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**OAK RIDGE
NATIONAL
LABORATORY**

MARTIN MARIETTA

**ORNL Long-Range Environmental
and Waste Management Plan**

**Detailed Management
Plan**

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

ORNL LONG-RANGE ENVIRONMENTAL AND WASTE MANAGEMENT PLAN

DETAILED MANAGEMENT PLAN

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ACRONYMS AND INITIALISMS

ACD	Analytical Chemistry Division (ORNL)
AcDM	Activity Description Memorandum
ADM	Action Description Memorandum
ADP	automated data processing
ALARA	as low as reasonably achievable
ANF	Acid Neutralization Facility
BAT	best available technology
BMAP	Biological Monitoring and Abatement Program
BMP	best management practices
BSR	Bulk Shielding Reactor
CAA	Clean Air Act of 1970
CAT	collection and transfer
CDF	Chemical Detonation Facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act ("Superfund") of 1980
CFR	Code of Federal Regulations
CH-TRU	contact-handled transuranic (waste)
CMS	corrective measures study
CSLF II	Centralized Sanitary Landfill II
CWA	Clean Water Act of 1977
CWDF	Central Waste Disposal Facility
CWMO	Central Waste Management Office
CWSF	Chemical Waste Storage Facility
CYRTF	Coal Yard Runoff Treatment Facility
DAS	Data Acquisition System
DOE	U.S. Department of Energy
EASC	Emergency Avoidance Solidification Campaign
E&HP	Environmental and Health Protection Division
EERF	Emergency Environmental Response Facility
EFPC	East Fork Poplar Creek
EIS	Environmental Impact Statement
EMC	Environmental Monitoring and Compliance
EMSU	Environmental Monitoring System Upgrade
EP	Environmental Projects (Program)
EPA	Environmental Protection Agency
EPO	Environmental Protection Officer
ERDP	Environmental Review and Documentation Program

FFA	Federal Facilities Agreement
FPDL	Fission Product Development Laboratory
FS	feasibility study
GCD	greater confinement disposal (an enhanced means for isolating radioactive wastes on site)
G-M	Geiger-Müller
CPE	general purpose equipment
GPP	general plant project
HEPA	high-efficiency particulate air (filter)
HFIR	High Flux Isotope Reactor
HMTA	Hazardous Materials Transportation Act of 1975
HRE	Homogeneous Reactor Experiment
HWMA	Hazardous Waste Management Area
HSWF	Hazardous Waste Storage Facility
IC	impractical to certify (a situation in which it is too difficult to locally certify that a TRU waste qualifies for acceptance at the WIPP and, therefore, requires special handling and/or disposal)
ICM	interim corrective measure
ITE	in-tank evaporation
LAN	local air monitor
LERC	Laboratory Emergency Response Center (Building 4512)
LIP	line-item project
LITR	Low-Intensity Test Reactor
LLW	liquid low-level (radioactive) waste
LLW	low-level (radioactive) waste
LLW-CAT	LLW-collection and transfer
LLWDDD	Low-Level Waste Disposal Development and Demonstration
LTHWSF	Long-Term Hazardous Waste Storage Facility
M&S	maintenance and surveillance
MAP	Mercury Assessment Program
MRF	Metal Recovery Facility
MVST	Melton Valley Storage Tanks
N&CW	Nuclear and Chemical Waste (Program)
NAS/NRC	National Academy of Sciences, National Research Council
NDA	nondestructive assay
NDE	nondestructive examination
NEPA	National Environmental Policy Act
NESHAP	National Emission Standard for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NRWTF	Nonradiological Waste Treatment Facility
ORGDP	Oak Ridge Gaseous Diffusion Plant
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations (DOE)
ORR	Oak Ridge Reservation

PA/SI	Preliminary Assessment/Site Investigation
PAM	Perimeter Air Monitor
PCB	polychlorinated biphenyl
PCBMP	PCB Monitoring Plan
PDS	project data sheets
PSS	project schedule sheets
PW	process waste
PWTP	Process Waste Treatment Plant
QA	quality assurance
QC	quality control
RAM	remote air monitor
RAP	Remedial Action Program
R&D	research and development
RCRA	Resource Conservation and Recovery Act of 1976
RFA	RCRA Facility Assessment
RFI/CMS	RCRA Facility Investigation and Corrective Measures Study
RH-TRU	remote-handled transuranic (waste)
RI/FS	Remedial Investigations/Feasibility Study
RMP	Radiological Monitoring Plan
RWMD	Reservation Waste Management Division
SARA	Superfund Amendments and Reauthorization Act of 1986
SDWA	Safe Drinking Water Act
SLB	shallow land burial
SLLW	solid low-level waste
SPCC	Spill Prevention Control Countermeasures and Contingency Plans
SRF	Silver Recovery Facility
SWMU	solid waste management unit
SWSA	Solid Waste Storage Area
TBD	to be determined
TCMP	Toxicity Control and Monitoring Plan
TDHE	Tennessee Department of Health and Environment
TEC	total estimated cost
TRU	transuranic
TSA	Technical Safety Appraisal
TSCA	Toxic Substances Control Act of 1976
TSD	treatment, storage, and/or disposal
TURF	Transuranium Research Facility
UIC	Underground Injection Control (TDHE regulations)
WAC	waste acceptance criteria
WBCV	West Bear Creek Valley
WBS	work breakdown structure
WCCF	Waste Characterization and Certification Facility
WEAF	Waste Examination/Assay Facility
WHPP	Waste Handling and Packaging Plant
WIPP	Waste Isolation Pilot Plant

WMO	Waste Management Operations (Program)
WMTC	Waste Management Technology Center
WOC	White Oak Creek
WOCC	Waste Operations Control Center
WOL	White Oak Lake

EXECUTIVE SUMMARY

OVERVIEW

This report, the *ORNL Long-Range Environmental and Waste Management Plan*, is the annual update in a series begun in fiscal year 1985. Its primary purpose is to provide a thorough and systematic planning document to reflect the continuing process of site assessment, strategy development, and planning for the current and long-term control of environmental issues, waste management practices, and remedial action requirements. The document also provides an estimate of the resources required to implement the current plan. This document is not intended to be a budget document; it is, however, intended to provide guidance to both Martin Marietta Energy Systems, Inc., and the U.S. Department of Energy (DOE) management as to the near order of magnitude of the resources (primarily funding requirements) and the time frame required to execute the strategy in the present revision of the plan. As with any document of this nature, the near-term (one to three years) part of the plan is a pragmatic assessment of the current program and ongoing capital projects and reflects the efforts perceived to be necessary to comply with all current state and federal regulations and DOE orders. It also should be in general agreement with current budget (funding) requests and obligations for these immediate years. Beyond the immediate time frame, the document reflects the strategy and the project and funding estimates as a snapshot at the time of publication. This report is intended to be a living document that will be revised annually to reflect the continuing evolution and development of environmental and waste management processes, characterizations, remedial actions, regulations, and strategies for the establishment and conduct of a comprehensive environmental and waste management program designed to be in compliance with state and federal regulations and guidelines designed to protect human health and the natural environment. In order to maintain uniformity within the environmental and waste management disciplines, Energy Systems installations have adopted the general format of this document for the annual Long-Range Environmental and Waste Management Plans.

BACKGROUND

Oak Ridge National Laboratory (ORNL) is a multiprogram laboratory operated for DOE by Martin Marietta Energy Systems, Inc., to conduct research and development (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. Control and treatment of waste streams from the ORNL facilities have been continuing responsibilities of DOE

and its managing site contractors since the beginning of Laboratory operations. Effluent monitoring has been used to aid waste management operations and to ensure the safety of on-site personnel, the environment, and the general public.

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 multidiscipline research laboratory that now exists. Similarly, waste management requirements have changed over the years. Many of the existing waste management sites and facilities have evolved from what would now be classified as crude disposal practices. Early waste management, which left significant environmental concerns unsatisfied, was a product of the limited scientific knowledge of that day and the urgency of the early mission.

Over the past several years, the awareness of environmental concerns has increased, and major environmental legislation has been enacted at both the federal and state levels for controlling existing and potential sources of pollution. As a result of this changing regulatory environment, recent inspections, audits, and reviews have been carried out. These reveal the need to accelerate environmental compliance activities, as well as activities that protect the public and employees, through "as low as reasonably achievable" (ALARA) directives on a more comprehensive basis. Treatment of discharges needs to be upgraded, and results of the earlier disposal practices need to be addressed. Timely action is being taken and will need to continue to maintain ORNL in conformance with current and future regulations and guidelines.

COMPREHENSIVE ENVIRONMENTAL MANAGEMENT

Routine waste management operations are provided through the ORNL Waste Management Operations (WMO) Program as part of its current mission to operate liquid, gaseous, and solid waste management systems. Routine environmental compliance monitoring is provided through the ORNL Environmental Monitoring and Compliance (EMC) Section within the Environmental and Health Protection Division (E&HP). The ORNL Remedial Action Program (RAP) and the ORNL Environmental Projects (EP) Program were established to provide ORNL the capability to comply with existing and future environmental regulations and requirements. These programs address remedial actions and provide the improvements needed for continued protection of the environment and the health and safety of on-site workers and the public and for compliance with current and future environmental regulations. These programs have also been improving or developing waste collection, treatment, storage, and disposal capabilities for all ORNL-generated waste and effluents.

Since these organizational elements have been in place, activities have focused on several key areas with the objective of establishing a sound basis for proceeding with the significant long-term commitments that will be required to give ORNL the capability for achieving and maintaining environmental compliance. Some key areas that have been addressed in this initial period include

- establishment of a program management organization and structure;
- assessment of near-term environmental compliance status, resulting in the initiation of a number of activities for attaining compliance in specific areas;
- initiation of strategy development and long-range planning in the major program areas;

- management of specific facility upgrade and site characterization and assessment tasks; and
- establishment of a working relationship among the staffs of Martin Marietta Energy Systems, DOE, the Tennessee Department of Health and Environment (TDHE), and the U.S. Environmental Protection Agency (EPA).

STATUS OF PLANNING

This *ORNL Long-Range Environmental and Waste Management Plan* summarizes the overall environmental and waste management strategy that has been developed to date. The planning activities to be continued over the next 1 to 2 years will be critical in defining the scope of work necessary to provide ORNL with the capability for complying with present and future environmental regulations. These planning activities are dependent on input from two major areas: a comprehensive characterization of the ORNL site and interpretation of current and proposed environmental legislation. Hence, the current Long-Range Plan is to be viewed as a summary of present plans, information, and understanding. The plan will be updated annually to report accomplishments, plans, and current scope. As part of this comprehensive planning effort, an environmental and waste management approach has been adopted by DOE for use at all of its facilities in planning environmental upgrade and waste management activities. This approach results in six major subprograms: (1) Comprehensive Environmental Management Program, (2) Air Pollution Control Program, (3) Water Pollution Control Program, (4) Solid Waste Management Program, (5) Remedial Action Program, and (6) Environmental Monitoring Program. The status of each of these subprograms is presented in the following sections.

Comprehensive Environmental Management Program

Development of the capabilities necessary for ORNL to achieve and maintain full compliance with environmental regulations requires the integration of a large number of individual projects and activities. The Comprehensive Environmental Management Program consists of the following activities:

- Long-Range Planning
- Environmental Monitoring and Compliance
- Comprehensive Project Tracking and Database Management System
- Quality Assurance
- Comprehensive Employee Training Programs
- Oak Ridge Operations (ORO) Office Program Support

Emphasis is currently being placed in the areas of long-range planning, regulatory documentation, and database management. Program planning and permit development activities have resulted in the issuance of numerous regulatory and support documents during the past year related to the Resource Conservation and Recovery Act (RCRA), the National Pollutant Discharge Elimination System (NPDES) permit, the Clean Air Act (CAA) permit reviews and permit application development, routine National Environmental Protection Agency (NEPA) document preparation for construction projects, and the *ORNL Long-Range Environmental and Waste Management Plan*. Many of these planning exercises have utilized or provided input to the expanding program database system for project tracking.

Air Pollution Control Program

Air pollution control at ORNL involves consideration of small local releases as well as monitoring and emission control for large central ventilation systems. An extensive Off-Gas and Ceil Ventilation System provides negative-pressure-based containment for Laboratory buildings and processes. This system has been in operation throughout the history of the Laboratory and has recently been upgraded. Other potential sources of air pollution are generally small, with the exception of the ORNL steam plant. Emissions from this source are controlled by common industrial equipment and practices. The research nature of ORNL does not involve significant production processes, which typically require permitting and control for gaseous emissions; however, the potential for significant emissions from smaller-scale processes and activities is a concern.

Air pollution control activities involve continued upgrading of the major air pollution control systems, as well as continued development and maintenance of a database of potential air pollutants at ORNL. Activities focus on identifying problems related to inflow, infiltration, and exfiltration of groundwater and surface water in the underground ductwork, and renovation of these systems will continue as necessary. Changes in regulations and the implementation of ALARA policies will probably result in additional activities necessary to minimize air pollution from ORNL facilities.

Water Pollution Control Program

ORNL activities generate six basic wastewater streams that could result in water pollution: (1) liquid low-level radioactive waste (LLLW); (2) process waste (PW); (3) wastes from area sources that consist of storm sewer collections from general-use areas (such as buildings, roads, and parking areas), contaminated areas such as the LLLW tank farms, and contaminated groundwater; (4) point sources, which include coal yard runoff and discharges from cooling towers; (5) sanitary wastes, which consist of typical industrial sanitary sewage from Bethel and Melton valleys; and (6) ORNL facilities at the Oak Ridge Y-12 Plant. The Water Pollution Control Program focuses on the control and treatment of liquid wastes produced by ORNL, as well as the activities and systems that have the potential for polluting groundwater and surface waters at ORNL. Nonradioactive hazardous wastes are effectively segregated from liquid waste streams at the generation source; thus, liquid waste streams require treatment primarily for radioactivity and some minor chemical contamination such as organics and heavy metals. Lower-activity waste is treated for removal of radioactivity prior to release into surface streams through an NPDES discharge point, and higher-activity radioactive wastes are concentrated and stored for future treatment and disposal.

Planning in the Water Pollution Control Program emphasizes source and volume reduction, additional treatment and monitoring, solidification of LLLW streams, and implementation of the "best management practices" (BMP) philosophy for all systems. New facilities will improve the management of water pollution. These facilities are the completed improvements to the Sewage Treatment Plant, which has reduced the frequency of noncompliance, and a Nonradiological Waste Treatment Facility (NRWTF) to be in operation by March 1990, which will treat nonradioactive process wastes for removal of minor chemical contamination prior to release through a permitted NPDES point. The NRWTF will receive and treat process wastes directly from Laboratory operations as well as waste streams that have been pretreated for removal of low-level radioactivity. Research, development, demonstration, and construction are under way to define and implement

solidification processes for higher-activity wastes that are presently stored in tanks with limited capacity. The implementation of BMP will include not only replacement of existing deteriorated systems, such as the LLW collection system, but also rehabilitation of existing piping systems to reduce inflow and infiltration. Rehabilitation via in situ lining of underground piping has been completed in the sanitary sewage collection system and is being conducted in the PW system. BMP implementation will also involve increased definition and understanding of waste generation processes and facilities through surveys, building drain inventories, systems analyses, identification and segregation of system cross-connections, and operational and process changes. Major sources of nitrate discharges to the watershed have been eliminated. The Water Pollution Control Program will be affected significantly by decisions made in conjunction with RAP regarding the continued and future treatment of contaminated groundwater and disposition of wastes generated by decommissioning inactive LLW tanks.

Solid Waste Management Program

Solid waste generated as a result of ORNL operations and research can be classified in three broad categories—radioactive [low-level and transuranic (TRU)], hazardous/mixed, and conventional. For the purposes of appropriate management, "solid" waste includes a wide range of materials, including sludges, solidified or containerized liquids, compressed gases, construction debris, and general refuse, all of which are disposed of in a solid or semisolid state.

