring requirements. After reaching operational status, a facility's monitoring program is periodically evaluated for its effectiveness and revised as necessary. Monitoring programs for non-operational facilities may include monitoring surface water, groundwater, soil, and other media as appropriate.

Current Plans. An extensive review of all monitoring programs is being conducted for compliance with draft DOE Order 5400.xy. The review includes an exposure pathway analysis of each site effluent to determine the need for and scope of environmental monitoring and surveillance. Based on the results of the analyses, programs will be revised, if needed, to incorporate new requirements. All new facilities will be evaluated to determine the types and quantities of effluents to be expected from the facility and to establish the associated environmental surveillance program.

Schedules and Costs. See Schedules and Costs in Sect. 4.2.k.1.

4.2.k.4 Performance trends, ascertain whether effluents meet DOE Order 5400.3 requirements

Evaluation of Requirement. The monitoring programs for operating TSD facilities are designed to provide early detection of changes in facility performance so that corrective actions may be undertaken before performance objectives are exceeded. Monitoring data and sampling results from both facility specific and the general monitoring program are evaluated to assess facility performance, determine the need for corrective action, and evaluate compliance with applicable EH orders.

Current Plans. An evaluation of the early detection capabilities of TSD facility monitoring programs is included in the general review of monitoring programs being carried out for DOE Order 5400.xy. The coordinated monitoring program being developed will provide early warning of changes in TSD facility performance and will enable ascertaining whether or not effluents from each facility meet the requirements of applicable EH orders. All new TSD facilities shall have monitoring programs meeting this requirement.

Schedules and Costs. See Schedules and Costs in Sect. 4.2.k.1.

4.2.1 Quality Assurance

4.2.1.1 Quality assurance, DOE Order 5700.6B, and ANSI/ASME NQA-1.

Evaluation of Requirement. All LLW operations are to be conducted in accordance with the applicable requirements of ANSI/ASME NQA-1 as mandated by DOE Order 5700.6B. The requirements and responsibilities for implementation of the ORNL QA program are defined in the ORNL QA Manual. QA requirements are mandated from the Martin Marietta Energy Systems, Inc., Policy Procedure GP-5 to the Energy Systems QA Manual and ultimately to the ORNL QA Manual. Specific QA plans are written for the design, construction, and operation of new TSD facilities for LLW in accordance with the requirements of the ORNL QA Program.

Current Plans. A QA Program has been developed for the EHPD containing procedures which fully implement the requirements of the ORNL QA Program. The EHPD QA manuals were issued to personnel engaged in LLW activities during February of this year. Efforts will continue to bring LLW waste management activities into compliance. New facilities will be brought on-line with NQA-1 QA programs in place.

Schedules and Costs. Over the next eight years several facilities will be designed, constructed, and operated for the stabilization, storage, disposal and certification of LLW. QA plans will be required for the design, construction, and the operation of these facilities. The estimated cost for preparing these documents is \$800K. The sustained effort to maintain compliance with these QA standards will add an ongoing substantial increment to the base operating costs.

4.2.m Records and Reports

4.2.m.1 Record keeping system requirements.

Evaluation of Requirement. ORNL's current record keeping system maintains a historical record of waste generated, treated, stored, disposed of, and shipped, based on data from waste manifests. The waste manifest is used to determine proper classification, treatment, storage, shipment, and/or final disposition of the waste.

Current Plans. Improvements to the record keeping procedures are planned for information retrieval and data reliability.

Schedules and Costs. Improvements to the record keeping procedures will occur during FY 1990 and FY 1991. These improvements include the purchase of new computers and the establishment of an improved data management control system. The costs for these improvements is estimated to require \$500K in expense and \$400K in capital funds.

4.2.m.2 Waste Manifest.

Evaluation of Requirement. Records are kept and accompany each waste package from generator to final disposal. The common manifest for all waste packages include entries for the chemical and physical characteristics of the waste, the quantities of each major radionuclide present, the volume, and other data pertinent for the proper handling and disposal of the waste package. All waste manifests are kept in a permanent file. ORNL WAC do not allow for the addition of absorbent media. The volume of any solidification media used is included in the total volume of the waste package. The weight of the waste package is not a required entry for any of the manifests. Guidelines are provided in the WAC for maximum permissible weights depending on the waste package used. Waste packages to be examined using NDA/NDE techniques are weighed due to weight limitations on the assay equipment and for worker safety.

Current Plans. Modifications to the waste manifest may be made in the future. The waste manifests will at a minimum will have entries for the information requested in this requirement.

Schedules and Costs. Costs related to modifying the existing waste manifests will be minimal. See Sect. 4.2.d.1.

Table 6. Implementation summary for management of low-level waste

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
a. Performance Objectives					
(1) Compliance Status to be Determined	Implementing new LLW disposal strategy to protect public health and safety according to applicable EH Orders and other DOE Orders.	Satisfy this requirement as part of a. (2-4), and b. (1-3) below. Continue LLWDDD Program Management Support (5 years).	a b	a 3,300K	a c
(2) Compliance Status to be Determined	d	a	a	a	a
(3) Compliance Status Uncertain	Status of present waste disposal practices with regard to inadvertent intruder is unknown at this time.	e	e	e	e
(4) Compliance Status to be Determined	d	Future LLW disposal facilities are currently being designed to meet this requirement.	f	f	f
b. Performance Assessment					
(1) Noncompliance	Active operations in SWSA 6 will be phased out by FY 1992 except as noted.	Perform performance assessments on future (FY 1992) LLW disposal facilities to demonstrate compliance with this requirement.	FY 1994	500K	c
		Continue LLWDDD Program performance assessment activities (5 years).	b	3,800K	c
(2) Noncompliance	Waste management systems performance assessment has not been performed for the ORNL.	Waste management systems performance assessments will be conducted by LLWDDD Core Program for the ORR, which will include ORNL.	FY 1991	500K	c
		Continue LLWDDD Program Waste Management Systems facility assessment (5 years).	b	2,850K	c
(3) Partial Compliance	Monitoring of facility and disposal site performance is presently performed on a reconnaissance level.	Evaluate monitoring data from Tumulus operations in SWSA 6 to evaluate facility performance. Detailed monitoring data will be gathered for the GCD silo area that will remain operational post FY 1992.	FY 1992	150K	c

*See b. (1-2).

*TBD.

*Not applicable.

*See a. (1).

*See b. (1).

*See b. (1-3).