ORNL radioactive wastes include both solid low-level waste (SLLW) and TRU waste. SLLW management has been heavily influenced by the Low-Level Waste Disposal Development and Demonstration (LLWDDD) Program and the evolution of DOE Order 5820, both of which call for establishment of disposal facility waste acceptance criteria based on site performance considerations. The LLWDDD classification scheme requires segregating SLLW into four distinct categories, three of which are considered suitable for disposal on the Oak Ridge Reservation (ORR) via three distinct approaches. A newly formed organization, the Reservation Waste Management Division (RWMD), placed under the management of the Oak Ridge Gaseous Diffusion Plant (ORGDP), has been charged with planning, development, construction, and operation of new facilities to dispose of these three waste classes. Most of the ORR's Class II waste is generated by ORNL. The disposal technology that has been selected for long-term implementation for Class II waste employs the tumulus concept. Stabilized waste in concrete vaults is placed on a reinforced concrete pad with a multilayer drainage system. When fully loaded, the pad and vaults are covered with a multilayer earthen cap to divert precipitation. The tumulus technology is currently used in ORNL's Solid Waste Storage Area (SWSA) 6 and is planned to be further proven during the operation of the Interim Waste Management Facility (IWMF) from FY 1992 to FY 1996. A long-term central disposal facility is expected to be operational in FY 1997.

ORNL also generates significant quantities of Class I and Class IV wastes. The latter is considered unsuitable for disposal on the ORR and is to be stored pending resolution of many technical and political obstacles to its shipment for off-site disposal.

The strategy for management of ORNL TRU waste is segregation, interim storage, stabilization, certification, and shipment to the Waste Isolation Pilot Plant (WIPP). WIPP will play a key role in the stabilization of remote-handled transuranic (RH-TRU) sludges and solids. Several facilities are also planned to meet storage and/or repackaging requirements for RH-TRU and contact-handled (CH) TRU wastes.

ORNL hazardous wastes are segregated, packaged, and shipped to commercial treatment, storage, and disposal facilities. Some treatment facilities, most notably the Chemical Detonation Facility, are operated on-site.

Mixed wastes have been accumulated in indefinite storage for several years. Most of these wastes are expected to be burned eventually at the ORGDP incinerator. However, extensive and costly characterization of those wastes will be required prior to their acceptance at ORGDP.

Most ORNL conventional solid wastes are transported to and disposed of in the Centralized Sanitary Landfill (CSLF II) operated by the Y-12 Plant. The CSLF II is expected to reach its capacity in FY 1993. Y-12 plans for expansion of the landfill will provide for continued disposal of sanitary and industrial wastes on the ORR. Soil and rock from construction and demolition activities are deposited in the ORNL Recontour Site located northwest of Building 1000.

Remedial Action Program

Past research, development, and waste management activities have produced a number of surplus, inactive facilities contaminated with LLW and/or hazardous chemical wastes, as well as areas of off-site contamination. Such sites include SWSAs, waste ponds and seepage pits/trenches, radioactive waste processing and transfer facilities, research laboratories, dedicated environmental research areas, experimental reactors, and radioisotope development facilities, as well as the areas surrounding these sites and off-site contamination in the Clinch-Tennessee rivers. Monitoring and control of these areas have been continuing responsibilities of the Laboratory to ensure that ORNL personnel exposures and off-site releases are maintained within applicable DOE guidelines. Environmental legislation enacted at the state and federal levels requires more comprehensive control over facility discharges and the cleanup of contaminated sites. The most important of these regulations are the RCRA (including the 1984 Hazardous and Solid Waste Amendments); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Superfund Amendments and Reauthorization Act of 1986 (SARA); the Clean Water Act (CWA); and the Safe Drinking Water Act (SDWA). In the near term, the RCRA and CWA regulations have had significant influence on the RAP through requirements associated with the RCRA and NPDES permits for ORNL. Under the 1984 Hazardous and Solid Waste Amendments, regulations have been (or are being) promulgated for management and closure of facilities containing hazardous wastes. Of particular significance to the RAP are both specific requirements for landfills (e.g., affecting SWSA 6), surface impoundments, and underground storage tanks and the more general provisions for assessment and corrective actions at sites found to be sources of continuing contaminant releases to the environment [Sects. 3004(u,v) of RCRA]. During FY 1989, the EPA proposed the addition of the ORR, including ORNL, to the CERCLA-SARA National Priorities List and began negotiation of an interagency agreement defining site characterization, assessment, and corrective action requirements and schedules.

The RAP has currently identified 169 sites in 13 basic categories that require some degree of remedial action or evaluation. These sites range in complexity from abandoned waste storage ponds and tanks to large experimental reactors and waste disposal sites. Some activity is under way at all of these sites, either through site characterization and assessment, routine maintenance and surveillance, corrective actions, or facility decommissioning. Current priorities and funding allocations have been established to provide continuing protective storage for all sites, to correct deficiencies in regulatory compliance, to reduce known sources of environmental contamination, and to decontaminate facilities to allow beneficial reuse.

Environmental Monitoring Program

A key element of the implementation of all subprograms is an effective environmental monitoring program. Environmental monitoring at ORNL includes surveillance of air quality, surface-water quality, and groundwater quality. Implementation of this system involves not only the location and operation of appropriate sensor devices but also the facilities and equipment for receipt and presentation of the data and appropriate modeling and predictive capability.

The Environmental Monitoring Program emphasizes two major areas: upgrading of existing deteriorated or unacceptable equipment and upgrading of the monitoring system to provide additional capability to meet increased regulatory requirements. Until recently, much of the air and surface-water monitoring capability was inadequate both functionally and from a maintenance perspective. The ORNL NPDES permit requires additional monitoring points and capability. Substantial upgrading of the environmental monitoring system has been achieved, and improvements will continue to be achieved and compliance maintained.

Additional emphasis on RCRA-directed groundwater monitoring requirements for chemical contamination will also require significant expansion of the total monitoring system. A total of 332 piezometer wells have been completed by the RAP and are being utilized for data acquisition, and about 100 groundwater quality wells have been installed. It is anticipated that several hundred additional groundwater quality wells will be required at ORNL to characterize and monitor facilities in accordance with environmental regulations. Although these and subsequent groundwater quality wells are being implemented by the RAP as part of the site characterization activities, some of the groundwater quality wells will be used subsequently on a longer-term basis for routine compliance monitoring.

PROGRAM BUDGET SUMMARY

Based on the program strategy outlined in this *ORNL Long-Range Environmental and Waste Management Plan*, preliminary cost estimates have been developed for completion of the required comprehensive environmental restoration and facilities upgrade activities at ORNL. As shown in Table ES.1, significant resource allocations will have to be made by DOE in several major program categories to ensure upgrading of the waste management systems to necessary levels of operation and adequate environmental monitoring for determining compliances and to provide for corrective actions at contaminated sites. Although annual funding needs have been outlined only for the near term (FY 1989-95), the total estimated costs have also been included to provide a picture of the anticipated out-year requirements. Estimates have been made of both the expense and capital resource commitments that are needed to adequately support the implementation of environmental restoration efforts. As currently outlined, this commitment is expected to exceed \$2.1 billion in unescalated current-year dollars over the lifetime of the effort. Most of this commitment (over \$1.5 billion) is associated with implementation of the comprehensive RAP. The preliminary cost estimates for these corrective actions are based primarily on the concept of in situ stabilization of the residual contamination, where feasible. Significant increases in these costs would be expected if extensive excavation and removal of these materials became necessary because of regulatory requirements.

In addition to the environmental restoration and facilities upgrade activities discussed above (which are funded by several DOE programs), ongoing routine operations are conducted at ORNL in the areas of waste management operations and environmental monitoring and compliance.

Table ES.1. Environmental and waste management budget summary^{a,b}
(millions of dollars)

Program category	Fiscal year								Total estimated cost ^c
	1988	1989	1990	1991	1992	1993	1994	1995	
1.0 Comprehensive Environmental Management	0.9	0.6	0.8	0.9	0.6	0.7	0.7	0.7	12.3
2.0 Air Pollution Control	1.6	0.3	1.2	0.9	1.8	2.2	0.8	0.8	15.7
3.0 Water Pollution Control	24.7	21.3	22.7	27.8	34.7	32.0	28.4	19.0	351.8
4.0 Solid Waste Management	4.7	9.1	9.6	13.1	39.7	52.1	79.1	42.1	254.5
5.0 Remedial Action	18.7	21.9	58.9	67.4	117.0	140.7	122.2	77.5	1508.3
6.0 Environmental Monitoring	3.9	1.9	2.1	3.0	1.5	1.5	1.5	1.5	31.8
Total	54.5	55.1	95.3	113.1	195.3	229.2	232.7	141.6	2174.3

^aFigures rounded off to nearest \$0.1 million.

^bFunds for routine operations on waste management conducted by WMO and routine compliance monitoring conducted by EMC are not included in this table. These figures are summarized in Tables ES.2 and ES.3.

^cIncludes funding for years preceding 1988 and beyond 1995. The total for FY 1988-95 is \$1116.8 million.

Funding for operating the facilities necessary for ORNL waste management is currently derived by allocating these costs to generators of specific waste streams. Further information concerning funding for waste management operations is provided below in the section entitled "Waste Disposal Costs."

Funding for routine environmental monitoring and compliance activities is provided from ORNL overhead. Further information is provided below in the section entitled "Environmental Monitoring and Compliance."

The cost and schedule estimates presented in this Plan are based on adherence to current regulatory and legal requirements as well as protection of the environment and health and safety. Compliance schedules that are only now being developed can be expected to impact significantly the planning and implementation of the proposed facilities upgrade and environmental restoration activities. As changes occur in the current regulations or in the way in which these regulations are applied to DOE sites like ORNL, similar revisions are expected in the program scope and schedules. In addition, the current cost estimates are based on preliminary and often incomplete characterization and assessment data and on action plans that have not received regulatory approval. Hence, these scoping estimates need to be viewed as order of magnitude only. As regulatory requirements are better defined and project plans are further developed, estimates will be refined.

Waste Disposal Costs

The treatment, storage, and/or disposal (TSD) of radioactive, hazardous, and mixed waste generated at ORNL is conducted by the Waste Management Operations (WMO) Program and has historically been directly funded by either a DOE programmatic sponsor or Laboratory overhead. Waste generators were therefore insulated from waste management costs and issues, which resulted in an insensitivity to the volumes and types of wastes generated. With the recent emphasis on disposal of hazardous and radioactive wastes in accordance with new and more stringent regulatory requirements, the benefits of waste minimization became obvious. In December 1985, ORNL was requested by DOE-ORO to develop and implement a cost recovery (charge-back) plan for TSD waste operations. The purpose of instituting a cost recovery program was to effect waste minimization through direct charges to generators for TSD of the waste they generate.

A charge-back plan was developed and ultimately approved in April 1986. The plan allowed for a gradual shifting of operational charges from programmatic sources to waste generators over a period of three fiscal years. The shift began in FY 1986 and was completed in FY 1988. There is no longer any programmatic funding of TSD waste operations at ORNL. The basis for charge-back is reviewed annually to incorporate additional costs associated with waste handling techniques, which are being improved, and costs associated with regulatory requirements, which are being incorporated into waste handling practices. The logic network used to establish the basis for charging waste generators is shown in Fig. ES.1. Estimated waste disposal costs to be funded by charge-back are summarized in Table ES.2.

Generators are charged for direct TSD operations and routine maintenance only, not for waste management R&D, capital equipment replacement, or capital improvements to TSD facilities, which is accomplished via general plant projects (GPPs) or line-item projects (LIPs).

Not all waste streams defined in the Long-Range Plan are intended to be covered by the cost recovery plan. The waste streams included in the current charge-back plan are

Fig. ES.1. Logic network for charge-back plan for ORNL waste management operations.

Table ES.2. Estimated waste disposal costs^a
(thousands of dollars)

WBS category	Fiscal year								Total FY 1988-95
	1988	1989	1990	1991	1992	1993	1994	1995	
Air (radioactive gas)	820	995	1,092	1,092	1,092	1,092	1,092	1,092	8,367
Liquid (radioactive liquid)	4,640	5,635	6,784	6,784	6,784	6,784	6,784	6,784	50,979
Solid (radioactive, hazardous, ^b mixed, ^b and conventional)	4,070	5,530	6,044	6,044	6,044	6,044	6,044	6,044	45,864
Total	9,530	12,160	13,920	13,920	13,920	13,920	13,920	13,920	105,210

^aAll estimates in FY 1989 dollars (except FY 1988). All numbers include 32% overhead except FY 1988 (30% overhead).

^bIncludes solid, liquid, and gaseous states.

1. Radioactive gaseous waste (cell ventilation and off-gas)
2. Radioactive liquid waste (process and low-level)
3. Radioactive solid waste
4. Hazardous solid, liquid, and gaseous waste
5. Mixed solid, liquid, and gaseous waste
6. Conventional solid waste (excluding sewage)

Charges for monitoring required to maintain process control in the liquid and gaseous treatment facilities are included in 1 and 2 above.

Environmental Monitoring and Compliance

Environmental surveillance and other activities associated with determining whether ORNL is in compliance with environmental regulations, guides, and DOE orders is conducted by the EMC Section within the E&HP Division and is funded from ORNL overhead funds. Environmental surveillance activities consist of the following:

- Data management and analysis
- Sample processing
- Data analysis and reporting
- Permitting and regulatory interpretation
- Environmental sampling
- Compliance reporting
- Monitoring instrumentation evaluation
- Field oversight
- Project planning and criteria review

Actual and projected environmental surveillance costs are summarized for each of these activities for the period FY 1988 through FY 1995 in Table ES.3.

Table ES.4. shows the Environmental and Waste Management Program by funding type with accumulative totals.

Table ES.3. ORNL Environmental Surveillance Program overhead funding by task^a
(thousands of dollars)

Task	Fiscal year							
	1988	1989	1990	1991	1992	1993	1994	1995
Data management and analysis	393	417	492	523	554	586	625	656
Sample processing	887	941	1097	1165	1233	1305	1381	1462
Data analysis and reporting	121	168	228	243	257	272	288	305
Permitting and regulatory interpretation	444	464	771	819	868	919	973	1030
Environmental sampling	702	991	1150	1220	1291	1366	1446	1531
Compliance reporting	221	199	211	225	238	252	267	283
Monitoring instrumentation evaluation	622	759	854	906	959	1015	1074	1137
Field oversight	359	637	775	824	872	923	977	1036
Project planning and criteria review	40	49	52	55	58	61	64	68
Total	3789	4625	5630	5980	6330	6599	7090	7508

^aExcludes funding for Environmental Review and Documentation Program (ERDP), which is funded via charge-back to customers.

Table ES.4. ORNL Environmental Program by funding type
(thousands of dollars)

Funding type	Fiscal year								Total FY 1988-95	Total estimated cost
	1988	1989	1990	1991	1992	1993	1994	1995		
GPP	6,388	5,100	6,588	7,288	12,725	10,500	10,500	9,500	68,589	98,406
LIP	11,800	12,900	10,500	14,413	38,800	53,400	80,400	35,100	257,313	302,842
CE	1,927	1,288	1,557	2,075	1,575	1,525	1,275	1,200	12,422	22,769
EXP	34,536	35,861	76,681	89,373	142,230	163,730	140,520	95,775	778,706	1,750,312
Total	54,651	55,149	95,326	113,149	195,330	229,155	232,695	141,575	1,117,030	2,174,329
Accumulative total	54,651	109,800	205,126	318,275	513,605	742,760	975,455	1,117,030		

INTRODUCTION

Over the past several years, significant environmental legislation has been enacted at both the state and federal levels for controlling existing and potential sources of pollution. Department of Energy (DOE) owned facilities are required to comply with this legislation, which has been in a state of evolution. As part of this changing regulatory environment, inspections, audits, and reviews by personnel from the Environmental Protection Agency (EPA), state of Tennessee, DOE-Oak Ridge Operations (ORO), and DOE-Headquarters have focused attention on environmental issues at Oak Ridge National Laboratory (ORNL). The reports generated by these inspections emphasized the need to reduce hazardous chemical and radionuclide discharges to the environment and to accelerate environmental compliance activities on a more comprehensive basis. The inspections identified the need to correct practices that provide inadequate treatment of discharges and to address earlier disposal practices that now affect the environment in and around ORNL.

Three major programs—the ORNL Remedial Action Program (RAP), the Waste Management Operations (WMO) Program, and the Environmental Projects (EP) Program—were established at ORNL to implement facilities upgrade activities and site remedial actions. These programs are necessary to give the Laboratory the capability for compliance with the applicable environmental regulations. The WMO Program identifies needed facilities and upgrades for the ORNL radioactive and hazardous waste management systems. The EP Program implements and manages capital- and expense-funded projects to achieve improvements. Remedial actions are being and will be conducted at locations where past waste management practices or research activities have resulted in contamination of facilities or the environment to levels that necessitate corrective actions. Routine waste management operations are continuing through the WMO Program as part of its mission to operate the liquid, gaseous, and solid waste systems at the Laboratory. Routine environmental compliance monitoring will continue to be provided through the Environmental Monitoring and Compliance (EMC) Section of the Environmental and Health Protection Division (E&HP).

To provide effective management of the extensive environmental restoration, facilities upgrade, and other environmental activities to be conducted over the next several years, comprehensive long-range planning is essential. Strategies have been developed that (1) outline the scope of needed improvements; (2) identify specific projects that must be implemented; (3) determine the priorities of these projects based on regulatory compliance, health and safety concerns, schedule and budget constraints, and other programmatic considerations; and (4) develop overall cost and schedule estimates for use in budget requests to DOE. These strategies are continuing to be updated consistent with current planning. They are included in this plan along with project identification. The planning activities to be conducted over the next few years will be most crucial in defining the scope of work necessary so that ORNL can comply with present and future regulations. The strategies for this compliance capability have been formulated, and specific project-level information is included. As planning and strategy development continues over the next several years, an updated program-level *ORNL Long-Range Environmental and Waste Management Plan* will be issued annually to provide the latest information available.

A comprehensive management structure has been adopted by DOE-ORO for use in planning for environmental restoration and facility upgrade activities at all of the DOE-ORO facilities. It consists of six major program categories: Comprehensive Environmental Management Program, Air Pollution Control Program, Water Pollution Control Program, Solid Waste Management Program, Remedial Action Program, and Environmental Monitoring Program.

The *ORNL Long-Range Environmental and Waste Management Plan* provides a program overview and summary information, focusing on relevant regulatory requirements for each of the above areas; development of overall strategy logic diagrams; and determination of program costs and schedules. The information provides insight into the magnitude and direction that will characterize the program over the next several years.

The *ORNL Long-Range Environmental and Waste Management Plan* is organized as two documents. ORNL-6536, *Program Overview and Summary*, provides a comprehensive summary of the manner in which ORNL activities are being planned and executed and an overall indication of general costs and schedules within the six work-breakdown structure (WBS) elements around which the overall effort is organized.

The present document, the *Detailed Management Plan* (ORNL-6537), provides detailed backup information for ORNL-6536 and a separate section containing detailed information for each of the six principal WBS elements constituting the program activities at ORNL. Each of these sections contains the following information for the given WBS element:

- an overview that places environmental concerns in perspective,
- a description of the current status of facilities and activities and their interrelationships, and
- a discussion of the overall strategy and plans for addressing environmental concerns within the given WBS.

In addition, each section contains an overall summary of total costs or projected annual funding needs for FY 1988-95, as well as current projected costs beyond FY 1995 required for completion of work within the given WBS. The funding information is broken into the categories of expense, general plant project (GPP), line-item project, and capital equipment for each of the known or proposed funding sources. In this version of the *ORNL Long-Range Environmental and Waste Management Plan*, operating costs required for facilities or for the execution of activities associated with a given WBS are also listed.

Finally, two or more pages of descriptive information are included for each capital project or expense-funded task that is being conducted or planned within the given WBS. The first page (project data sheet) provides descriptive information on the scope, justification, and facilities for a given project or task, as well as a breakdown of annual funding requirements, types, and sources. The second sheet indicates the scope of work, the subtasks necessary to accomplish the work, and the relative time frame in which they are expected to occur for execution of the given capital project or expense-funded task.

Section 7 of this document contains budget information at three successive levels of detail, which provides costs or projected annual funding for all WBS elements, as well as an indication of known or proposed annual funding sources.

1. COMPREHENSIVE ENVIRONMENTAL MANAGEMENT PROGRAM

Development of the capabilities necessary for ORNL to adequately protect the environment and the health and safety of on-site workers and the public, as well as maintain full compliance with environmental regulations, requires the integration of a large number of individual projects and activities. To effect overall integration of work and to allow for effective long-range planning, overall budget control and development, and proper scheduling and tracking, six activities are conducted in the Comprehensive Environmental Management Program. These activities consist of

- Long-Range Planning
- Environmental Monitoring and Compliance
- Comprehensive Project Tracking and Database Management System
- Quality Assurance
- Comprehensive Employee Training Programs
- Oak Ridge Operations (ORO) Office Program Support

Implementation of these activities will continue indefinitely, with particular emphasis in the areas of long-range planning, regulatory documentation, and database management. These activities are summarized briefly in this section.

LONG-RANGE PLANNING

A comprehensive long-range planning function has been established to allow ORNL to be fully responsive to its environmental protection needs, including compliance with applicable environmental regulations. For each of the five principal subprograms (Air Pollution Control, Water Pollution Control, Solid Waste Management, Remedial Actions, and Environmental Monitoring), an overall strategy document was developed in FY 1986. Annual updates are provided in the Long-Range Plan. Major environmental needs, their relative priorities for facilities upgrade, remedial actions or other environmental activities, and projects for implementing the strategy have been identified, characterized, and prioritized relative to cost and schedule.

Long-range planning has utilized the current strategies for the respective subprograms, prioritized needed projects, and developed a comprehensive ORNL program.

ENVIRONMENTAL MONITORING AND COMPLIANCE

Environmental surveillance and other activities associated with determination of whether ORNL is in compliance with environmental regulations, guides, and DOE orders are conducted by the EMC section within the E&HP Division and are funded in part from ORNL overhead funds. Environmental surveillance activities consist of the following:

- Data management and analysis
- Sample processing
- Data analysis and reporting

- Permitting and regulatory interpretation
- Environmental sampling
- Compliance reporting
- Monitoring instrumentation evaluation
- Field oversight
- Project planning and criteria review

Actual and projected environmental surveillance costs are summarized for each of these activities for FY 1988 through FY 1995 in Table 1.1.

Data management and analysis. This task includes database development and management for all environmental samples, statistical analysis of data, and assessment of the impacts of ORNL activities on the environment and the public. Other activities include maintenance of two computers for real-time data collection; maintenance of another computer for data storage, retrieval, management, and analysis; and analysis of data from over 20 monitoring stations. Staff supported under this task also perform backup of all computerized data, maintain the integrity of the computer systems, support user requests, install new software and software updates, coordinate the installation of new communications hardware, and implement and update automated data processing (ADP) protection plans.

Table 1.1. ORNL Environmental Surveillance Program overhead funding by task*
(thousands of dollars)

Task	Fiscal year							
	1988	1989	1990	1991	1992	1993	1994	1995
Data management and analysis	393	417	492	523	554	586	625	656
Sample processing	887	941	1097	1165	1233	1305	1381	1462
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Environmental sampling	702	991	1150	1220	1291	1366	1446	1531
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Monitoring instrumentation evaluation	622	759	854	906	959	1015	1074	1137
Field oversight	359	637	775	824	872	923	977	1036
Project planning and criteria review	40	49	52	55	58	51	64	68
Total	3789	4625	5630	5980	6330	6599	7090	7508

*Excludes funding for Environmental Review and Documentation Program (ERDP), which is funded via charge-back to customers.

Sample processing. Staff supported under this task prepare samples for analysis and process and track all environmental samples and results. Successful performance of tasks requires coordination with five analytical laboratories for analysis of radioactive and nonradioactive samples. Included in this task are the archiving of samples and the development of QA procedures and controls. QA activities include sample spiking, submission of blanks and standards, data verification, procedure verification and auditing, and operational performance checks. Timely processing and analysis of samples is ensured, and the regulatory requirement for chain-of-custody control of environmental samples is fulfilled.

Data analysis and reporting. Periodic reports are prepared and issued on the data analysis and assessment of radioactive and nonradioactive effluent streams as required by DOE, the state, and the EPA. Among the reports generated are the following: quarterly data reports for ORNL distribution, quarterly reports for EPA on groundwater monitoring, and monthly Discharge Monitoring Reports. Staff supported under this task are required to test data for compliance with applicable permits and report any violations within prescribed reporting time periods.

Permitting and regulatory interpretation. Under this task, appropriate documentation is prepared to ensure that all ORNL operations comply with the various federal and state environmental laws and regulations. Responsibilities included in this task are (1) preparing appropriate permits for compliance with the Research Conservation and Recovery Act of 1976 (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Toxic Substances Control Act of 1976 (TSCA), the Clean Water Act of 1977 (CWA), and the Clean Air Act of 1970 (CAA); (2) informing ORNL management of changes in environmental laws that will affect operations; (3) acting as ORNL's point of contact with state and federal agencies, DOE, and Martin Marietta Energy Systems staff; and (4) determining the need for monitoring activities called for by compliance requirements.

Environmental sampling. Environmental sample collection and other monitoring services are provided to demonstrate compliance with pertinent DOE orders such as DOE Orders 5540.1BN, 5484.1, and 5830; EPA laws such as CAA, CWA, RCRA, and the Safe Drinking Water Act (SDWA); and State of Tennessee laws such as the Tennessee Air Quality Act. Atmospheric, aquatic, terrestrial, biological, and foodstuff samples are collected for radiological and nonradiological monitoring. Staff supported under this task also provide services to determine environmental impact from ORNL operations.

Compliance reporting. Under this task, reports are prepared as required by DOE, EPA, and the State of Tennessee. Each regulatory agency requires regular noncompliance reports of findings as part of compliance activities. Environmental assessments are prepared as required by DOE Order 5440.1C and the National Environmental Policy Act (NEPA). The assessments document that Laboratory operations do not conflict with existing environmental laws or regulations.

Monitoring instrumentation evaluation. Under this task, management systems needed to monitor the environment and ORNL effluents are evaluated. Criteria and criteria review for instrument locations, frequency of measurements, and other instrument protocols are provided. The instrumentation systems to be maintained are numerous: meteorological towers, atmospheric monitoring stations, National Pollutant Discharge Elimination System (NPDES) monitoring points, aquatic monitoring stations, groundwater wells, and other environmental measurement systems.

Field oversight. Field-level interface and oversight is provided for implementation of Action Description Memoranda (ADM), Activity Description Memoranda (AcDM), and "as-low-as reasonably-achievable" (ALARA) guidelines to ORNL projects and operations. Compliance

inspections are conducted for ORNL operations. Interface is carried out with ORNL divisions and with Y-12 and Oak Ridge Gaseous Diffusion Plant (ORGD) representatives on environmental protection, surveys and audits, and waste management functions for the ORNL facilities located at Y-12 and ORGD.

Project planning and critical review. Liaison is maintained with Central Staff, Engineering, Safety, Fire Department, Operations, and research and development (R&D) divisions on projects and activities proposed for ORNL to ensure compliance with DOE orders, with State of Tennessee and EPA regulations, with ORNL ALARA guidelines, and with corporate policies. Staff supported under this task review project criteria and engineering documentation and drawings for environmental concerns. Reviews are conducted on the design, construction, and operation of required pollution control, environmental monitoring, and sampling equipment.

COMPREHENSIVE PROJECT TRACKING AND DATABASE MANAGEMENT SYSTEM

A comprehensive project management tracking system has been developed for following the programs and projects addressed by the *ORNL Long-Range Environmental and Waste Management Plan* in terms of scheduling, funding, interrelationships between tasks, and important control points. This system is an essential management tool in communications among the various activities covered by the Plan, affected programs, divisions within ORNL, other organizations within Martin Marietta Energy Systems, Inc., and DOE. The system is used for tracking and managing the timely accomplishment of milestones, developing budgets and following costs, and preparing various summary reports for use by management and DOE.

The project data sheets, milestone bar charts, and summary tabulations of projects in each program area of this document are examples of the detailed information that has been generated by the project tracking and database management system.

Efforts in FY 1989 are concentrated on development and implementation of methods to improve the manner in which periodic information on cost and status for individual projects and tasks, as well as for the program as a whole, is provided.

QUALITY ASSURANCE

The objective of the E&HP Division QA system is to develop, implement, and maintain QA practices that will ensure that all activities are (1) conducted with the highest regard and assurance for the health and safety of personnel and the surrounding population, (2) designed and executed for both the short- and long-term protection of the environment, and (3) in compliance with state and federal regulatory and sponsor requirements. Work is ongoing to bring all programmatic elements of the division into compliance with ANSI/ASME NQA-1 quality assurance standards and with all other requirements mandated by DOE, Martin Marietta Energy Systems, and ORNL. A QA manual provides procedures and instructions for implementation of NQA-1. This manual addresses all elements of the NQA-1 standard and ensures that all requirements are met. A QA evaluation is made for each project or activity, and project-specific QA plans are developed, implemented and supervised through a cooperative effort of division line and QA staff. Audit, review, inspection, and surveillance activities form an integral part of each project. QA training activities have been initiated and will continue for all division personnel. The QA staff interface regularly with line personnel and division management.

COMPREHENSIVE EMPLOYEE TRAINING PROGRAMS

Employee training programs are an important tool in improving the environmental and health compliance capabilities of the Laboratory; these are discussed in this plan because of the close relationship between these training programs and the activities covered within the plan.

Environmental safety and health and waste management training programs are integrated at ORNL as one part of the general strategy to improve environmental performance in the numerous divisions involved in these activities. The objective of the upgraded training program is to provide employees with the knowledge and skills needed to perform assigned duties in a safe and efficient manner.

A broad range of training is required at the Laboratory, including general employee training, special job qualifications, and specific program area qualifications. General employee training encompasses major health, safety, and emergency preparedness programs; participation includes the completion of an awareness sheet signed by the employee and his or her supervisor. Since its implementation, approximately 85% of Laboratory employees have completed the program, and many have been retrained after a 2-year interval.

DOE orders, environmental and health laws, and other associated contractual documents set forth requirements for worker qualification programs for critical positions. Currently, this program provides qualification training in whole or in part for reactor and nonreactor nuclear facility operators and maintenance personnel, radiation protection and monitoring personnel, waste management personnel, and environmental sampling personnel. These programs are ongoing and require regular revision and supplemental training and testing every 2 years. They include DOE-driven operational training as well as environmental compliance-driven training such as the waste worker protection program required under 29 CFR 1910.120 (SARA) and the transportation worker programs under 49 CFR [Hazardous Materials Transportation Act of 1975 (HMTA/DOT)].

Special health and environmental training programs for Laboratory employees and other individuals associated with construction and other contracted activities have been established. These include specific training for personnel working in radiation-suspect areas.

These programs, excluding general employee training, trained more than 3000 persons during the last year, increasing employee knowledge and skills in environmental safety and health.

OAK RIDGE OPERATIONS OFFICE PROGRAM SUPPORT

The ORO-directed support activities provide for critical administrative database management, regional test facility operations, and disadvantaged colleges/universities support programs. Two programs are supported annually through this task, with funding maintained at the required levels throughout the planning horizon. These programs are (1) the Historical Black Colleges/Universities (HBCU) support programs for allocating DOE funds for research efforts on waste issues for disadvantaged colleges, and (2) an ORO support contract for administrative and technical assistance. This activity also provides for the development of a reservation-wide waste management activities Environmental Impact Statement (EIS). The EIS will be prepared under DOE-ORO direction and will cover the programmatic aspects of solid radioactive, hazardous, and mixed waste management of all DOE-ORO facilities. It will also specifically address the facility-specific NEPA requirements for proposed solid low-level waste disposal facilities planned for construction on the Oak Ridge Reservation.