Table 6. Implementation summary for management of low-level waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
c: Waste Generation					
(1) Partial Compliance	Waste minimization program has been initiated.	A waste minimization coordinator has been established for ORNL and program implementation is underway. A waste minimization plan for generators will be developed in FY 1989 in accordance with DOE Order 5400.1. Additional emphasis will be given to LLW minimization at the source.	FY 1994	500K	c
(2) Partial Compliance	Incentives provided through charge-back program, minimization results reported and published.	g	g	g	g
(3) Partial Compliance	Incentive for waste segregation provided through cost differential for disposal of LLW versus uncontaminated waste. Some suspect waste generated.	Continue current practice. Suspect waste category to be eliminated.	FY 1991	300K	c
(4) Partial Compliance	Waste Management Plan required for all new waste generating projects. Waste minimization must be addressed.	g	g	g	g
d. Waste Characterization					
(1) Partial Compliance	Current certification program relies heavily on generator estimates and administrative or process controls.	Future program will bring waste characterization and certification program into full compliance.	FY 1994	1,500K	2,000K
(2) Partial Compliance	Waste manifests currently used contain entries for characterization data cited in this requirement, except for radionuclide concentration data.	Improve current practice and record keeping procedures.	FY 1990	50K	c
(3) Noncompliance	Diversity and inconstancy in radionuclide concentrations in ORNL waste streams find indirect methods of limited value.	Demonstrations underway and planned to assess applicability of direct and indirect measurement techniques.	h	h	h

^aSee c. (1).^bSee d. (1).

Table 6. Implementation summary for management of low-level waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
e. Waste Acceptance Criteria					
(1) Compliance	ORNL does not routinely receive LLW from off-site nor does ORNL ship LLW off-site for disposal at the present time.	Future planning for shipment of waste off-site will ensure compliance with this requirement.	c	c	c
(2) Partial Compliance	Preliminary WAC have been established for most existing and proposed LLW TSD facilities.	Finalize WAC for all existing and proposed LLW TSD facilities and submit to DOE-ORO	FY 1992	150K	c
		Continue LLWDDD Program WAC/waste certification activities (5 years).	b	2,150K	c
(3) Partial Compliance	Certification program assures conformance with current WAC through administrative controls and NDA/NDE techniques. However, modifications to the program and development of measurement techniques are necessary to meet WAC for LLWDDD waste classes.	h	h	h	h
(4) Compliance	ORNL waste generators are subject to routine audits from waste management operations staff through the use of RTR system, waste manifests approvals, and periodic formal QA audits.	Continue current practice.	c	c	c
(5) Partial Compliance	Specific concentrations of radioisotopes will be determined through NEPA process; otherwise ORNL is in compliance with this requirement.	i	i	i	i
f. Waste Treatment					
(1) Partial Compliance	LLW is compacted to achieve volume reduction and greater stability and grouted to prevent contact with water and to increase stability.	Implement improved waste treatment methods (i.e., grout stabilization and sludge drying) once final WAC are established.	FY 1994	750K	4,000K
(2) Partial Compliance	Cement grouting, compaction, and super compaction will be used to achieve waste form stability and improve long-term facility performance.	j	j	j	j
(3) Compliance	ORNL currently has no plans for constructing large-scale waste treatment facilities.	c	c	c	c
(4) Partial Compliance	See f. (1 and 3) above. Before any facility, handling LLW, is permitted to initiate operation, required documentation must be in place and approved.	Continue current practice as required. Develop required documentation.	FY 1994	100K	c

¹See e. (2).

²See f. (1).

Table 6. Implementation summary for management of low-level waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
g. Shipment					
(1) Partial Compliance	ORNL currently does not ship LLW off-site for disposal.	Class IV LLW will eventually be shipped for off-site disposal and plans and procedures put in place for implementing those future shipments in compliance with this Order.	FY 1992	250K	c
(2) Partial Compliance	Shipment forecast will be provided as part of the annual ORNL Waste Management Plan development.	Annual forecast will be provided as required.	FY 1989	c	c
(3) Partial Compliance	Before ORNL ships any waste off-site for processing or storage, advanced approval is obtained and WAC are met.	h	FY 1992	h	h
(4) Compliance	Ship LLW within ORR on public highways for interim storage. ORNL is in compliance with all applicable DOT and DOE regulations.	Continue to meet all applicable DOT and DOE regulations for shipping LLW on-site. For future off-site shipments, labeling requests will be met as part of g. (1).	FY 1989	c	c
h. Long-Term Storage					
(1) Partial Compliance	Store LLW <50 mrem/h on contact at ORGDP on interim basis. Store Class C waste retrievably in SWSA 5. EASC waste is stored on an interim basis. Mixed waste is stored in RCRA-permitted facilities.	Each storage facility in use will be assessed in terms of the performance objectives stated in this Order in the Waste Management Systems PA. New facilities development will be provided to meet the performance objectives.	FY 1994	400K	2,000K
(2) Compliance	Waste manifests accompany each LLW package and are kept on permanent file.	Continue current practice for all future storage operations.	c	c	c
(3) Partial Compliance	Documentation is in place for most of the existing storage facilities, although required scope and rigor is below current standards.	Upgrades to existing documentation will be provided as part of ongoing improvements to the waste management system. New facilities documentation needs will be met under h. (1).	FY 1992	300K	c
(4) Compliance	Store limited volumes of biological waste to allow for nuclide decay.	Continue current practice.	c	c	c

Table 6. Implementation summary for management of low-level waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
i. Disposal					
(1) Partial Compliance	Dispose of LLW using above-grade and below-grade technologies. Performance monitoring indicates above-grade technology achieving performance objectives; below-grade uncertain.	Performance assessments will be conducted for each disposal technology currently in use or planned for use in SWSA 6 after FY 1992. New disposal facilities will be developed and implemented to meet the performance criteria.	FY 1992	750K	2,000K
(2) Partial Compliance	Engineered GCD above- and below-grade technologies used for disposal of LLW.	LLW classification limits will be determined for the CIIDF during the EIS process for waste management strategies on the ORR for the Class II IWMF as addressed in i. (1) above.	FY 1992	i	i
		Continue LLWDDD Program facility development and integration activities (5 years).	b	1,450K	c
(3) Compliance	ORNL has a representative on Oversight and Peer Review Panel.	A performance assessment team has been formed which has the responsibility for conducting performance assessments for all DOE-ORO sites.	FY 1989	e	e
(4) Partial Compliance	Store greater-than-Class C waste on-site in retrievable stainless steel wells.	Stainless steel retrievable storage well area will be expanded in SWSA 5. Class III/IV Repackaging and Bulk Retrievable Storage Facilities are tentatively planned for construction.	FY 1994	500K	25,000K
(5) Compliance	Additional disposal requirements are currently in practice.	Requirements will be included in final WAC being developed under e. (2).	FY 1992	i	i
(6) f	BRC waste has not been officially defined by Federal regulations. Suspect landfill operations is most applicable area.	Continue to pursue BRC concept with TDHE. Support Y-12 lead in BRC issue.	FY 1992	i	i
(7) Partial Compliance	A site for the proposed CIIDF is being selected in conformance with this requirement as part of the ORR waste management EIS.	Support will be provided to the ORR Waste Management EIS effort to ensure compliance with this requirement.	FY 1990	200K	c
		Continue LLWDDD Program support for the ORR waste management EIS.	FY 1991	750K	c
(8) Partial Compliance	The proposed facilities and site design for the CIIDF and IWMF are being selected in conformance with this requirement.	Plan and construct IWMF and CIIDF in accordance with this requirement.	FY 1996	500K	25,000K
(9) Partial Compliance	Operation of disposal facilities are generally in compliance with this requirement, although improvements need to be made in administrative controls.	Discontinue disposal of LLW in excavations. Upgrade operations procedures and training programs.	FY 1991	200K	c