COMPREHENSIVE ENVIRONMENTAL MANAGEMENT PROGRAM

DETAILED INFORMATION

***PROJECT DATA SHEETS**

***FINANCIAL SUMMARY TABLES**

- 1.2. Environmental management systems project summary—expense funding
- 1.3. Environmental management systems project summary

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: ORNL COMPREHENSIVE ENVIRONMENTAL MANAGEMENT

CONTACT: L. E. MCNEESE

PROGRAM CATEGORY: Comprehensive Environmental Management **PLANT:** ORNL

PROJECT NO: 1.00

STATUTORY REQ: ALL

NEEDS ASSESSMENT CAT:

EMP NO: ERKG002

EMG PROJ. NO:

EPMP NO: 2.1.00

SCOPE: Development of the capabilities that are intended to place ORNL in full compliance with all current regulations and anticipation of and planning for complying with developing future regulations requires the integration of a large number of individual projects and activities.

JUSTIFICATION: In order to effect overall integration of work and to allow for long-range planning, overall budget development, and control of costs and schedules, these seven activities have been initiated which collectively comprise the Comprehensive Environmental Management Program: (1) Long-Range Planning, (2) Regulatory Documentation and NEPA Review, (3) Comprehensive Project Tracking and Database Management System, (4) Project/Program Review and Audit, (5) Environmental Release Response, (6) Waste Reduction/Recycle Activities, and (7) Comprehensive Employee Training Programs.

FACILITIES:

STATUS/COMMENTS: The GF ORO-directed support activities provide for critical administrative data base management, regional test facility operations, and disadvantaged colleges/university support programs.

16

FUNDING YEARS: 85-92				TEC (\$M1000): 12281									
R&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR									
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
GF(354)	BA	EXP	4951	0	0	300	600	551	300	400	400	400	2000
KG 02/ERKG021	BA	CE	14	14	0	0	0	0	0	0	0	0	0
KG 02/ERKG021	BA	EXP	3550	0	0	0	250	330	330	330	330	330	1650
KG 02/ERKG021	BO	EXP	3766	2590	907	269	0	0	0	0	0	0	0
TOTAL:			12281	2604	907	569	850	881	630	730	730	730	3650

1 Program Category
COMPREHENSIVE ENVIRONMENTAL COMPLIANCE & UPGRADE MANAGEMENT
 3 Project Title

2 Reporting Period
 7/01/89 through 7/31/89
 4 Program Representative
 L. E. MCNEESE
 5 Project Engineer

Funding Type
 EXP
 Funding Year
 FY 1985

FWP NO. ERAC002
 ACTIVITY NO. A002

6 Project Number
 100

WRS
 100

ISSUE COMPREHENSIVE OUTLINE AND WORK
 PLAN FOR ORNL ENVIRONMENTAL AND
 WASTE MANAGEMENT LONG RANGE PLAN

ISSUE DRAFT ORNL ENVIRONMENTAL AND
 WASTE MANAGEMENT LONG RANGE PLAN
 (MSK 11 ORNL 2 9, 89)*

SUBMIT SEMI ANNUAL UPDATE OF ORNL
 POLLUTION ABATEMENT PLAN, OMB CIRCULAR
 A-106 (MSK 12 A LR 2 6/89 & 12/89)

ISSUE FIELD WORK PROPOSAL (FWP)
 (MSK 12 B LR 1 2/90)

ISSUE DRAFT ENVIRONMENTAL COMPLIANCE
 CURRENT YEAR WORK PLAN
 (MSK 12 C LR 2 9/89)

SUBMIT STATUS REPORT ON
 SAFETY & JAE EVALUATIONS TO HQ
 (ORMB4008 LR 3 9, 89)

8 Fiscal Year and Months
 FY 1989

FY 1990

FY 1991

1

2

3

4

1

2

3

4

1

2

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SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 FORECAST

SYMBOL
 MILESTONE LEVEL 0 1 2 3 4

Comments

* April distribution delayed by ORNL. Proposal for 9/89 draft FWP submitted to ORD

Table 1.2. Environmental management systems project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$x1000)									BEYOND FY 95
		TYPE	SOURCE		FY 80	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95		
1 00	ORNL COMPREHENSIVE ENVIRONMENTAL MANAGEMENT	EXP	GF	4951	0	300	600	551	300	400	400	400	2000	
1 00	ORNL COMPREHENSIVE ENVIRONMENTAL MANAGEMENT	EXP	KG	4726	907	269	250	330	330	330	330	330	1650	
FUNDING TOTALS:				9677	907	569	850	881	630	730	730	730	3650	

Table 1.3. Environmental management systems project summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)								BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
GF	Expense	4951	0	300	600	551	300	400	400	400	2000
	Subtotal	4951	0	300	600	551	300	400	400	400	2000
KG	Expense	4726	907	269	250	330	330	330	330	330	1650
	Subtotal	4726	907	269	250	330	330	330	330	330	1650
Program Totals	Capital	0	0	0	0	0	0	0	0	0	0
	Expense	9677	907	569	850	881	630	730	730	730	3650
Grand Total		9677	907	569	850	881	630	730	730	730	3650

2. AIR POLLUTION CONTROL PROGRAM

OVERVIEW

For planning and strategy evaluation, air emission sources at ORNL are classified into three general categories: (1) radioactive air emission sources, (2) emission sources that require state air permits, and (3) all other emission sources. These categories are shown in Fig. 2.1. Because most of the major facilities at ORNL except for the steam plant (Bldg. 2519) either are being used or have been used for work related to nuclear energy, emissions containing radionuclides are of primary importance. Emission sources that require state air permits are generally small and do not require large pollution control equipment but must be identified, characterized, and in some cases permitted. Other air emission sources, not regulated by the CAA, have been identified but are not included in the Air Pollution Control Program.

The objectives for the Air Pollution Control Program are

1. Environmental health and safety—to ensure that air emissions from ORNL facilities do not constitute a hazard to on-site personnel, the public, or the environment;
2. Regulatory compliance—to ensure that air emissions from ORNL facilities are in compliance with applicable federal, state, and local regulations;
3. System operation improvement—to ensure that air pollution control systems for ORNL facilities satisfy DOE ALARA objectives and that operation of the system does not contribute to other environmental insults.

Air emissions from ORNL facilities are generally in compliance with existing regulations. However, in a technical review of the management of radioactivity at ORNL, the National Academy of Sciences, National Research Council (NAS/NRC), recommended that a comprehensive, reservation-wide evaluation of the currently installed atmospheric emission control equipment for radioactive gaseous effluents be made to determine which installations may be upgraded in a cost-effective manner to improve compliance with ALARA policy regardless of EPA regulations.

The radioactive gaseous effluent streams generated at ORNL are divided into three general categories: (1) cell ventilation, encompassing high-volume, low-activity gas streams from enclosed areas such as containment or confinement areas, limited access areas, and hot cells; (2) process off-gas, encompassing low-volume, potentially high-activity gas streams from process vessels and from systems or other sensitive areas where the release of radioactivity may be routine and of relatively high concentration; and (3) laboratory hoods and individual vents, which provide controlled ventilation for laboratory-type operations and normally vent at the source location. These effluent streams are discharged through stack systems at various locations at ORNL.

The physical, operational, and monitoring characteristics of the seven main stacks currently in use at ORNL for disposing of radioactive gaseous effluents are summarized in Table 2.1. Two of the seven stacks, 3039 and 7911, provide service for most ORNL facilities. The 3020 stack provides

1.2
1.3

- (1) NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS
- (2) AS LOW AS REASONABLY ACHIEVABLE; DOE ORDER 5480.1
- (3) OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
- (4) AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

Fig. 2.1. Emission sources at ORNL.

Table 2.1. ORNL stack characteristics^a

Characteristics	Stack						
	3039	7911	3020	2026	7512	6010	7025
Area served	Isotope area, 4500 area, ORR, 3500 area, 3025/3026	HFIR, transuranics, TURF	Bldg. 3019 (pilot plant)	Bldg. 2026 (High Radiation Level Alpha Laboratory)	Bldg. 7503 (Molten Salt Reactor Experiment)	Bldg. 6010 (electron linear accelerator)	Bldg. 7025 (Tritium ^b Target Fabrication Facility)
Height, ft	250	250	200	75	100	50	12
Base elevation, ft	814	835	860	856	850.5	805	868
Construction	Brick	Concrete	Concrete	Mild steel	Mild steel	Mild steel	Stainless steel
Flow, ft ³ /min	135,000	34,000	40,000	16,860	10,000	16,000	2,300
Flow, m ³ /s	63.712	16.046	18.878	7.957	4.719	7.551	1.085
Orifice ID, m	2.438	1.524	1.524	1.067	0.914	0.762	0.305
Effluent velocity, m/s	13.643	8.796	10.349	8.902	7.187	16.558	14.88
Off-gas cleanup facilities	Caustic scrubber high-efficiency particulate air (HEPA) filters; roughing filters	Charcoal absorbers; HEPA filters; roughing filters	Routed to 3039 stack	No off-gas sources	Charcoal filters; HEPA filters; roughing filters	No off-gas sources	No off-gas sources
Cell ventilation	HEPA filters; roughing filters	Charcoal filters; HEPA filters; roughing filters	HEPA filters; roughing filters	Charcoal filters; HEPA filters; roughing filters	Charcoal filters (partial); HEPA filters; roughing filters	HEPA filters; roughing filters	No cell ventilation
Off-gas blowers	Electrically driven negative-pressure of 55-in. water gauge; capacity 4000 ft ³ /min; steam driven standby	Two 10-hp electrically driven 500-ft ³ /min, 53-in. negative-pressure blowers, one for normal and one for pressurized off-gas; one unit standby for each of Bldg. 7900 75-hp diesel generators	Off-gas routed to 3039 stack	No off-gas sources	Same as cell ventilation	No off-gas sources	No off-gas sources

Table 2.1 (continued)

Characteristics	Stack						
	3039	7911	3020	2026	7512	6010	7025
Cell ventilation blowers	Electrically driven 8-in. water gauge negative pressure; capacity 200,000 ft ³ /min; steam-driven standby diesel generator available to power 5 blowers	100-hp electrically driven 13-in. water gauge negative pressure; capacity 28,000 ft ³ /min; two 75-hp diesel generator operated standbys	Electrically driven 10-in. water gauge negative pressure; capacity 44,000 ft ³ /min; 35,000 ft ³ /min steam-driven standbys	Electrically driven 10-in. negative pressure; capacity 19,840 ft ³ /min with similar standby unit; diesel generator available in case of power failure	Electrically driven 7-in. negative pressure; capacity 21,000 ft ³ /min; similar unit as standby	Electrically driven 10-in. negative pressure; capacity 16,450 ft ³ /min; no standby	Electrically driven; no standby
Continuous compliance stack monitors							
Location	Ducts at ground level	50-ft level	54-ft level	Ground level	40-ft level	Ground level	Ground level
Readout	Particulate, α , β - γ , iodine, noble gas tritium ^a	Particulate, α , β - γ , iodine, noble gas tritium ^a	Particulate, α , β - γ , iodine	Particulate, α , β - γ , iodine	Particulate, β - γ , iodine	Particulate, β - γ	Tritium
Frequency of instack inventory sample collection (particulate and iodine)	3 times/week	Weekly	Weekly	Weekly	Weekly	No samples collected	Monthly

^aCharacteristics circa 1981.^bTritium monitors are currently not functional because of high noble gas contents of stack effluent.

cell ventilation for the Radiochemical Processing Plant, Building 3019. The other four (2026, 7512, 7025, and 6010) handle specific facilities and only very low levels of activity. An eighth stack, 3018, is no longer in service, although it is used to supply a small flow of air through the ORNL Graphite Reactor, which has been shut down since 1963. Flowsheets for the three major stacks (3039, 7911, and 3020) are shown in Figs. 2.2 through 2.4, respectively.

Several facilities for handling radioactive gas emissions have recently undergone significant improvements through a line-item capital project initiated in 1981 (Improvements to Radioactive Waste Facilities-81-T-104). These include 3039 stack area ventilation improvements, isotope area ventilation improvements, and 3020 stack area ventilation improvements. During the 3039 stack area improvement program, completed in 1984, the fans and ductwork around the stack were either replaced or refurbished. The isotope area ventilation improvements, completed in FY 1986, replaced the existing underground ventilation ducts with a stainless steel locally filtered overhead system. The 3020 stack area improvements include replacement of ductwork between Building 3019 and the 3020 stack, replacement of the two electrical fans and one steam fan with four new electrical fans, rewiring of an existing emergency generator, and addition of a second emergency generator. This project was also completed in 1986.

Improvements are also being made through GPPs. Planned projects include (1) upgrade of the cell ventilation system in Building 3517; (2) installation of emergency power generators for the 3039 stack hot off-gas system and the Building 7025 tritium facility; (3) provision of a building to enclose filter pit 7913 to reduce water leakage; and (4) upgrade of fans, motors, and process control system associated with the main ventilation stacks.

Control of nonradioactive air pollutants from ORNL facilities is conducted in accordance with the guidelines of the CAA or regulations of the Tennessee Department of Health and Environment (TDHE) Division of Air Pollution Control. Materials for which there are EPA and Tennessee Ambient Air Quality Standards are suspended particles, sulfur dioxide, carbon monoxide, lead, ozone, nitrogen oxides, and fluorides. In addition, the CAA gives emission standards for volatile organic compounds and National Emission Standard for Hazardous Air Pollutants (NESHAP) limits for beryllium, mercury, vinyl chloride, asbestos, and radionuclides. Nonradioactive air emissions are regulated by state air permits.

As of July 31, 1989, 105 air permits (104 operating and 1 construction) have been issued for ORNL facilities. Of the emission sources that now have permits, only one (ORNL steam plant, Bldg. 2519) requires air monitoring. Opacity is recorded for the TDHE review during its annual inspection. The other emission sources are mainly small individual sources such as degreasers, fuel storage tanks, spray booths, oil burners, ovens, shop operations, and small processes that do not require large pollution control equipment.

All major gaseous emissions (both radioactive and nonradioactive) from ORNL facilities are in compliance with existing state and federal regulations, although additional air permits may be needed for some small emission sources, and additional upgrade of pollution control equipment is needed to ensure long-term reliable service. Many of the facilities have been in service for over 20 years. In addition, DOE facilities at ORNL operate under an ALARA policy for radionuclide emissions. To place ORNL emissions into perspective, in 1988 airborne releases of radioactive effluents from all three Oak Ridge facilities (ORNL, the Oak Ridge Y-12 Plant, and ORGDP) resulted in a committed dose equivalent of less than 5.5 mrem to the pulmonary tissue and a committed effective dose equivalent of 0.7 mrem to a member of the public receiving the highest exposure to plant effluents. This dose is approximately 2% of the EPA standard NESHAP of

Fig. 2.2. ORNL central ventilation system for Bethel Valley facilities (3039 stack).

ORNL-DWG 86-14789R3

Fig. 2.3. ORNL central ventilation system for Melton Valley facilities (7911 stack).

25 mrem. Uranium nuclides from the Y-12 Plant were the main source of the dose for pulmonary exposure. Tritium released from the isotope production facilities at ORNL through the 3039 stack was the primary source of the whole-body exposure. The other major contributor to the dose commitment from ORNL facilities was ^{191}Os , with minor contributions from entrained particulates ^{85}Kr , ^{133}Xe , ^{131}I , and ^{220}Rn , primarily from isotope and reactor operations and the processing facilities in buildings 7920 and 3019.

PLANS AND STRATEGY

The current approach to controlling radioactive gaseous emissions from ORNL facilities is illustrated in Fig. 2.5. Control of pollutants from nonradioactive sources is based on the use of local pollution control devices. Pollutant emissions from the ORNL steam plant are controlled by the use

RADIOACTIVE GASEOUS WASTE EMISSION CONTROL STRATEGY

Fig. 2.5. Radioactive gaseous waste emission control strategy.

of electrostatic precipitators and low-sulfur coal. High-efficiency particulate air filters are used extensively in other areas for the control of particulate emissions. Off-gas scrubbers, condensers, and other control equipment are also used as needed. Small amounts of low-toxicity material are released directly to the atmosphere through stacks and vents.

The strategy for upgrading air pollution control systems at ORNL for the three types of emissions (radioactive air emission sources, emission sources that require state air permits, and all other emission sources) is summarized in the following paragraphs. The strategy is discussed in detail in a strategy document, *Air Pollution Control Strategy*, issued August 1, 1986, and revised in 1987. Because radioactive air emissions from ORNL facilities are in compliance with existing

regulations, the program strategy is to identify and implement system upgrades needed to (1) ensure continued protection of the environment, on-site workers, and the public; (2) ensure continued compliance with regulations; and (3) meet DOE objectives for ALARA. In addition, potential regulatory changes or new regulations are evaluated to determine if additional upgrades or new equipment will be required for future compliance.

The strategy for radioactive air emission sources is being implemented through a series of technical studies and capital projects. The technical studies include

- maintaining currency of the stack and vent survey to identify and characterize emissions sources;
- inspecting and evaluating ventilation ducts, filter houses, emergency power systems, fans, and other pollution control equipment associated with radioactive emission sources;
- engineering studies and cost estimates for repair of equipment such as underground ventilation ducts and filter pits, and the installation of new pollution control equipment;
- studies to determine flow distribution, particle size distribution, and flow stability and to evaluate the use of new flow instruments in the main ventilation stacks for use in stack sampling and monitoring;
- ALARA studies to determine methods to further reduce emissions in a cost-effective manner;
- evaluating new programs and changes in existing programs to ensure continued compliance with regulations; and
- implementing preventative maintenance programs to detect problems and prevent failures before they occur in the main stack systems.

Some of the inspections and studies are in progress, and several capital projects have been identified from results to date.

The program strategy for emission sources that may require state air permits is to periodically update and evaluate the stack and vent survey to determine if additional permits are required. The sources for which permits are required will be evaluated to determine if additional pollution control equipment or upgrade is needed. In addition, to ensure that ongoing and planned actions meet the requirements of federal and state regulations, the ORNL Environmental Review and Documentation Program (ERDP) evaluates all new activities and is in the process of evaluating ongoing activities.

Permitted emission sources other than the ORNL steam plant are small systems located at scattered locations throughout ORNL that are not amenable to centralized pollution control equipment. In general, it is expected that small emissions from processes or shop operations will be treated on an individual basis by the operator of the facility, and the EP will be involved mainly with upgrading the larger, more centralized equipment that serves major emission sources. Major upgrade does not appear to be needed for most of the emission sources that currently have state air permits.

Other air emission sources that may contain pollutants but are not regulated by the CAA or the Tennessee Air Pollution Control regulations include room exhausts, exhausts from small-scale experiments, nonradioactive hood exhausts, and machine exhausts. Sources of this type are regulated by DOE Order 5480.10 (Contractor Industrial Hygiene Program), Occupational Safety and Health Administration (OSHA) standards, and Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment (by the American Conference of Governmental Industrial Hygienists). These sources at ORNL facilities have also been identified through the stack and vent survey but are not included in the Air Pollution Control Program.

However, changes in regulations will be evaluated periodically so that appropriate action can be taken if changes in regulations require permits or pollution controls for emissions in this category.

Detailed project information and financial summaries for the Air Pollution Control Program are provided in the remaining pages of this section. Detailed project information is provided in the form of Project Data Sheets (PDSs) and Project Schedule Sheets (PSSs), which are listed in Table 2.2. The PDSs provide details for each project, such as scope, justification, facilities, and detailed funding breakout by fiscal years from 1988 to 1995, as well as funding beyond FY 1995, and project total estimated cost. The PSSs give details of project activities over the span of each project, enumerating the steps to complete the project, most of which are program milestones.

Following the PDS and PSS package, detailed and summary-level financial information for the Air Pollution Control Program is presented. Tables 2.3 and 2.4 summarize the capital and expense funding, respectively, for all defined projects in this program area. Table 2.5 provides the overall funding summary by funding source.

Table 2.2. Air Pollution Control Program detailed project information

Project number	Project	Funding year	Total estimated cost (\$ × 1000)
2.00	Air Pollution Control Program	86	8735
2.03	Emergency Power System, 3039	87	150
2.05	Ventilation System Upgrade	93	1300
2.07	Upgrade 3047 Filter House	92	1400
2.08	Upgrade Cell Filtration, 3517	88	630
2.09	Upgrade 7913 Filter Pits	88	450
2.12	Upgrade Stack Fans, 3039	90	550
2.26	Gaseous/Liquid Waste Support Facility	91	538

AIR POLLUTION CONTROL PROGRAM

DETAILED INFORMATION

***PROJECT DATA SHEETS**

***PROJECT SCHEDULE SHEETS** **(AS SUMMARIZED IN TABLE 2.2)**

***FINANCIAL SUMMARY TABLES**

2.3 Air Pollution Control Program project summary—capital funding

2.4 Air Pollution Control Program project summary—expense funding

2.5 Air Pollution Control Program funding summary

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
B-14-1989

LAST UPDATE: 8/09/89

ACTIVITY PROJECT AIR POLLUTION CONTROL PROGRAM

CONTACT PEPPER SCANLAN

PROGRAM CATEGORY Air Pollution Control Program

PLANT: ORNL

PROJECT NO 2 00

STATUTORY REF CAA

NEEDS ASSESSMENT CAT:

EMP NO ERNG002, DPGF101, 107, 108

ENG. PROJ. NO:

EMP NO: 2.2.00

SCOPE This data sheet is not a summary of the Air Pollution Control Program. It covers the expense and capital equipment funding necessary to support program activities, including strategy development, studies and assessments, capital project definition, and technical support. It includes the outyear GPP budgets which are not covered by specific data sheets. Line-item and GPP funding which has been specifically defined is designated on the data sheet for each of those projects.

JUSTIFICATION This activity provides the expense, operating, and miscellaneous capital and equipment support necessary to provide an integrated strategy for and implementation of air pollution control measures. This includes management of airborne radioactive, hazardous, and mixed effluents and ensures compliance with the CAA, DOE Orders, NESHAPS, and other applicable regulations and guidelines.

FACILITIES: None

STATUS/COMMENTS:

FUNDING YEARS: 86-93			TEC (\$M1000): 8735										BEYOND FY-95
REF CODE	RA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
AR 05/DPGF107	BO	EXP	743	743	0	0	0	0	0	0	0	0	0
GF 01 02 06 0	BO	EXP	73	0	73	0	0	0	0	0	0	0	0
KG 02	BA	GPP	2000	0	0	0	0	0	0	500	500	500	500
KG 02 EP/ERKG	BA	EXP	1500	0	0	0	110	90	100	100	100	100	900
KG 02 EP/ERKG	BO	EXP	150	0	90	60	0	0	0	0	0	0	0
KG 02 WMCO/ER	BA	EXP	2100	0	0	0	300	250	300	250	200	200	600
KG 02 WMCO/ER	BO	EXP	1701	1223	288	190	0	0	0	0	0	0	0
KG 02/ERN022	BA	CE	468	0	30	63	225	0	30	30	30	30	30
TOTAL:			8735	1966	481	313	635	340	430	880	830	830	2030

1. Program Category ENVIRONMENTAL COMPLIANCE		2. Reporting Period 7/01/89 through 7/31/89									
3. Project Title A/R POLLUTION CONTROL PROGRAM FWP NO. : LK0002 ACTMITY NO. : KG 02 00 0		4. Program Representative C. M. KENDRICK/T. F. SCANLAN		Funding Type:							
		5. Project Engineer S. M. ROBINSON		Funding Year:							
6. Project Number WBS 200	7. Subproject Title	8. Fiscal Year and Months FY-1989		FY-1990							
		FY-1991									
		1	2	3	4	1	2	3	4		
	ISSUE INPUT FOR LONG-RANGE PLAN (MS K-2.1A LR-1 9/89) **										
	PROVIDE INPUT FOR FIELD WORK PROPOSAL (MS K-2.1B LR-1 2/89)										
	ISSUE DRAFT CURRENT YEAR WORK PLAN (MS K-2.1C LR-1 9/89)										
	ISSUE LETTER REPORT ON VENTILATION DUCTS INSPECTION (MS K-2.2.1 LR-2 4/89) *										
	ISSUE MAINTENANCE SURVEILLANCE PLAN FOR MAIN ORNL STACKS (MS K-2.2.2 LR-1 4/89)										
	ISSUE STATUS REPORT ON HEPA FILTER INSPECTION (MS K-2.2.3 LR-1 8/89)										
SHADING INDICATES STATUS AND COMPLETION		Comments									
ACTIVITY SCHEDULE		** Delayed to 9/89. Official approval granted on 7/3/89 by ORO * April distribution delayed by ORO. Proposal for 9/89 draft LRP submitted to URU									

1 Program Category
ENVIRONMENTAL COMPLIANCE

3 Project Title
AIR POLLUTION CONTROL PROGRAM

FWP NO ERK002

ACTIVITY NO K002 000

2 Reporting Period
 7/01/89 through 7/31/89

4 Program Representative

C. E. PEPPER

5 Project Engineer

F. P. DELOZIER

Funding Type

Funding Year

6 Project Number

WBS
 2 00

7 Subproject Title

8 Fiscal Year and Months
 FY-1989

FY-1990

FY-1991

1

2

3

4

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SUBMIT PRELIMINARY PROPOSALS FOR ALL
 ERK002 SPONSORED GPPs IN FY 1989
 AND FY 1990 TO DOE/ORD FOR
 APPROVAL (MS K-2.3.1 LR-4 8/89)
 UPGRADE 7913 FILTER F11
 (MS K-2.3.1 2.09 LR-2 7/90)

2 09

UPGRADE STACK FANS 3039
 (MS K-2.3.1 2.12 LR-2 1/91)

2 12

ISSUE FY 1990 K002 GPP PLANNING BASE
 LETTER FOR DOE APPROVAL
 (MS K-2.3.2 LR-4 12/88)

12

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 12 MONTH

SYMBOL
 MILESTONE LEVEL

0 1 2 3 4

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 9/09/89

ACTIVITY/PROJECT: EMERGENCY POWER SYSTEM, 3039

CONTACT: R. C. STEWART

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.03

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

FWP NO: DPGF107

ENG. PROJ. NO: 87-2

EPMP NO: 2.2.03

SCOPE: This project will provide a standby generator power system for the 3039 stack hot off-gas system equipment. It will replace the existing 375 KW diesel generator set in bldg 3125 and will continue to serve the existing loads. Equipment included will be a generator, transfer switch, control panel, timers, relays, and related components. This equipment will be located in bldg. 3125. A new diesel fuel tank will be provided by a separate project.

JUSTIFICATION: The hot off-gas system serving the 3039 stack, which provides ventilation capability for the ORNL Plant, currently has no backup electrical power. Unscheduled outages cannot be tolerated in this system. This problem has been identified in the recent 3039 System Safety Analysis Report as a deficiency. Increased diesel generator system capacity is needed to supply the new as well as existing loads. It is more economical to replace the existing diesel generator rather than provide a separate one for the 3039 stack hot off-gas system alone.

FACILITIES: A diesel generator with transfer switch, control panel, timers, relays, and related components.

STATUS/COMMENTS: Project revised to GPP. To start Construction in FY-90.

FUNDING YEARS: 87				TEC (\$M1000): 150									
				PRIOR									
B/R CODE	BA/BO	FUNDING TYPE	TOTAL	FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AR 05 DPGF107	BA	C2	150	150	0	0	0	0	0	0	0	0	0
TOTAL:			150	150	0	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: VENTILATION SYSTEM UPGRADE

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.05

STATUTORY REQ: CAA, CWA

NEEDS ASSESSMENT CAT:

FWP NO:

ENG. PROJ. NO: 90-2

EPMP NO: 2.2.05

SCOPE: This project provides modifications to the 4500 and 3500 area cell ventilation ductwork to reduce groundwater infiltration which will in turn reduce the volume of water which is drained from the ducts to the ORNL Process Waste Treatment Plant and also increase the efficiency of the Cell Ventilation system.

JUSTIFICATION: Groundwater currently leaks into underground ductwork in the subject areas due to the negative pressure of the ventilation system. This water becomes contaminated by contact with the ductwork and must be treated prior to release. In addition, leaking ductwork decreases the efficiency of the ventilation system.

FACILITIES: This project will provide repair/modifications to existing underground ductwork.

STATUS/COMMENTS: Project deferred to FY 1993.

FUNDING YEARS: 93		TEC (\$M1000): 1300											BEYOND
B&R CODE	BA/BQ	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
GF 01 02 06 0	BA	GPP	1300	0	0	0	0	0	0	1300	0	0	0
TOTAL:			1300	0	0	0	0	0	0	1300	0	0	0

1. Program Category
AIR POLLUTION CONTROL PROGRAM
 3. Project Title
VENTILATION SYSTEM UPGRADE
 FWP NO. DP2101
 ACTIVITY NO.

2. Reporting Period
 7/01/89 through 7/31/89
 4. Program Representative
 S. T. RUDELL
 5. Project Engineer
 F. P. DELOZIER

Funding Type
 GPP
 Funding Year
 FY-1992

6. Project Number
 WBS
 2 05

7. Subproject Title

8. Fiscal Year and Months																			
FY 1988				FY 1989				FY 1990				FY 1991				FY 1992			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FUNCTIONAL CRITERIA																			
ASSESSMENTS (SAFETY, QA, ADM)																			
STUDY AND ESTIMATE																			
DOE REVIEW																			
TITLE II DESIGN																			
BID AND AWARD																			
CONSTRUCTION																			

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 FORECAST

SYMBOL
 MILESTONE LEVEL 0 1 2 3 4

Comments

This is now scheduled as a FY 1992 project

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: UPGRADE 3047 FILTER HOUSE

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.07

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 90-2

EPMP NO: 2.2.07

SCOPE: This project will construct a remote changeout prefilter for the 3047 filter house.

JUSTIFICATION: The existing 3047 filter house requires hands-on change out of the contaminated HEPA filters by maintenance personnel. The proposed prefilter will entrain the bulk of the activity and allow for remote changeout of the highly contaminated filter media and will provide double HEPA filtration without reliance on the in-cell filters. This project is required to meet DOE ALARA principles.

FACILITIES: Facilities will include a shielded filter vault with internal filters and remote changeout mechanisms.

STATUS/COMMENTS: Functional Requirements to be revised.

2-22

FUNDING YEARS: 92		TEC (\$M1000): 1400											BEYOND FY-95
BSR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
GF 01 02 06 0	BA	GPP	1400	0	0	0	0	0	1400	0	0	0	0
TOTAL:			1400	0	0	0	0	0	1400	0	0	0	0

1 Program Category
AIR POLLUTION CONTROL PROGRAM

3 Project Title
UPGRADE 3047 FILTER HOUSE

FWP NO. 0002101

ACTIVITY NO.

6 Project Number
207

WBS

207

7 Subproject Title

FUNCTIONAL CRITERIA

ASSESSMENTS (JAPEL, QA, ADM)

STUDY AND ESTIMATE/PRELIMINARY PROPOSAL

DOE REVIEW

TITLE II DESIGN

BID AND AWARD

CONSTRUCTION

2 Reporting Period
7/01/89 through 1/31/89

4 Program Representative
S. T. RUDELL

5 Project Engineer
F. P. DELOZIER

Funding Type
GPP

Funding Year
FY-1990

8 Fiscal Year and Months

FY-1987

1 2 3 4

FY-1988

1 2 3 4

FY-1989

1 2 3 4

FY-1990

1 2 3 4

FY-1991

1 2 3 4

FY-1992

1 2 3 4

3

8

12

2

SHADING INDICATES STATUS
AND COMPLETION
ACTIVITY SCHEDULE

MONTH

FORECAST

SYMBOL
MILESTONE LEVEL 0 1 2 3 4

Comments:

The project is on hold until the future use of the facility can be evaluated

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: UPGRADE CELL FILTRATION. 3517

CONTACT: R. E. HELMS

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.08

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO: 88-2

EPMP NO: 2.2.08

SCOPE: Two above ground filter houses of commercial design will be installed in the 3517 cell ventilation system to provide double HEPA filtration of the air discharged to the 3039 stack. The existing filters which do not meet DOP test efficiency requirement will be used as prefilters.