Table 6. Implementation summary for management of low-level waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
j. Disposal Site Closure/Post Closure					
(1) Partial Compliance	Closure/post closure plans have not been developed for the active areas of SWSA 6, the Class II IWMF, or the proposed CIIDF.	Closure/post closure plans will be developed for active areas in SWSA 6 and Class II IWMF under RCRA 3004(u); CIIDF closure plan will be prepared at time of detailed facility design.	FY 1992 (IWMF) FY 1994 (CIIDF)	250K 250K	c c
(2) Partial Compliance	Residual radioactivity levels are considered in closure planning for inactive portions of SWSA 6 and will be considered for the rest of the site in compliance with this requirement.	Incorporate residual radioactivity requirements in development of closure plans under j. (1).	FY 1994	k	k
(3) Partial Compliance	Maintenance and surveillance, and performance monitoring systems in place to determine if corrective measures are required for disposal sites or individual units. Corrective actions for current GCD silos are being planned for near-term implementation.	Implement corrective actions for SWSA 6 GCD silos and other disposal units, as required.	FY 1992	2,000K	c
(4) Compliance	The EPA has elected to enforce regulatory requirements for remedial response activities to inactive disposal facilities, sites, and units through RCRA 3004(u).	Inactive site closure and post-closure care is provided through the DOE Energy Research Program.	FY 1989	c	c
(5) Partial Compliance	Existing protocol requires that all closure plans for inactive, active, and new LLW disposal facilities be reviewed by DOE-ORO.	Continue current practice.	FY 1994	k	k
(6) Compliance	This requirement will be included as part of closure/post closure plans for existing and new disposal sites and facilities.	Continue current practice.	k	k	k

^tSee j. (1).

Table 6. Implementation summary for management of low-level waste (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
k. Environmental Monitoring					
(1) Partial Compliance	ORNL LLW TSD operational facilities have environmental monitoring programs that provide adequate control over environmental releases. Improvements to this program must be made, however, to conform to DOE Order 5484.1, k. (2-4) of this Order, and the recently issued DOE Order 5400.1.	Entire environmental monitoring program undergoing review. Will eventually come into compliance with DOE Order 5400.1 and requirements of this Order.	FY 1994	2,000K	2,000K
(2) Partial Compliance	Majority of LLW TSD operational facilities have environmental programs that assess effluent releases, radionuclide migration, and changes affecting long-term performance.	l	FY 1994	l	l
(3) Partial Compliance	Preoperational monitoring determines operational monitoring requirements. Operational monitoring status reevaluated on periodic basis.	l	FY 1994	l	l
(4) Partial Compliance	Majority of LLW TSD operational facilities have environmental monitoring programs designed to detect significant changes that may compromise performance so corrective actions may be implemented.	l	FY 1994	l	l
l. Quality Assurance					
(1) Partial Compliance	LLW management activities are being performed under an active QA program. However, significant upgrades to this program must be made in accordance with applicable elements of ANSI/ASME NQA-1 and DOE Order 5700.6B.	Continue to bring all LLW waste management activities into compliance. New facilities will be brought on-line with NQA-1 QA programs in-place.	FY 1994	800K	c
m. Records and Reports					
(1) Partial Compliance	ORNL maintains a record keeping system that documents waste was properly classified, treated, stored, shipped, or disposed of.	Upgrade data system to increase reliability and retrievability of data.	FY 1992	500K	400K
(2) Partial Compliance	Waste manifests accompany all waste packages from initial generation to final disposition and contain the information necessary to determine adherence with WAC for TSD activities.	Improved manifest will be developed to conform with new WAC and data base management requirements.	FY 1990	h	h
TOTALS			FY 1994	27,800K	63,000K

See k. (1).

See d. (2).

4.3. SUMMARY FOR LLW COMPLIANCE

There are 53 requirements in this Order pertaining to the management activities affecting LLW. ORNL is in noncompliance with three requirements and in partial compliance with 35 requirements. Five requirements were determined to be not applicable to present LLW management activities but may become applicable in the future. ORNL is in full compliance with 10 requirements. ORNL's goal is to achieve full compliance with this Order by FY 1994. In order to accomplish this significant costs will be incurred. Current estimates will require a funding level of \$32M in expense funds over the next five years. This total includes \$14M funding level for the LLWDDD Program. Many activities are planned for managing LLW waste that extend beyond FY 1994. To implement these activities an additional \$59M will be required at a minimum. These projected costs do not include those costs incurred to support routine waste management operations. These costs are incurred by the waste generators.

As stated above, the compliance status of LLW management under this Order is complex. This Order was promulgated during a transition period at ORNL. The LLWDDD Strategy being implemented gradually phases out crude SLB disposal practices, replacing them with disposal techniques designed for specific waste categories developed using site specific dose-based performance objectives. The DOE-ORO is also preparing an EIS on proposed waste management activities on the ORR. During the NEPA process, the entire LLWDDD Strategy will be reviewed and evaluated. If major shifts in strategy result from this NEPA process, significant impacts on schedules and costs for managing LLW on the ORR may occur.

In response to this Order, over the next several years ORNL will be conducting performance assessments for current and planned disposal operations. In addition, waste management systems performance assessments will be performed for ORNL facilities. Results from these studies will be evaluated in terms of performance objectives established by this Order and the LLWDDD Strategy. Waste minimization, characterization, and the refinement of WAC have been given priority attention at ORNL. Implementation of the LLWDDD Strategy will mandate that waste streams be characterized in a more quantitative manner. The increased costs of waste disposal have provided an incentive for minimizing waste. WAC are continually being honed and refined.

Waste treatment at ORNL is performed to achieve volume reduction, increase waste stability, and prevent contact with water. ORNL does not currently ship waste off-site for disposal, but may do so in the future. ORNL does ship waste off-site occasionally for treatment (compaction). When LLW is transported over public highways, the waste is shipped according to all applicable DOT, DOE, other Federal, State, and local regulations. Limited quantities of easily certifiable LLW (<50 mrem/h) is currently being stored at the ORGDP. Permanent disposal of this waste will occur sometime after 1997 when the proposed CIIDF becomes operational.

To achieve compliance with this Order, many facilities will need to be developed or modified. A complete listing of these facility development activities is given in Table 3.