JUSTIFICATION: Cell ventilation system must be upgraded to meet the double filtration, DOP-testable requirements while maintaining ventilation services.

FACILITIES: Construction of filter house to connect Building 3517 cell ventilation ducts to the 3039 Stack.

STATUS/COMMENTS: Concrete pad to support filter houses and foundation for duct supports are complete. Installation of valve in the water line that runs under the area has been completed. Delay in fabrication of filter house resulting from availability of stainless steel is being experienced.

FUNDING YEARS: 88		TEC (\$x1000): 630										BEYOND	
PER CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95..
GF 01 02 06 0	BA	GPP	630	0	630	0	0	0	0	0	0	0	0
TOTAL:			630	0	630	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: UPGRADE 7913 FILTER PITS

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.09

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO:

EPMP NO: 2.2.09

SCOPE: This project will provide sheet metal enclosures, hoists, and containment barrier over the 7913 filter pit.

JUSTIFICATION: The filters provide primary containment barriers between the NFIR and the environment. A cover is needed to prevent damage to the filters and corrosion of the sealing mechanism by rainwater leakage. The hoist and containment are needed to reduce radiation exposure and contamination release during filter change.

2-26

FACILITIES: Facilities include a sheet metal shed and hoist for the 7913 filter pit.

STATUS/COMMENTS: Construction in FY-90

FUNDING YEARS: 88		TEC (\$x1000): 450											
BER CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
MG 02	BA	GPP	450	0	450	0	0	0	0	0	0	0	0
TOTAL:			450	0	450	0	0	0	0	0	0	0	0

1 Program Category
AIR POLLUTION CONTROL PROGRAM
 3 Project Title
UPGRADE 7813 FILTER PIT
 FWP NO ERK0002
 ACTIVITY NO

2 Reporting Period
 7/01/89 through 7/31/89
 4 Program Representative
 S. T. RUSSELL
 5 Project Engineer
 D. A. CONATSER

Funding Type
 GPP
 Funding Year
 FY-1988

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 FORECAST

SYMBOL
 MILESTONE LEVEL
 0 1 2 3 4

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: UPGRADE STACK FANS 3039

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.12

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 89-2

EPMP NO: 2.2.12

SCOPE: This project will upgrade selected cell ventilation and hot off-gas fans and drive units that discharge air to the 3039 stack. The pressure control system for the 3092 process off-gas scrubber will also be upgraded.

JUSTIFICATION: Some of the present cell ventilation and hot off-gas fans and drive units have been in operation for over 20 years. The fans are subject to corrosion, metal fatigue and wear. Upgrade of the fans is needed to reduce fan failure rate and to thus increase the margin of safety for contamination control in the facilities. Upgrade of the pressure control system for the 3092 process off-gas scrubber is needed to prevent problems from the use of obsolete instrumentation.

FACILITIES: This project will upgrade selected cell ventilation and off-gas fans and drive units that discharge to the 3039 stack by replacement with modern units.

STATUS/COMMENTS: Preliminary Proposal is in preparation. Will be issued by 8/89.

FUNDING YEARS: 90			TEC (\$M1000):										BEYOND
PER CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
NG(350)	BA	GPP	550	0	0	0	550	0	0	0	0	0	0
TOTAL:			550	0	0	0	550	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: GASEOUS/LIQUID WASTE SUPPORT FACILITY

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Air Pollution Control Program

PLANT: ORNL

PROJECT NO: 2.26

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.2.26

SCOPE: A support facility for liquid and gaseous waste operations is needed. This facility would consist of hardware and equipment storage space as well as equipment maintenance facilities necessary to support the Central Radioactive Gas Disposal Facility and other stack gaseous emissions systems, the Process Waste Treatment Plant, and the Monradiological Wastewater Treatment Plant (MRWTP).

JUSTIFICATION: The proposed new facility is needed to ensure effective and efficient maintenance and support of Liquid/Gaseous process can be provided. Current facilities will not be adequate as the MRWTP begins operation. No existing space is available to provide these storage capabilities.

FACILITIES: Proposed facility would provide storage space for equipment used in the Liquid and Gaseous Waste Programs.

STATUS/COMMENTS: Functional Requirement need to be developed.

2-30

FUNDING YEARS: 91			TEC (\$x1000):										BEYOND
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
GF 01	BA	GPP	538	0	0	0	0	538	0	0	0	0	0
TOTAL:			538	0	0	0	0	538	0	0	0	0	0

Table 2.3. Air Pollution Control Program project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$M1000)									BEYOND
		TYPE	SOURCE		FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 95	
2 00	AIR POLLUTION CONTROL PROGRAM	GPP	KG	1000	0	0	0	0	0	500	500	500	500	
2 00	AIR POLLUTION CONTROL PROGRAM	CE	KG	468	30	63	225	0	30	30	30	30	30	
2 06	VENTILATION SYSTEM UPGRADE	GPP	GF	1300	0	0	0	0	0	1300	0	0	0	
2 07	UPGRADE 3047 FILTER HOUSE	GPP	GF	1400	0	0	0	0	1400	0	0	0	0	
2 08	UPGRADE CELL FILTRATION, 3517	GPP	GF	630	630	0	0	0	0	0	0	0	0	
2 09	UPGRADE 2913 FILTER PITS	GPP	KG	450	450	0	0	0	0	0	0	0	0	
2 12	UPGRADE STACK FAMS 3039	GPP	KG	550	0	0	550	0	0	0	0	0	0	
2 26	HAZARDOUS LIQUID WASTE SUPPORT FACILITY	GPP	GF	538	0	0	0	538	0	0	0	0	0	
FUNDING TOTALS:				7336	1110	63	775	538	1430	1830	530	530	530	

Table 2.4. Air Pollution Control Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$M1000)									BEYOND FY-95
		TYPE	SOURCE		FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95		
2 00	AIR POLLUTION CONTROL PROGRAM	EXP	GI	73	73	0	0	0	0	0	0	0	0	
2 00	AIR POLLUTION CONTROL PROGRAM	EXP	KG	4228	378	250	410	340	400	350	300	300	1500	
FUNDING TOTALS:				4301	451	250	410	340	400	350	300	300	1500	

Table 2.5. Air Pollution Control Program funding summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)								BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
GF	Capital-GPP	3868	630	0	0	538	1400	1300	0	0	0
GF	Expense	73	73	0	0	0	0	0	0	0	0
	Subtotal	3941	703	0	0	538	1400	1300	0	0	0
KG	Capital-CE	468	30	63	225	0	30	30	30	30	30
KG	Capital-GPP	3000	450	0	550	0	0	500	500	500	500
KG	Expense	4228	378	250	410	340	400	350	300	300	1500
	Subtotal	7696	858	313	1185	340	430	880	830	830	2030
Program Totals	Capital	7336	1110	63	775	538	1430	1830	530	530	530
	Expense	4301	451	250	410	340	400	350	300	300	1500
	Grand Total	11637	1561	313	1185	878	1830	2180	830	830	2030

3. WATER POLLUTION CONTROL PROGRAM

OVERVIEW

DOE-ORO and Energy Systems have developed a joint policy that addresses the broad category of radioactive, radioactive mixed with hazardous, and hazardous wastes for both solids and liquids. Objectives of the Water Pollution Control Program have been written to incorporate this policy into the strategy for upgrading facilities. The objectives of the Water Pollution Control Program are outlined below.

- Reduction of risk to human health and the environment
 - Limit the risk of contaminating the environment
 - Limit employee risk by continuing to implement the DOE ALARA policy
 - Limit public risk by continuing to implement the DOE ALARA policy
- Regulatory compliance
 - Comply with established regulations and DOE orders and QA requirements
 - Prepare for compliance with proposed regulations and orders
- Stream operations improvement
 - Minimize waste generation through modifications at the source
 - Segregate waste according to waste acceptance criteria
 - Reduce the volume and hazards of waste through improved waste treatment
 - Ensure that facilities for waste treatment are available

The Water Pollution Control Program at ORNL is divided into six categories, as shown in Fig. 3.1 and described below.

Liquid low-level waste (LLLW). Waste solutions having a significant amount of radioactivity are considered to be LLLW. The LLLW Treatment Plant (Bldg. 2531) can process streams that have radioactivity levels as high as 0.2 TBq/L (20.0 Ci/gal). LLLW at ORNL originates from hot sinks and drains in R&D laboratories and from facilities such as the radiochemical pilot plants, nuclear reactors located in Bethel and Melton valleys, and the Process Waste Treatment Plant (PWTP, Bldg. 3544).

Process waste. Process wastes (PW) consist of all liquid wastes that are not normally radioactive or hazardous but may periodically be contaminated. Process wastes at ORNL include wastes collected from numerous laboratories and facilities in Bethel and Melton valleys and condensate from the LLLW evaporators. This general category of liquid waste can contain small quantities of radionuclides, metals, anions, and organics.

Area sources. Wastes from area sources consist of (1) runoff from general use areas such as buildings, roads, and parking areas collected by the storm sewer system; (2) waste collected from contaminated areas such as the low-level (radioactive) waste (LLW) tank farms; and (3) contaminated groundwater that is transferred to the liquid waste system.

Fig. 3.1. Liquid waste categories included in the Water Pollution Control Program.

Point sources. Point sources include coal yard runoff and discharges from several cooling towers at the ORNL site. The coal yard stores coal for use by the ORNL steam plant. During periods of rainfall, runoff from the coal pile is produced. This runoff, which is actually a leachate, is acidic and contains coal fines as well as some heavy metals. Cooling tower discharges contain algae-retardant chemical additives that can be toxic to aquatic life.

Sanitary sewage waste. Sanitary sewage wastes are collected and treated separately from other waste categories. Sanitary waste at ORNL consists of typical industrial sanitary sewage from the Bethel and Melton valley facilities, where approximately 5200 people are employed.

ORNL facilities at the Y-12 Plant. The major ORNL activity at the Oak Ridge Y-12 Plant involves the Biology Area PW streams. Process wastewater is generated by diverse operations such as laboratory sinks, glassware washers, bottle washing and soaking tanks, animal cage washers, and sterilizer condensate.

The treatment processes involved in each waste system are described below.

LIQUID LOW-LEVEL WASTE SYSTEM

The LLLW system (Fig. 3.2) at ORNL is used to collect, neutralize, concentrate, and store aqueous radioactive waste solutions from various sources at a rate of approximately 99 m³ (26,000 gal) each month. There are three source categories for LLLW:

1. Process-generated LLLW. Most of the LLLW is process related. Significant generators of LLLW are the PWTP, the Fission Product Development Laboratory, and the High Flux Isotope Reactor (HFIR). Other process-related sources of LLLW include the fuel rod polishing operation in Building 3525 and the Radiochemical Engineering Development Center (REDC).
2. Laboratory-generated LLLW. Much of the LLLW is from the diverse Laboratory-scale operations and experiments being carried out plant-wide. The primary contributors are located in the 4500 complex.
3. LLW generated at Remedial Action tanks. Rainwater and surface water contribute to the volume of LLLW. Tanks W-17, W-18, and W-1A (shown in Fig. 3.3) collect surface water accounting for 10% of the total volume of LLW collected. Other inactive tanks (e.g., gunite tanks) collect some rainwater, but this LLW is not routinely transferred to the LLLW evaporator.

Waste solutions from the source buildings are discharged into the LLLW Collection and Transfer (CAT) system. Each collection tank in this system receives waste from one or more source buildings. The locations of the 22 collection tanks are shown in Fig. 3.3. Each collection tank is equipped with liquid-level instrumentation and a filtered vent to the atmosphere or to the off-gas system of the facility that it serves. A network of 0.05- and 0.08-m (2- and 3-in.) stainless steel lines buried directly in the ground connect the collection tanks to a 0.15-m (6-in.) doubly contained, stainless steel collection header that directs the flow to storage tanks. Waste is transferred by pump or steam jet.

Waste solutions that accumulate in the collection tanks are periodically transferred via the central collection header to large [189,250-L (50,000-gal)] stainless steel central collection and storage tanks near the LLLW evaporator (Fig. 3.4). These tanks are enclosed in underground stainless-steel-lined concrete vaults.

Waste from the central collection tanks is transferred by steam jet to the evaporator, in which the aqueous solution is concentrated. The volume-reduction factor averages approximately 17:1. The

Fig. 3.2. Existing LLLW collection, transfer, and treatment system.

Fig. 3.3. Location of LLLW tanks at ORNL.

Fig. 3.4. LLLW service tanks, evaporator, and storage tanks.

overhead from the evaporator contains minor amounts of radioactivity that are sent to the process waste system (Fig. 3.4) for further cleanup before discharge to the environment. The volume of solution in the evaporator is reduced until a predetermined specific gravity of 1.25 is reached. This concentrate is then transferred to one of several 189,250-L stainless steel storage tanks located near the evaporator or in Melton Valley near the hydrofracture site through a buried, cathodically protected, doubly contained stainless steel line.

From the mid-1960s to August 1984 the concentrate was mixed with additives to form cementitious grout and disposed of by the hydrofracture process. Since hydrofracture is no longer used, the LLLW storage tanks are quickly reaching their capacity. In 1988, an emergency-avoidance solidification campaign was completed in which 2×10^5 L (50,000 gal) of LLLW stored in these tanks was solidified in concrete. At the present LLLW concentrate generation rate (8 m³, or 2200 gal, per month in 1988), the LLLW storage tanks will reach their capacity in 34 months. Increased activity in the decommissioning and remedial action areas could significantly change this estimate. The limited storage tank capacity has had an impact on the long-term strategy for both the LLLW and the process waste systems. Steps are being taken to reduce the amount of LLLW produced at ORNL, and long-term treatment options for LLLW are being studied.

The LLLW CAT system was designed in the 1950s and now needs upgrading. Most of the floor drains, collection tanks, and transfer lines are singly contained and, in many cases, are in very poor condition. Many of the storage tanks are also singly contained. The system had a design life of approximately 30 years, but most of the system has exceeded its life expectancy. The upgrade is being designed and will be implemented in the mid-1990s.

To provide early indications of any leaks and prevent environmental insult, integrity assessments are regularly performed for ORNL's active LLLW collection and storage tank systems. These assessments include material balances, pressure tests of infrequently used lines, and sampling of tank dry wells, as summarized in Table 3.1.

The \$3M Waste Operations Control Center (WOCC) provides a central focus for systems control and assessment. Continuous monitoring and data storage for waste management operations are provided at the WOCC. The WOCC receives and processes approximately 300 signals from field sensors. Levels and conditions of the active LLLW tanks are included in the parameters monitored at the WOCC.

Material balances are provided through continuous monitoring of tank liquid levels, which are specifically recorded six times daily (three times each shift). Unexplained variations greater than 1% are investigated further to determine whether they are caused by leaks. In addition, once each day a field technician checks the local level indicator for each tank. Discrepancies with a remote reading of greater than 5% are further investigated.

Table 3.1. Integrity assessments performed for active ORNL LLLW tanks

Integrity test	Subject	Frequency
Volume balance	Tanks	6/day
Volume balance	Lines between tanks	Each transfer
Volume balance	Strategic lines from generator drains to tanks	Annually
Dry-well monitoring	Tanks	Continuously
Dry-well sampling	Tanks	Monthly
Pressure testing	Specific transfer lines	Each transfer

Material balances are also performed for all transfers between tanks and annually for lines between strategic generators' drains and collection tanks. Each time waste is transferred from a collection tank to a storage tank, the change in level of each tank is compared, within a specified margin of error, to ensure that waste has not leaked from piping during the transfer. Once each year, selected drain lines that receive heavy use are subjected to material balance. A premeasured volume of water is discharged and compared to the corresponding level of the receiving tank.