Disposal Site Closure/Post Closure of SWSA 6, ORNL's only currently active LLW disposal site, will be conducted by the ORNL RAP under the requirements of RCRA, Section 3004(u). The entire environmental monitoring program at ORNL is currently undergoing review and will eventually culminate with a revised Environmental Monitoring Plan to meet the requirements of draft DOE Order 5400.xy, Radiological Effluent Monitoring and Environmental Surveillance.

ORNL uses waste manifests to document the classification, treatment, storage, and disposal of waste. Data from the waste manifests are maintained permanently. LLW operations are being reviewed for conformance with the applicable requirements of ANSI/ASME NQA-1, as mandated by DOE Order 5700.6B.

5.0 MANAGEMENT OF WASTE CONTAINING NATURALLY OCCURRING AND ACCELERATOR PRODUCED RADIOACTIVE MATERIAL

5.1 BACKGROUND

On an annual basis, ORNL generates extremely small volumes of waste containing naturally occurring and accelerator produced radioactive materials. Past and current waste management practices do not differentiate this waste from LLW. According to this Order, small volumes of waste of this type may be managed as LLW in accordance with the requirements of this Order for the management of LLW. ORNL intends to continue this practice. Mixed waste that contains radioactive materials in this category is managed in a manner that complies with RCRA.

6.0 MANAGEMENT OF DECOMMISSIONING OF RADIOACTIVELY CONTAMINATED FACILITIES

6.1 BACKGROUND

The SFMP was established at ORNL in 1976 in order to provide collective management of all of the surplus sites under ORNL control on the ORR. The program originally contained both civilian- and defense-related facilities and was administered by the SFMP Office in Richland, Washington, through the DOE-ORO. In 1986, the administration of the civilian program was assumed by DOE-HQ and retained the SFMP identification. The defense surplus facilities program continues to be administered through DOE-Richland Operations Office and has assumed the DFDP title to differentiate it from its civilian counterpart. Both programs continue to be coordinated through DOE-ORO and are managed by the ORNL RAP in the EHPD.

The SCFP was organized during the second half of FY 1985 to encompass the needs of surplus contaminated facilities at ORNL which were not part of the national SFMP. The SFMP and DFDP have not excepted facilities which have been removed from service since 1976. The need existed for a companion program which would include Energy Research facilities and those which were utilized by several programs within the Laboratory. The SCFP currently manages 24 facilities under this program.

The SCMP includes a large number of sites, many of which have been out of service for a number of years. The program includes a number of sites currently active which will be designated surplus sites in the near term. The total number of sites managed by this program is 86, 75 of which are inactive. Almost all of these sites are physical sites which will be remediated under the RAP. Only a small number (four) are facilities that will require decontamination and decommissioning activities.

6.2 5820.2A REQUIREMENTS FOR THE DECOMMISSIONING OF RADIOACTIVELY CONTAMINATED FACILITIES

6.2.a General

6.2.a.1 Prepare a list of contaminated facilities; record jurisdictional program responsibility.

Evaluation of Requirement. At the present time, ORNL does not have a single, complete, list of both operational and excess contaminated facilities. Similarly, a single continuous record of program responsibility for all contaminated facilities at ORNL has not been developed.

However, all of the major radioactive operations within the Laboratory and related facilities are maintained on file and periodically reviewed by designated committees under the direction of the Laboratory Director and Office of Operational Safety. These committees include the Radioactive Operations Committee, Reactor Operations Review Committee, Reactor Experiments Review Committee, Criticality Review Committee, and the Accelerators and Radiation Sources Review Committee. Similarly, surplus contaminated facilities currently managed as part of the ORNL RAP are also maintained on file. Facilities in this latter category which have already been accepted by the NE SFMP or the DP DFDP have their jurisdictional program responsibility documented and accepted by the respective DOE programs. In addition, a memorandum of agreement has been developed and approved by the DP, NE, and ER programs which designates responsibility for most other remedial action sites currently in existence at ORNL.

Current Plans. For the current list of excess contaminated facilities, existing documentation adequately meets the requirement of designating jurisdictional program responsibility. No further actions are required in this area.

For operational facilities, files maintained by the respective review committees list all other contaminated facilities of significance. In order to address the aspect of program responsibility, members of the ORNL RAP will work with the Office of Operational Safety to obtain information regarding programmatic responsibility in the normal course of future reviews. This will provide jurisdictional information from this point forward which will become a normal part of active files on all operational contaminated facilities.

As operational facilities are declared surplus, additional historical information will be obtained as necessary to supplement on-file data concerning programmatic responsibility. There are currently no plans to obtain historical association of operational facilities until they are declared surplus.

These plans are deemed to be the most reasonable approach to meet this requirement. Additional data-gathering exercises for the sake of maintaining a facility responsibility data base are judged to be not cost effective.

Schedules and Costs. The mechanism to acquire present-day program responsibility information through periodic reviews of operational contaminated facilities will be established by the end of FY 1989.

6.2.a.2 Maintenance of operational records for all contaminated facilities.

Evaluation of Requirement. Operational records are maintained by the respective functional support organizations at ORNL. For example, facility design drawings and modifications are maintained on file at the Energy Systems Engineering Records center. As-built drawings are maintained as either original tracing drawings or on microfiche. These records are not however, totally inclusive of all modifications which could have been made at a facility since its construction. In many cases, design support groups exist in the field serving a particular facility or complex and may design and implement facility modifications without having input those changes on the original drawings on file with Energy Systems Engineering.

In the area of radiological characterization data and prior decontamination activities, field survey data for particular facilities are maintained on file as hard copy by the respective facility health physicist. Work environment surveys are stored in this manner for 1 year, then transferred to the ORGDP computer center and archived as magnetic files. However, incidental or casual survey data from a given facility would not necessarily be stored in this manner. Further, all available data for any given facility would not constitute a complete radiological characterization of the type needed to prepare decommissioning plans.

As required by DOE Order 5000.3, Unusual Occurrence Reports are developed when unusual or unplanned events occur which have programmatic significance such that the performance, reliability, or safety of a facility is adversely affected. These reports are maintained on file by the ORNL Office of Operational Safety which is also responsible for the further dissemination of information to DOE and other Energy Systems facilities.

All of the above information is maintained by the respective offices and functional support groups within ORNL. At the time of facility acceptance into a decommissioning program, all available information is obtained and reviewed for planning maintenance and surveillance. In the initial stages of a decommissioning project for a specific facility, this and other pertinent information is compiled and maintained at a central file point which would typically be the project manager responsible for the decommissioning project. This information is then used to formulate decommissioning project plans, characterization plans, request for proposals from decommissioning subcontractors, and other plans as required to meet the scope and need of the project.

Current Plans. As described above, ORNL is in compliance with this requirement to maintain pertinent operational records for future use in preparing decommissioning plans. No additional activities are planned to meet this requirement.

Schedules and Costs. No additional costs are anticipated.

6.2.a.3 Planning for facility decommissioning.

Evaluation of Requirement. Inclusion of decommissioning requirements in the design of new facilities is addressed more fully under Sect. 6.2.b.

In the past, planning for decommissioning of existing operational facilities has been given only minimal consideration prior to their shutdown. Typically the curtailment of funded research and development activities and other radioactive operations has resulted largely in abandonment of contaminated facilities. Only the most essential steps of placing a facility in a safe shutdown condition in preparation for decommissioning have been taken, and the resulting facility conditions often require significant and sometimes increasing levels of surveillance and maintenance to ensure adequate containment. Historically, the post-operation period prior to decommissioning extends much beyond the 2-year budget cycle, and considerable resources are required for maintenance and surveillance support for facilities left in such conditions.

More recently, increasing attention and scrutiny are being placed on activities associated with the shutdown of contaminated facilities. Requirements for acceptance of contaminated facilities into the DP and NE decommissioning programs (see Sect. 6.2.a.6) clearly define minimal safe standards of shutdown that must be met in order for the NE or DP decommissioning programs to accept responsibility for continued management of the facility. The ORNL RAP serving as the site installation agent for these national programs works with the current owner-organization to ensure these steps are taken prior to application for acceptance by a decommissioning sponsor. For large or special case facilities where subjective interpretation of criteria may enter the process, the ORNL Facilities Safety Manager is formally requested to participate in the definition of activities required for safe shutdown prior to decommissioning.

Current Plans. The activities described above and in the referenced sections of this document indicate the extent to which ORNL is in compliance with this requirement. No specific actions other than those described in Sects. 6.2.a.6 and 6.2.b. are planned.

Schedules and Costs. See Sects 6.2.a.6 and 6.2.b.

6.2.a.4 Placing inactive facilities in a safe storage condition and providing maintenance and surveillance.

Evaluation of Requirement. ORNL is in compliance with this requirement. Inactive facilities at ORNL have been identified to the extent feasible. Facilities which have obvious program ties have been identified for acceptance by the appropriate DFDP, the SFMP, or the Environmental Compliance area of the Energy Research funded ORNL RAP. Multi-program facilities have been initially assigned to the ORNL Landlord, Office of Energy Research, awaiting further definition. This definition is made on the basis of historical use, subject to the availability of such information. The ultimate responsibility for inactive facilities has then been documented in a Memorandum of Agreement between the Office of DP, Office of Nuclear Energy, and the Office of Energy Research. Although modifications to this agreement will continue to occur, it represents a framework within which ORNL facility responsibility can be refined.

Current Plans. ORNL is currently revising its planning base to reflect the above agreements. The ORNL Maintenance and Surveillance Plan has been modified and updated during FY 1989 to reflect changes in program responsibility. Plans are in place to update the Facility Decommissioning Long-Range Plan to produce two program-specific documents. The DP portion of the plan will be completed during FY 1989, and the NE portion of the plan will be updated in FY 1990. Additional facility agreements will be incorporated as they are defined and as facilities are accepted into the respective programs.

Schedules and Costs. Agreements are currently in place on all facilities within the ORNL Surplus Facilities Programs. Additional agreements will be completed as necessary with the deactivation of new facilities. Updating of planning documents, as outlined above, will occur during the period from FY 1989 to FY 1990. No specific costs for implementation of this requirement of the Order are anticipated above those already planned as part of routine program management.

6.2.a.5 Transfer of responsibility from one program organization to another.

Evaluation of Requirement. ORNL is in compliance with this requirement. Responsibility for inactive facilities has been the subject of substantial negotiations between the Office of Defense Programs, Office of Nuclear Energy, and the Office of Energy Research during 1988 and 1989. A Memorandum of Agreement has been signed which delineates responsibilities between the subject three offices of HQ with respect to identified facilities. Other specific agreements have also been developed which define specific transfers of responsibility and the terms and conditions of these transfers.

Current Plans. ORNL is currently revising its planning base to reflect the above agreements. The ORNL Maintenance and Surveillance Plan has been modified and updated during FY 1989 to reflect changes in program responsibility. Plans are in place to update the Facility Decommissioning Long-Range Plan to produce two program-specific documents. The DP portion of the plan will be completed during FY 1989, and the NE portion of the plan will be updated in FY 1990. Additional facility agreements will be incorporated as they are defined and as facilities are accepted into the respective programs.

Schedules and Costs. Agreements are currently in place on all facilities within the ORNL Surplus Facilities Program. Additional agreements will be completed as necessary with the deactivation of new facilities. Updating of planning documents, as outlined above, will occur during the period from FY 1989 to FY 1990. No specific costs for implementation of this requirement of the Order are anticipated above those already planned as part of routine program management.

6.2.a.6 Admission of "orphan" facilities to the DP and NE decommissioning programs.

Evaluation of Requirement. ORNL is in compliance with this requirement for DP and NE facilities. Facilities identified as being primarily DP or NE responsibilities are being added to those programs with the appropriate concurrence and acceptance. For example, five facilities are currently pending for acceptance into the SFMP of the Office of NE. However, it should be pointed out that ORNL has several multi-user facilities that have been assigned to the ORNL Landlord, the Office of Energy Research, for maintenance, surveillance, and decommissioning. These costs are documented within the D&D activity of the standardized EARS for the Office of ER and it is assumed that these facilities will be managed by ER. ORNL has no guidance to indicate that all facilities are to be managed within the DP or NE programs and in fact guidance has been provided by NE that prohibits this approach. When HQ-level agreements are reached, ORNL will comply.

Current Plans. ORNL will continue to pursue the agreements and requests for facility assignments that are already in place and will initiate such activities for new facilities as they are encountered.

Schedules and Costs. No additional costs will be incurred.

6.2.a.7 Decommissioning expertise and data are available for use by DOE programs.

Evaluation of Requirement. ORNL is in compliance with this requirement. As a part of the DFDP and the SFMP, ORNL maintains valuable interactions with other sites related to decommissioning work. This includes attendance and participation in conferences, workshops, working groups, etc. Information is provided, as available, to update the Decommissioning technology data base at the Richland Operations Office and the data base will be used as a resource when appropriate. The RAPIC is a part of the ORNL RAP and provides similar services for the program including access to the national level RAPIC information. Monthly bulletins produced by RAPIC are circulated to key decommissioning management staff and the staff of the RAPIC are utilized as a resource in defining and accessing necessary information.

Current Plans. No additional actions are necessary for full compliance with this requirement.

Schedules and Costs. No additional costs will be incurred.