Infrequently used lines are pressure-tested before each transfer. Pressure-tested lines include lines between the Central Pumping Station (CPS) and the HFIR, the Transuranium Processing Plant (TPP), the Melton Valley Storage Tanks (MVST), and the Evaporator Facility in Bethel Valley. The lines must hold a pressure of 30 psi for 30 min.

In addition to material balance and pressure testing, many of the tanks have dry wells, which are monitored continuously and sampled monthly. Changes in the levels of radioactivity in the dry wells are indications of possible leaks and are further investigated.

Results of the integrity assessments to date have shown no leaks in active tank systems. In the past, tanks found to be leaking have been taken out of service to mitigate environmental impacts. These inactive tanks are being managed by the ORNL Remedial Action Program.

PROCESS WASTE SYSTEM

Process wastes are collected by the PW system and treated at the PWTP. The existing PW system is shown schematically in Fig. 3.5. The system is designed for waste streams that are normally nonradioactive or contain insignificant levels of radioactivity. Some streams may occasionally contain radioactivity; such streams are monitored to permit diversion to the PWTP if significant radioactive contamination is found. The system also collects water that is contaminated with very low levels of radioactivity (including groundwater), in addition to condensate from the LLW evaporator.

The PW collection system is constructed of vitrified clay pipes and manholes. Most of the system was constructed in the 1940s and expanded in the 1950s and 1960s. Process wastes from Bethel Valley generators other than the 4500 area flow by gravity to the open, unlined Equalization Basin (3524). Process wastes from the 4500 area drain to unlined ponds 3539 and 3540 (also called the 190 Ponds). The contents of 3539 and 3540 are normally discharged to White Oak Creek (WOC) because the activity level is acceptably low; otherwise, the wastes are pumped to the Equalization Basin for treatment in the PWTP before discharge to WOC.

Process wastes generated in the Melton Valley complex flow by gravity to four unlined ponds (7905, 7906, 7907, and 7908). The contents of these ponds are normally discharged to Melton Branch unless the activity level exceeds limits; the wastes are then pumped to the Equalization Basin (3524) in Bethel Valley. The limits for discharge from all ponds are currently <1 beta cpm/mL, <1 alpha cpm/mL, and pH between 6.5 and 8.5. The NPDES permit requires that 24-h composite samples be taken twice a month. The permit further requires that "no discharge of floating solids or visible foam" be allowed. Nonradioactive PW is currently discharged untreated to the watershed from the 2000 area, the 1500 area, and the Oak Ridge Reservation (ORR) Makeup Water Demineralizers. The flow from MH229 is monitored for radioactivity and diverted to the PWTP if radiation is detected.

Each month, about 20,000 m³ (5.2×10^6 gal) of PW containing 1200 Bq/L (33 nCi/L) of gross beta activity are collected for treatment and about 21,000 m³ (5.5×10^6 gal) of untreated

wastewater are discharged to WOC. The flow diagram in Fig. 3.6 shows the processing steps, including clarification, filtration, and ion exchange, and also includes the column regeneration step. The bulk of the radioactive material is removed from the waste by the PWTP clarifier and ion-exchange columns, which are operated to achieve high decontamination factors. The sludge from the clarifier is passed through a filter press to reduce the liquid content and is then sent to storage. Most of the concentrated radioactive material resulting from the regeneration of the PWTP ion-exchange columns is currently evaporated to about 40% solids at the PWTP and then transferred to storage tanks at the LLLW evaporator building.

Beginning in 1990, all of the process wastewater will be collected in tanks and treated in a new Nonradiological Waste Treatment Facility (NRWTF). Radioactively contaminated process wastewater will be treated for removal of the radionuclides in the PWTP and then combined with the currently untreated process wastewater for treatment at the NRWTF (Fig. 3.7). The NRWTF will provide for the removal of suspended solids, heavy metals, and organics. A simple flow diagram of the treatment plant is shown in Fig. 3.8.

The NRWTF will provide for the collection and treatment of various major process wastewater streams from ORNL. Specifically, these wastewater streams are

1. Bethel Valley sources
 - 4500 complex (3539 and 3540 ponds, also known as 190 Ponds)
 - PWTP effluent (Bldg. 3544 effluent)
 - 2000 area
 - 1505 area
 - 3518 Acid Neutralization Facility
 - High Temperature Materials Laboratory
 - Other miscellaneous sources
2. Melton Valley sources
 - HFIR
 - TRU Processing Facility
 - Thorium-Uranium Recycle Facility

A single NPDES discharge and monitoring point will be maintained at the plant outfall and will include discharges from all ORNL process waste generators.

The process waste CAT system is also being upgraded. The original piping system has begun to leak and is being repaired by in situ lining of the pipes. The system is also being upgraded to segregate radiological and nonradiological process wastewaters.

AREA SOURCES

Storm Sewer System

The storm sewer system for the Laboratory handles water from area runoff of rainwater, roof drains, storm drains, and parking lot drains. The ORNL watershed consists of First Creek, Fifth Creek, WOC, the Northwest Tributary, and Melton Branch. Figures 3.9, 3.10, and 3.11 show the location of discharges from the storm sewer system to the watershed.

Most of the storm sewer system is constructed of reinforced concrete piping that ranges in diameter from 20 to 76 cm (8 to 30 in.). Piping has been placed in trenches that were typically backfilled with gravel. The system contains catch basins that drain areas in Bethel and Melton

Fig. 3.6. Process flow diagram of the Process Waste Treatment Plant.

Fig. 3.7. Upgraded process waste system.

Fig. 3.8. Process flow diagram of the Nonradiological Waste Treatment Facility.

Fig. 3.9. First Creek storm sewer outfalls.

Fig. 3.10. Fifth Creek storm sewer outfalls.

Fig. 3.11. White Oak Creek storm sewer outfalls.

valleys. Typically, storm sewer piping has been installed at a higher elevation than other piping systems within the main plant area. Once-through cooling water and inappropriate PW connections to the storm sewer system contribute to the volume of water handled by the system.

The NPDES permit for ORNL established three categories of discharges collected by the storm sewer system. NPDES permit Category I discharges are composed of rainwater. Category II discharges include the drainage from buildings and areas with no process effluents (i.e., building roof drains, parking lot runoff, cooling water discharges, etc.). Category III discharges include drainage from buildings and areas that indicate the presence of untreated PW. A preliminary characterization of discharges from the storm sewer system to the ORNL watershed indicated that there are Category III wastes entering the storm sewer system that are being discharged to the watershed without treatment. A general plant project has been completed in which a portion of the storm drain system was upgraded. Recent sampling results indicate that most Category III waste streams no longer exist. Exercises have begun to have these discharge points changed to Category II. The performance of the storm system will continue to be monitored and upgraded.

Groundwater System

ORNL subsurface hydrology is being fully characterized through the RAP. Current information indicates that the bedrock underlying the Bethel Valley site is predominantly limestone of the Chickamauga Group and that solution channels independent of surface drainage exist in the limestone. Groundwater occurs on the ORNL Bethel Valley site under water-table conditions rather than artesian conditions. Thus, groundwater discharge contributes to the base flow of surface streams in the area and ultimately augments the flow of the Clinch River.

The water-table map constructed from data obtained from observation wells indicates that in general the groundwater table is a subdued replica of the land surface at the Bethel Valley site. Thus, water flows from areas of high elevation to those of low elevation, and the principal movement is in directions normal to the contour lines. The lay of the land is such that drainage at and below the surface of the Bethel Valley site apparently converges to empty into WOC and WOL. An exception to this situation occurs at the western end of the Bethel Valley site, where the groundwater west of a groundwater divide flows west into the Racoon Creek drainage basin rather than into WOC. However, groundwater collection points, such as sumps, can be seen on the water-table map as depressions in the water table. The natural system has been modified by the construction of subsurface piping, sumps, and tank farms. The impact of the groundwater table on the liquid waste systems will be discussed further.

Seven locations in the Bethel Valley area of ORNL have been identified as points where contaminated groundwater is collected in the PW system, thus contributing to the total volume of PW that must be treated prior to discharge. The seven sources of contaminated groundwater are

1. Oak Ridge Research Reactor pipe case
2. 3047 area
3. Tank Farm drainage
4. South Tank Farm/3517 ventilation sumps
5. Isotopes Area drainage
6. WC-10 dry well
7. WC-8 sump

Fig. 3.12. Location of imleakage to process waste system in Bethel Valley.

Fig. 3.13. Groundwater leakage to LLLW system.

POINT SOURCES

Coal Yard Runoff

The coal yard, which stores coal for use by the ORNL steam plant, is located south of the steam plant at the west end of ORNL. The steam plant provides steam for space heating and process needs and for the steam turbines used for backup emergency operations of gaseous exhaust systems. Four of the five steam plant boilers operate on coal. Maximum coal consumption is 32,000 tons per year.

The coal yard, which has an area of 1.0 ha (2.5 acre), has a storage capacity of approximately 22,000 tons. Coal yard runoff from rainfall is currently collected in a 1135-m³ (40,000-ft³) basin. Discharge from the collection basin may be as high as 24,600 m³ (869,000 ft³) per year. The runoff from the coal pile is acidic and also contains coal fines and trace amounts of heavy metals leached from the coal. The coal pile from which the runoff occurs has the approximate characteristics listed in Table 3.2.

Table 3.2. Coal pile specifications

Total moisture, maximum	8%
Ash (dry basis), maximum	8%
Sulfur (dry basis)	2 to 3%
Delivered heat content, minimum	13,000 Btu/lb
Ash softening temperature, minimum	2300°F
Size	3/8-1 1/4 in.
Fines, maximum	5%
Other	a

^aWashed and substantially free of surface impurities such as earth, wood, rock, slate, or pyrite.

A flow diagram of the Coal Yard Runoff Treatment Facility (CYRTF) is presented in Fig. 3.14. The wastewater to be treated in the facility is stored in a 757,000-L (200,000-gal) collection basin until enough wastewater is collected to operate the CYRTF. The wastewater from the collection basin is pumped into the pH adjustment tank (tank T-2), where it is mixed with a lime slurry [0.12–0.18 kg/L (1.0–1.5 lb/gal) of lime] from the lime slurry tank (tank T-2), until a pH of about 10.5 is obtained. From the pH adjustment tank, the wastewater flows to the clarifier, where polymer is added and the solids are settled. The solids from the settler are stored in the sludge storage tank (tank T-7) until enough sludge has been collected to be treated by the rotary drum vacuum filter. The liquid effluent from the clarifier enters a recycle tank (tank T-12), where sulfuric acid is added to adjust the pH of the wastewater to the 6.0 to 9.0 range. The effluent from the recycle tank flows to a discharge basin before being discharged to WOC through an NPDES discharge point. The facility is designed to automatically recycle the wastewater to the recycle tank should the pH recorder or turbidity meter indicate the wastewater is out of specification. This flow path is indicated in Fig. 3.14 by the dashed line.

The CYRTF may also be used for treatment of regenerate solutions from the steam plant boiler makeup water demineralizers. Feasibility studies have been conducted, and an Engineering Study and Estimate will be performed in FY 1989. If the results are cost effective, the CYRTF will be upgraded to handle this waste stream, which will result in increased use of the treatment system.

Cooling Tower Discharges

There are 26 operating cooling towers at the ORNL site. Buildings in Bethel and Melton valleys are serviced by 23 cooling towers; the ORNL nuclear reactors are serviced by 3 cooling towers. Chemical pollution associated with operation of all 26 cooling towers and potential radioactive pollution associated with the operation of the 3 cooling towers that service the reactors will be controlled through the Water Pollution Control Program.

Analytical studies, performed to define a strategy for attaining compliance with the NPDES permit requirements, have determined that chemical pollution due to the use of a toxic biocide and chlorine in cooling tower water treatment may contribute to the mortality of minnow larvae and *Ceriodaphnia* and also cause high residual halogen in surface streams. In addition, analysis has

Fig. 3.14. Flow diagram of the CYRTF.

indicated that the potential exists for the release of radioactive pollutants into surface streams via reactor cooling tower discharges. The probability of release has been reduced, and additional measures are being considered.

SANITARY SEWERS

The sanitary wastewater treatment facility, located in Building 2521 at the west end of ORNL near the steam plant, serves a major part of ORNL. Sanitary wastes from the main plant and from HFIR, which are trucked to the plant, are treated by the facility before release to WOC.

The facility consists of a waste influent pumping station equipped with comminutors (to break up solids) and level controllers, chlorination equipment, flow recording and effluent sampling equipment, a Parshall flume and chlorine contact basin, and a control/laboratory building (see Fig. 3.15).

Upgrading of the sewage treatment plant was completed in September 1985. This involved the addition of a packaged extended-aeration treatment plant, an average/peak flow head box system, a sewage pumping station, and a tertiary filter system; inflow/infiltration rehabilitation of the sewage piping; and modifications to existing facilities, including the West Lagoon, the sludge drying beds, and the pumping station.

Phases I and II of an inflow and infiltration reduction project were completed in November 1985 and reduced the excess in sewage flow as a result of rain by approximately 30% (about 568,000 L/d (150,000 gal/d)). This has enhanced the effectiveness of sewage treatment and improved ORNL's capability for achieving NPDES compliance by (1) maintaining a more nearly

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Fig. 3.15. Block flow diagram for new sewage treatment plant.

constant hydraulic loading and (2) keeping the nutrient concentration at a higher level. The effluent discharge limitation requirements are shown in Table 3.3.

Table 3.3. Design conditions for the new sewage treatment plant: effluent discharge limitations

Ammonia nitrogen	1.8 mg/L
BOD5	5.0 mg/L
Chlorine residual	0.5-2.0 mg/L
Fecal coliform	200/100 mL
	monthly mean
	400/100 mL
	weekly mean
pH	6.0-9.0
Settleable solids	0.5 mL/L
Suspended solids	10.0 mg/L

ORNL FACILITIES AT Y-12

ORNL facilities at Y-12 include portions of several ORNL divisions, including the Biology Division, Operations Division, Fusion Energy Division, and Engineering Technology Division. All of these divisions are involved in activities related to biological research, reactor development, controlled thermonuclear research, and stable isotopes separation. Wastes generated at these facilities were originally discharged to East Fork Poplar Creek (EFPC). However, the CWA, enforced by state of Tennessee laws and regulations and supported by DOE orders, established the Federal Facility Compliance Agreement, which requires the Y-12 Plant to eliminate untreated and unmonitored discharges of wastewater to the Y-12 Plant watershed; therefore, the Y-12 plant waste facilities were upgraded.

The Biology Area process waste streams required the most upgrades. The Biology Division complex discharges wastewater from diverse sources such as laboratory sinks and equipment, mouse cage and rack washers, glassware washers, sterilizer condensate systems, and bottle washing and soaking tanks. Process wastewater contains organic contaminants from animal care and research facilities and residual chlorine and detergents from sterilization and cleaning operations. The Biology Division operations were reviewed, and, to the extent possible, procedural changes and administrative controls have been instituted to reduce both the volume of wastewater for treatment and the pollutant concentrations. However, some aspects of the animal care program and laboratory operations could not be modified sufficiently to ensure continuous compliance with the concentration limits. Therefore, provisions have been made to treat this waste stream.

The process collection system has been upgraded to segregate the Biology Division process wastewater from nonprocess wastewater, as shown in Fig. 3.16. The process water is being collected and treated at the Oak Ridge City Sewage Treatment Plant. The nonprocess wastewater will be transferred to the EFPC via the storm sewer.

SUMMARY OF REGULATIONS

The Water Pollution Control Program at ORNL is influenced by several regulations and orders as described in the following paragraphs.

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Fig. 3.16. Process flow diagram of the existing Biology Area wastewater system.

Tennessee Laws and Regulations

The state of Tennessee has promulgated rules which establish standards of water quality, enforce RCRA regulations, classify surface water into seven categories of use, control underground injection of wastes, and protect groundwater.