6.2.b Design facilities to simplify decontamination, decommissioning, or reuse

Evaluation of Requirement. Facilities at ORNL are designed with decontamination and decommissioning in mind. In September 1985, the Engineering Design Criteria which provides the basis for facility design of ORNL radioactive facilities was revised to indicate that facilities in which radioactive or other hazardous materials are utilized shall be designed to limit dispersion of these materials and to simplify decontamination and decommissioning or reuse. The current requirement further stipulates that this be based on an assumed decommissioning method and consider DOE 6430.1. Although a decommissioning method is assumed in the original wording of the design criteria, to ensure compliance with the new requirement, actual application of this criteria will be reviewed and additional clarification will be made in the criteria if deemed necessary.

Current Plans. Current plans are to evaluate the application of previous criteria addressing this issue and provide further definition and/or guidance for the design process, as necessary.

Schedules and Costs. Review of the criteria will occur during FY 1989.

6.2.c Post-Operational Activities

6.2.c.1 Development of decommissioning priorities.

Evaluation of Requirement. Methodologies and procedures currently exist for DOE Program organizations to use in identifying contaminated facilities under their jurisdiction and evaluating potential reuse and recovery of real property. These procedures are documented in DP and NE decommissioning program resource manuals and program plans. This type of information is provided when a surplus contaminated facility is submitted to a decommissioning program for future disposition management. Information provided in the application process also includes a listing of all ancillary facilities to be included in a given decommissioning project.

Criteria for setting decommissioning priorities are also prescribed in the same decommissioning reference documents and reflect the same list of factors described in this requirement. Decommissioning schedules based on these criteria are published periodically in ORNL long-range planning documents, and are updated at least annually during the budget planning process.

The ORNL RAP has the responsibility for evaluating current facility conditions, monitoring site surveillance information, and reviewing applicable environmental regulations to ensure current decommissioning priorities reflect this requirement. Significant changes in these areas which impact decommissioning plans are conveyed routinely to the respective DOE program sponsor.

Current Plans. The activities described above document ORNL compliance with this requirement. No other specific actions are planned.

Schedules and Costs. Included in annual planning, no additional costs will be incurred.

6.2.c.2 Adequate maintenance and surveillance performed prior to decommissioning.

Evaluation of Requirement. All activities which involve handling, storage, or disposal of radioactive and other hazardous materials are required to adhere to applicable Laboratory standards and practices. These standards are universally applicable to active operations, maintenance and surveillance of shutdown facilities, and decommissioning activities. For activities involving radioactive materials, these standards and practices are documented in the ORNL Procedures and Practices for Radiation Protection-Health Physics Manual which is reviewed and updated periodically to ensure compliance with DOE Order 5480.1B. Similarly, activities involving hazardous chemicals and other potentially hazardous operations must comply with applicable sections of the ORNL Environmental Protection Manual, Industrial Hygiene Manual, and Safety Manual.

In order for a facility to be accepted by current DP and NE decommissioning programs, removal of all high-level and stored hazardous materials must have been completed and documented (see Sect. 6.2.a.3). All facilities supported by these programs are managed under a structured program of routine maintenance and surveillance which also adheres to the same standards of safe operating practice. Maintenance and surveillance activities for these sponsors are documented in formal maintenance and surveillance plans which are reviewed and updated periodically to ensure applicable standards are met and the public and environment are adequately protected from potential hazards.

Current Plans. The activities described above and in the referenced sections of this document and published maintenance and surveillance plans document ORNL compliance with this requirement. No other specific actions are planned.

Schedules and Costs. See Sect. 6.2.a.4. Costs for providing adequate maintenance and surveillance for ORNL facilities is estimated at \$11.7M.

6.2.d Decommissioning Project Activities

6.2.d.1 Characterization base-line data shall be collected to support NEPA, RCRA, CERCLA, and SARA requirements.

Evaluation of Requirement. The first year of any decontamination and decommissioning project conducted by the RAP at ORNL is always devoted to engineering planning and assessments. During this planning phase all drawings, photographs and other records which reflect the current configuration and condition of the facility are collected. The condition of all structures, existing protective barriers and systems to protect personnel and the environment is evaluated and an inventory is taken of all hazardous and radioactive material located at the site. Any other information gathered from records or personnel interviews about past operations which could influence decommissioning alternatives is also noted. The information gathered during these exercises is used in the generation of all the project documents (i.e., health and safety plan, ADM, QA plan, waste management plan, etc.). These documents also reference and reflect the requirements of all governing regulations applicable to the project. After the planning phase of the project has been completed and all documentation is in place, a readiness review is conducted and the project is ready to begin.

Current Plans. Continue current RAP practices on a project specific basis.

Schedules and Costs. Estimated costs for decommissioning the current list of inactive facilities will require \$240M in expense and \$10M in capital funds. Decommissioning of facilities will not be completed until 2010 assuming adequate funding.

6.2.d.2 Environmental review process to meet NEPA, RCRA, CERCLA, and SARA requirement.

Evaluation of Requirement. ORNL has a RFA in place with the regulating agencies. This RFA identifies all SWMUs as well as non-SWMUs (i.e., inactive facilities). Additional clarification of RCRA versus CERCLA will be provided through the IAG currently in negotiation.

Plans have been developed and presented for the ORNL approach to conduct a RI/FS which includes activities on 13 WAGs, many of which contain inactive facilities.

In addition, ORNL through its EHPD has in place a comprehensive program which identifies the regulations governing a project, determines (based on the results of the RI/FS and other pertinent data) if an environmental review is required, conducts the appropriate environmental review to satisfy the governing regulations, and selects the preferred decommissioning alternative based on the results of the environmental review.

Current Plans. Continue to operate under current policies.

Schedules and Costs. See Sect. 6.2.d.1.

6.2.d.3 Conduct technical engineering planning during the environmental review process.

Evaluation of Requirement. The RAP at ORNL prepares a Decommissioning Project Plan for approval by the appropriate program office for each of its contaminated facilities which are candidates for decontamination and decommissioning. These plans comply with requirements d. (3). The RAP uses an earned value cost and schedule reporting system in the management of all projects.

Current Plans. Continue current RAP practices.

Schedules and Costs. See Sect. 6.2.d.1.

6.2.d.4 Decommissioning operations.

Evaluation of Requirement. Decommissioning projects managed by the RAP at ORNL are conducted in accordance with guidance from the respective DOE-HQ program offices and the Decommissioning Project Plan. Significant deviations are documented on a Project Change Request and approved by ORNL's RAP, DOE-ORO, and the DOE-HQ program office, as appropriate to the magnitude of the change. Approval of MA-22 is obtained before initiating activities to demolish DOE-owned facilities. Progress reports are issued monthly based on guidance from the DFDP Office and a final project report is issued at the conclusion of a D&D project. Information on waste generation is collected in compliance with the Waste Management Plan which is required for each RAP project and approved by ORNL management. Information for the IDB Program is submitted each year as requested by DFDP. D&D operations are considered to be a waste generator and will meet the generator requirements of this order.

Current Plans. Continue to operate under current policies.

Schedules and Costs. See Sect. 6.2.d.1.

6.2.d.5 Post decommissioning activities.

Evaluation of Requirement. The RAP at ORNL prepares a project final report on each surplus facility which is decommissioned at the completion of the decommissioning project. This final report contains final radiological and chemical survey data.

For future projects the RAP will compile and maintain a Project Data Package on each facility which is decommissioned which contains the Record of Completion, the Project Final Report and an independent verification survey report, Certification Docket and public notices as required.

Although the goal is minimal long term maintenance, the RAP will provide, as necessary, maintenance and surveillance including safety controls for decommissioned facilities at the end of the decommissioning project until the facility is assigned for reuse for other program activities unless the facility is dismantled. The level of maintenance and surveillance activity is determined by the condition of the facility at project end relating to residual contamination, utilities, etc.

Any release from DOE ownership of surplus contaminated facilities will comply with the requirements of this order.

Current Plans. Continue current RAP practices.

Schedules and Costs. See Sect. 6.2.d.1.

6.2.e Quality assurance, DOE Order 5700.6B, and ANSI/ASME NQA-1.

Evaluation of Requirement. The application of NQA-1 is a requirement for all waste management activities at ORNL including decontamination and decommissioning. Each project has a quality assessment to evaluate and document quality actions in accordance with NQA-1. Major activities such as maintenance and surveillance of surplus inactive facilities awaiting decommissioning have had separate quality documentation prepared. All quality documentation is completed in accordance with ORNL and Division level plans and procedures which implement DOE 5700.6B.

Current Plans. The RAP intends to develop a program level NQA-1 quality document to simplify individual project quality plans and ensure overall program application of NQA-1.

Schedules and Costs. The RAP level quality document is projected for completion in FY 1989 and is anticipated to cost approximately \$50K. Additional QA documentation requirements will be incorporated in project budgets, as outlined in the summary.

Table 7. Implementation summary for decommissioning of radioactively contaminated facilities

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
a. General					
(1) Partial Compliance	RAP maintains list of inactive contaminated facilities. Major radioactive operations maintained on file and reviewed by appropriate committees periodically.	Increasing emphasis will be given to obtaining information on programmatic association of operational contaminated facilities during periodic safety-related reviews.	FY 1989	a	a
(2) Compliance	Pertinent operational records for future use in preparing decommissioning plans are in permanent files.	Continue current practices.	a	a	a
(3) Partial Compliance	Decontamination and decommissioning activities are taken into consideration for new facilities (see b. below). Existing facilities nearing shutdown are scrutinized very closely with respect to decontamination and decommissioning activities.	b	a	a	a
(4) Compliance	Inactive facilities have been identified and assigned a program sponsor. Maintenance and surveillance and decommissioning responsibilities have been assigned.	Update specific program planning documents.	FY 1990	a	a
(5) Compliance	Responsibilities for contaminated facilities through negotiation have been assigned to specific programs.	Maintenance and surveillance plans and decommissioning plans are updated periodically to reflect most recent changes in responsibility.	a	a	a
(6) Compliance	Facilities identified as DP, NE, or ER are pending acceptance into appropriate programs.	Pursue existing agreements and initiate new agreements.	a	a	a
(7) Compliance	ORNL provides information, as available, to update the decommissioning technology data base RAPIC as part of the ORNL RAP.	Continue current practices.	a	a	a
b. Facility Design					
(1) Compliance	All new facilities at ORNL are designed with decontamination and decommissioning activities taken into consideration. New facilities are designed and constructed according to applicable requirements of DOE 6430.1	Evaluate application of previous criteria. Provide better definitive guidance for the design process.	FY 1989	a	a

*Not applicable.

*See a. (6) and b.

Table 7. Implementation summary for decommissioning of radioactively contaminated facilities (contd.)

Requirement/Status	Current practice	Current plans	Completion Date	Estimated Cost	
				Expense	Capital
c. Post-Operational Activities					
(1) Compliance	Methodologies and procedures are in place for identifying contaminated facilities and evaluating potential reuse or recovery of real property.	Continue current practices.	a	a	a
(2) Compliance	Inactive facilities are evaluated for acceptance through set standards and practices. Adequate maintenance and surveillance is performed before decontamination and decommissioning.	Continue current practices.	c	11.7M	c
d. Decommissioning Project Activities					
(1) Partial Compliance	ORNL collects characterization baseline data to fulfill NEPA, RCRA, CERCLA, SARA, and detailed engineering requirements.	Continue current RAP practices on a project specific basis.	2010	240M	10M
(2) Partial Compliance	ORNL has submitted a RFA to proper federal agencies. Conduct environmental reviews when required.	d	d	d	d
(3) Partial Compliance	Decommissioning Project Plans are prepared for approval by appropriate program offices.	d	d	d	d
(4) Partial Compliance	Facilities are decommissioned in accordance with DOE-HQ guidance. Proper approvals are obtained and status reports submitted.	d	d	d	d
(5) Partial Compliance	Final decommissioning reports are prepared. Maintenance and surveillance is supplied if required, project data packages prepared.	d	d	d	d
e. Quality Assurance					
(1) Partial Compliance	Decontamination and decommissioning activities are conducted in accordance with applicable elements of ANSI/ASME NQA-1 and DOE Order 5700.6B.	Develop program level NQA-1 QA document and implement for all RAP projects. Project QA costs are reflected in project budgets in d. (1).	FY 1989	50K	a
TOTALS			FY 2010	250M	10M

^aSee a. (4).

^dSee d. (1).

6.3 SUMMARY FOR DECOMMISSIONING OF RADIOACTIVELY CONTAMINATED FACILITIES COMPLIANCE

There are 16 requirements in this Order pertaining to the management activities affecting the decommissioning of radioactively contaminated facilities. ORNL is in partial compliance with eight requirements and full compliance with eight. ORNL has four programs responsible for the maintenance and surveillance, and the decommissioning of currently inactive facilities. These facilities are scheduled to be decommissioned by FY 2010. In order to decommission these facilities on this schedule significant costs will be incurred. Current estimates will require a funding level of \$240M in expense and \$10M in capital funds. Delays affecting the schedules for decommissioning these facilities will increase costs substantially. These costs do not include annual routine maintenance costs for these inactive facilities or the annual costs for maintaining compliance with the requirements of this Order.

For the partial compliances noted in this Section, planning has already been initiated by the RAP to bring existing D&D programs into compliance with this Order. Many of the partial compliances noted resulted primarily from a broader interpretation and scope of activities mentioned in this Order than was originally envisioned when the D&D programs at ORNL were created.

APPENDIX A. WASTE MANAGEMENT DOCUMENTATION REQUIREMENTS

WASTE MANAGEMENT DOCUMENTATION REQUIREMENTS

DISCUSSION

This appendix addresses the principle documentation requirements as identified in the Order. This appendix will be updated annually and included in the ORNL Waste Management Plan that will be submitted each December. Reporting is limited to documents issued in the previous fiscal year, unless the most recent revision of an existing document was issued earlier.

(1) Sect.2.0 - High-Level Waste

Not applicable

(2) Sect. 3.0 - Transuranic Waste

(a) Sect. 3.2.c.3. Cite the Transuranic Waste Certification Plan and dates of issue. If not issued, give schedule for preparation.

Oak Ridge National Laboratory Transuranic Waste Certification Program, Addendum 2 - Newly Generated Remote-Handled Transuranic Waste, to be published June 1989.

Oak Ridge National Laboratory Transuranic Waste Certification Program, Addendum 3 - Stored Remote-Handled Transuranic Waste, to be published September 1994.

J. H. Smith et al., Oak Ridge National Laboratory Transuranic Waste Certification Program, ORNL/TM-10322/R1 (draft), August 1988.

J. H. Smith et al., Oak Ridge National Laboratory Transuranic Waste Certification Program, Addendum 1 - Stored Contact-Handled Transuranic Waste, ORNL/TM-10322 A1 (draft), December 1988.

(b) Sects. 3.2.g and 3.2.h. Cite the closure plan for interim storage facilities. If not issued, give schedule for preparation.

Oak Ridge National Laboratory Transuranic Retrievable Waste Storage Facilities (Buildings 7823, 7826, and 7834 and the RH-TRU Retrievable Storage Area) Closure Plan, December 23, 1987.

Part B RCRA Permit Application for Cell 4 Solids Storage Facility, December 23, 1987.

Part B RCRA Permit Application for Existing Remote-Handled Transuranic Concrete Cask Storage Facility (Building 7855) and Proposed Transuranic/Solid Low-Level Waste Staging Facility, December 23, 1987.

(c) Sect. 3.2.i. Index major documentation developed under the Buried Transuranic - Contaminated Waste Program. Show schedule for preparation of documents in the current fiscal year.

J. R. Trabalka, Buried TRU Waste and TRU-Contaminated Soils and ORNL Remedial Action Program Sites; Program Strategy and Long-Range Planning, ORNL/RAP-8, July 1987.

Buried TRU Waste and TRU-Contaminated Soils at Oak Ridge National Laboratory, ORNL/RAP-24, September 1987.

No documents are scheduled for preparation this fiscal year.

(3) Sect. 4.0- Low-Level Waste

(a) Sect. 4.2.b.1. Cite documentation on radiological performance assessment of disposal facilities. If not issued, provide schedule for preparation in Sect. c. (3) of the Waste Management Plan.

The schedule has been provided in Sect. 4.0, Management of Low-Level Waste, Performance Assessment Sect. 4.2.b.1. This schedule will be updated in the ORNL Waste Management Plan.

(b) Sect. 4.2.e.1. Cite Waste Acceptance Criteria for each LLW treatment, storage, and disposal facility. List anticipated additions to this list for the fiscal year.

WAC for Interim Storage at ORGDP.

Internal Correspondence, Warehousing of Wastes, W. R. Gollhofer, July 12, 1988, Attachment: Waste Acceptance Criteria for Storage, (K-25 Building)

WAC for SWSA 6 for ORNL

Radioactive Solid Waste Operations Manual, Radioactive Solid Waste Operations Group, Environmental and Health Protection Division, December 1, 1988, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

No additions are anticipated this fiscal year.

(c) Sect. 4.2.e.3. Report the status of audits of certification activities by operators of disposal facilities. Report status of follow-up reports.

A draft certification strategy document that will assure generator compliance with WAC for LLW TSD facilities at ORNL will be completed by the end of FY 1989.

(d) Sect. 4.2.g.2. List document(s) forecasting waste to be shipped by generators to off-site disposal facilities.

Not applicable to ORNL. See Sect. 4.0, Management of Low-Level Waste, Shipment, Sect. 4.2.g.2.

(e) Sect. 4.2.i.4. List reports justifying on-site disposal of waste exceeding Class C limits. Such disposal cases anticipated for the next year should be forecast.

ORNL does not intend to dispose of Greater than Class C Waste on the ORR.

(f) Sect. 4.2.i.8. Cite major NEPA documentation supporting selection of any new disposal sites. Give schedule of preparation for appropriate documentation for the next year.

A draft EIS is currently in preparation that will address waste management activities on the ORR. This draft EIS will include the siting of proposed new LLW facilities. The draft EIS is scheduled to be released to the public towards the end of 1989. A ROD is expected about June 1990.

(g) Sect. 4.2.j.1. Cite closure plans for LLW disposal sites and dates of issue. Give schedule of preparation for anticipated reports.

No closure plans have been developed for any active or inactive LLW disposal site at ORNL. Closure plans for SWSA 6 and all other inactive LLW sites will be developed by the RAP under RCRA Section 3004(u). The RAP has submitted a closure plan/post-closure permit application in response to this federal regulation.

Closure Plan/Post-Closure Permit Application for Solid Waste Storage Area 6, ORNL/RAP-Sub/87-99053C/5, April 1988.

(4) Sect. 6.0 - Decommissioning of Radioactively Contaminated Facilities

(a) Sect. 6.2.a.1. Cite field organization documentation where the complete listing and the jurisdictional program responsibility for all contaminated facilities is recorded.

T. W. Burwinkle, et al., Maintenance and Surveillance Plan for the ORNL Surplus Facilities Management Program and Defense Facilities Decommissioning Program FY 1990-1999, ORNL/RAP-51, January 1989.

Memorandum, Troy E. Wade II to Theodore J. Garrish, James F. Decker, and Joe La Grone; Subject: Approval of Memorandum of Agreement Concerning Management of ORNL Remedial Action Program, dated May 16, 1988.

(b) Sect. 6.2.c.1. Cite the post-operational documentation that records the potential for reuse and recovery of materials and equipment and the schedule for decommissioning contaminated facilities.

T. W. Burwinkle et al., The ORNL Surplus Facilities Management Program Long-Range Plan Revision 1, ORNL/TM-8957/R1 (Draft), June 1987.

(c) Sect. 6.2.d.3. List Decommissioning Project Plans and date of issue. Show schedule for preparation of plans in the current fiscal year.

T. E. Myrick, R. W. Schaich, and J. R. DeVore, Metal Recovery Facility Decommissioning Project Plan - April 1984, ORNL/TM-9018, April 1984.

T. E. Myrick, R. W. Schaich, and F. V. Williams, Fission Product Development Laboratory Cell Decommissioning Project Plan - August 1983, ORNL/TM-8779, August 1983.

(d) Sect. 6.2.d.5. List final radiological and chemical survey reports and project final reports, and show dates of issue. Show anticipated additions to this list for the coming year.

R. W. Schaich, Final Report on the Decontamination of the Curium Fabrication Facility, ORNL/TM-8276, December 1983.

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