Federal Resource Conservation and Recovery Act

RCRA governs the management of hazardous materials and underground storage tanks. The RCRA Subtitle C final rules for management of hazardous waste storage tanks were promulgated on July 14, 1986, and went into effect on January 12, 1987. This regulation does not alter the permit status of wastewater treatment tank systems. The final rule specifies secondary containment, materials compatibility with wastes, corrosion protection, and leak detection for systems regulated under this rule. Maintaining compliance with RCRA significantly impacts the strategy for the LLLW system.

RCRA 3004(u) requires corrective actions for all releases of hazardous waste or hazardous constituents from any solid waste management unit at an RCRA facility. Corrective actions are required beyond the boundary of a facility where such action is necessary to protect human health and the environment. These requirements will be implemented at ORNL through RAP.

Waste minimization is required by the 1984 Hazardous and Solid Waste Amendments to RCRA. Congress stipulated that waste minimization efforts must be reported annually, but no quantitative limits have been set.

Federal Clean Water Act

The CWA regulates the discharge of nontoxic and toxic pollutants into surface waters. The state of Tennessee issued an NPDES permit to ORNL that became effective April 1, 1986. The permit includes a Federal Facility Compliance Agreement which delineates specific completion dates for system improvements. The permit designates categories of waste and outlines discharge requirements. The ORNL NPDES permit requires the implementation of Best Management Practices (BMP).

Federal Safe Drinking Water Act

The SDWA mandates establishment of uniform federal standards for drinking water quality and sets up a system to regulate underground injections of wastes and other substances that could contaminate underground water sources.

Department of Energy Orders

DOE is responsible for promulgating regulations, guidelines, and performance standards relative to certain aspects of the operations of DOE facilities. DOE has established orders and guidelines for the conduct of operations at contractor-operated sites that manage radioactive, hazardous, and mixed waste by setting a policy for compliance with public laws.

A revision to DOE 5820.2, *Radioactive Waste Management*, has been implemented "based on environmental protection policies and standards . . . derived from draft 5480.xx and draft 5480.12" (memorandum from Thomas B. Hindman, Jr.; subject: Review of Draft DOE Order 5820.2,

Radioactive Waste Management, dated September 30, 1987). The revision increases required documentation in the following areas for all categories of waste:

- site performance assessment
- waste characterization
- waste certification
- waste acceptance criteria
- waste treatment
- waste systems performance and cost
- safety analyses
- operating safety requirements
- operating procedures for all steps
- maintenance procedures
- monitoring plans
- emergency response plans
- closure plans
- shipment and storage plans
- waste minimization plans
- reports on progress against plans
- forecasts (generation, shipment, treatment)

Maintaining compliance with this order significantly impacts the strategy for the liquid waste system. Many of the concepts outlined above are incorporated in the present water pollution control strategy; however, comprehensive implementation would require a dramatic increase in staff.

DOE-EPA Interagency Agreement

The EPA has proposed to place ORNL on the Superfund National Priority List and is negotiating an interagency agreement with DOE for Superfund cleanup activities. The agreement will set the requirements for mixed, hazardous, and radioactive waste tanks at ORNL. This agreement may significantly impact the strategy for the LLLW CAT system.

PROGRAM STRATEGY

The diverse R&D activities at ORNL produce a wide variety of liquid wastes that, in combination with the natural characteristics of the sites, present an extremely complex challenge for waste management disposal. In this context, plans and strategies must be flexible, dynamic, and responsive to effectively address this complexity in the climate of changing regulatory requirements.

Long-range planning reflects the strategy for characterization and evaluation, project identification and definition, R&D support, capital project implementation, expense-funded activities, and operation of the waste management facilities to meet the general objectives outlined in the overview to Sect. 3. Particular attention is given to source terms, the CAT systems, and the processing and disposal facilities.

Expense funding is used to perform technical studies needed to define and characterize each potential project, conduct R&D to determine how to address needs, and identify appropriate actions to be taken. Capital funding is then used to implement projects required to meet program objectives. Current planning is to proceed with a continuum of expense activities and capital

projects, factoring into the planning and strategy the results of R&D activities, improvements identified by characterization work, and regulatory compliance requirements.

The general program strategy is depicted in Fig. 3.17. Detailed strategies for LLW, PW, and area sources are shown in Fig. 3.18, and for sanitary sewage, point sources, and ORNL facilities at the Y-12 Plant in Fig. 3.19. The functional areas used for strategy development and planning are outlined in the left column and include generation, waste transfer and operational monitoring control, waste collection, waste treatment, waste disposal and discharge, and environmental monitoring and permitting. Figures 3.18 and 3.19 illustrate both existing and proposed facilities and actions.

The LLW system, the PW system, and area sources are interrelated. Figure 3.20 illustrates this relationship. The LLW and PW systems treat contributions from generators, groundwater, and surface water. A strategy is being developed to meet the objectives of improving the efficiency of the overall liquid waste system, minimizing total hazardous and radioactive waste generation, and reducing risk to humans and the environment while meeting regulatory requirements. The long-range planning for this integrated system will be described below. Long-range plans that impact only individual waste systems will then be discussed.

Liquid Waste System

Implementing activities that control radioactive and hazardous wastes at the source improves system operations by minimizing and segregating waste. The following modifications have been identified as ways to minimize waste generation at the source. They include

- charge-back of waste management to the waste generator,
- implementation of the BMP Plan, and
- a characterization and tracking system that includes generator compliance with waste acceptance criteria.

Evaluating improvements in waste generation depends on the initiative of the generators. To date, generators have been responsible for implementing waste minimization activities at individual buildings. The EP and WMO have identified problem areas and supported generators in seeking solutions. In the future, a liquid-waste certification program will be implemented to train generators in waste segregation and minimization techniques.

The driving force for generators to implement waste minimization activities is primarily the charge-back of waste collection, treatment, and disposal costs so that employees are made aware of the actual costs of disposal. A plan for charging back costs was first developed during FY 1986. The basis for charge-back is reviewed annually to incorporate additional costs associated with waste handling techniques, which are being improved, and costs associated with regulatory requirements, which are being incorporated into waste handling practices.

The generation of process waste and LLLW is presently characterized through building inventories. Source to final disposal characterization, documentation, and tracking systems are being initiated for PW and/or LLLW. Detailed waste stream characterization will be accomplished through the liquid-waste certification program required by DOE Order 5820.2A and currently in the development stages.

This detailed characterization and tracking system will be used to meet several water pollution control objectives. The data will be used as input for an ongoing liquid-waste systems analysis to

LIQUID WASTE MANAGEMENT STRATEGY

Fig. 3.17. Liquid waste management strategy.

3-29

Fig. 3.18. Water Pollution Control Program strategy—Part I.

Fig. 3.19. Water Pollution Control Program strategy—Part II.

ORNL-DWG 86-086A

Fig. 3.20. Relationships of low-level radioactive process waste and area waste.

provide a comprehensive evaluation for liquid-waste system upgrades, to determine BMP, and to reduce the generation of hazardous and radioactive wastes.

Detailed characterization and tracking will also improve stream operations by providing WMO with data necessary to identify problem areas. Waste will be segregated according to required treatment rather than historical classification. Discharges to the process waste system that are categorized as LLLW and to the PWTP that are categorized as nonradioactive process waste will be identified and diverted to appropriate treatment. Capital projects have been implemented to eliminate known areas of improper flows. Additional locations for segregation of waste will be identified as characterization data become available.

Changing the piping system at the source of waste generation, improving the integrity of the piping systems, and segregating waste streams within the collection systems are typical examples of good waste management practices. Specific examples are described below.

Building inventories identified two electroplating operations (Bldgs. 3587 and 2525) that discharge untreated waste to the storm sewer. Upgrades are being made to eliminate these process waste discharges to the watershed.

Sources of contamination due to exfiltration from leaking process waste piping has been reduced by two FY 1986 GPPs scheduled to line sections of both the radiological and nonradiological process waste systems. The Category III outfalls will be sampled again to determine the effect, if any, of the lining on the composition of the discharge from the storm drains.

The Materials Testing Laboratory, which is located in Building 4500S, is a major user of cooling water. Results of the NPDES Biological Monitoring Plan indicated that aquatic life is affected by the free and residual chlorine content of cooling water discharged to WOC. The recycle of machine cooling water is also consistent with sound water management practices. An FY 1988 GPP, Wastewater Piping Replacement, is providing funding to install a system to recycle cooling water in the Materials Testing Laboratory.

The CWA GPP is identifying nonradioactive sources in the process waste system that can be diverted around the PWTP and sent directly to the NRWTF. This will reduce the amount of LLLW generated by the PWTP.

The intrusion of surface water and groundwater in cell ventilation filter pits, dry wells, tank farm vaults, and tanks is a source of LLLW. These sources have been evaluated, and initial corrective actions have been taken. A continuation of efforts to determine sources of surface water and groundwater that should be eliminated from the LLLW system will result in a reduction of waste requiring treatment.

Approximately 50% of the volume of process waste is attributable to surface water and groundwater collection and infiltration. The intrusion of surface water and groundwater in the cell ventilation system, dry wells, tank farm sumps, and piping is a source of process waste. These sources have been evaluated, and initial corrective actions for piping upgrade have been taken. Continued efforts to determine sources of surface water and groundwater that should be eliminated from the process waste system will result in a reduction of waste requiring treatment.

An investigation of process waste piping in Bethel and Melton valleys was conducted during FY 1986. The study included smoke testing of selected process waste lines, televising 1500 m (5000 lin ft) of pipe, and determining the volume of inleakage to the process waste system. The inspection indicated that inappropriate connections exist, some pipes are crushed, most pipes are cracked, joints are offset, and inleakage of groundwater is prevalent.

Two capital projects have replaced sections of process waste piping to reduce surface water inflow and groundwater infiltration—the Process Waste Inflow/Infiltration (FY 1986 AT GPP) and the Upgrade Process Waste Collection System, 3000 Area (FY 1986 KG GPP). Field work begun in 1987 resulted in the lining, replacement, or rehabilitation of underground piping sections. These projects decrease environmental contamination due to outleakage and also decrease the hydraulic load on the system by reducing inleakage.

A 1900-m (6300-ft) carbon steel pipe with mechanical joints, installed in the 1960s, is used to transfer process waste between Melton and Bethel valleys. The potential for the existing line to leak will increase as the pipe integrity declines; leakage will lead to environmental and operational difficulties. Planning for the replacement of this pipeline has been completed through an FY 1987 KG GPP, the Melton Valley Process Waste Transfer Line Replacement.

Online monitors and control systems will be required to control the segregation of wastewaters by concentration of radioactivity, heavy metals, and regulated chemicals. Existing radiological monitoring equipment was installed in the 1960s, and the accuracy, dependability, and maintainability of the equipment is not state of the art.

Upgraded monitoring and sampling capabilities for segregation in the process system have been provided through two capital projects that are nearing completion, the Process Waste Segregation System (FY 1985 AR GPP) and the Process Waste Monitoring System (FY 1986 AR GPP). Online characterization of metallic contaminants is being obtained through an FY 1986 KG GPP, Liquid Waste Metals Monitoring System.

Waste acceptance criteria for each waste system must be determined using the treatment facilities' capabilities to remove pollutants, the facilities' throughput capacities, the discharge limits for the pollutant, the effects on secondary waste generation, and processing costs. Additional monitors may need to be developed to meet the diversion limits between facilities.

The NPDES permit for ORNL became effective in April 1986. The impact of direct discharges of once-through cooling water on the toxicity of streams will be measured through the Biological Monitoring and Abatement Plan. Because potable and process water contains residual chlorine, once-through cooling water and leakage from the water supply system may contribute to the toxicity of area streams and groundwater. Analysis of stream toxicity to marine life continues through the Biological Monitoring and Abatement Plan required by NPDES. Steps are being taken to recycle or treat these streams for direct discharge to the watershed.

Water pollution control strategies that are specific to a given waste system are described below.

LLLW Treatment System

LLLW Treatment System. The objective of this portion of the waste treatment system is to provide overall management of the LLLW program, including both near-term initiatives for immobilization, storage, and disposal of waste as well as the long-term strategy for processing and disposal of the existing waste inventory and newly generated LLLW. To accomplish this objective, three major areas are emphasized: (1) near-term (present to FY 1990) planning and R&D support for reducing the volume of stored waste; (2) intermediate-term (FY 1990 through FY 1997) removal of LLLW and TRU sludges from tanks, thereby eliminating the inventory of waste [via the Waste Handling and Packaging Plant (WHPP) to the Waste Isolation Pilot Plant (WIPP)]; and (3) longer-term (FY 1998 and beyond) planning, project management, and technical support and facilities for processing newly generated waste for on-site disposal.

The established strategy has three key elements that were designed to be responsive to the major areas of emphasis noted above: (1) reduction of waste inventory to regain operational flexibility by implementation of solidification campaigns and in-tank evaporation, (2) processing of the bulk of the present inventory at the proposed WHPP and disposal at WIPP, and (3) development of a process for long-term LLLW treatment which will allow the final waste form to be disposed of on the Oak Ridge Reservation (ORR). The strategy for LLLW management will be continually analyzed and reassessed. This process will be enhanced by conducting a systems analysis, performing waste characterization, and formulating a contingency plan.

The short-term goal of the systems analysis effort is to analyze the LLLW systems for potential improvements. A first pass at this effort will be completed in FY 1989. The longer-term goal for systems analysis is performance, to the extent possible, of an optimization of the LLLW system. This analysis will take into account the system constraints (e.g., regulatory, physical/chemical, operational, fiscal). A complex objective function will be necessary to perform the optimization. Parameters will be included to reflect cost minimization, volume minimization, extent of on-site storage, and other factors. A major goal for FY 1989 is to develop and document the objectives of and framework for the systems analysis. The complete systems analysis is targeted for the end of FY 1991.

Waste characterization will be conducted to develop a complete understanding of the waste to be managed. The sampling plan will be built on the lessons learned from sampling for the EASC and the inactive tanks. Both the liquid phase (supernatant) and the sludge phase will be sampled in each waste tank. The samples will be analyzed to determine the concentration of radionuclides (alpha, beta, gamma, and neutron emitters) and chemical constituents (cations, anions, and organic screening).

Sampling and analysis of the MVSTs will begin in FY 1989 and will continue in FY 1990. Sampling in FY 1991 and out years will monitor the LLLW system for changes in the waste stream characteristics with time.

Contingency plans will be prepared to deal with the situation should the LLLW tankage fill up. A number of activities will be pursued: (1) detailed planning for discontinuing the centralized collection of LLLW from low-priority generators at increasing degrees of risk on the basis of the remaining free board in the tanks, (2) risk assessments of the programmatic and environmental consequences of selected discontinuance of the collection activities, (3) use of storage tanks of lesser integrity than the present LLLW storage system (i.e., gunite tank), (4) options for treatment of waste at the source for disposal, and (5) development of second-generation plans for a follow-up solidification campaign. This activity is necessary because of uncertainties surrounding LLLW generation rate, efficiency of in-tank evaporation, acceptability of future solidification campaigns, and the actual startup schedule for both WHPP and WIPP.

During an EASC in the first quarter of FY 1989, 50,000 gal of MVST supernatant were solidified in a grout matrix for storage on the ORNL site. Depending on the success of the in-tank evaporation process, the generation rate of LLLW, and the timing of WHPP and WIPP startups, it may be necessary to conduct additional solidification campaigns. Planning for a second solidification campaign began in FY 1989 and will be accelerated or delayed as required, depending on the LLLW system inventory.

A significant potential for concentration of stored LLLW exists. In-tank evaporation (ITE) capitalizes on that potential by removing water from the stored LLLW prior to startup of WHPP. The ITE project will consist of six separate phases. Although all six phases are described here,

planning for phases 4 through 6 will require an analysis of the results of the phases 1 through 3 and, thus, have not been finalized.

Phases 1 and 2 of the proposed project were completed in conjunction with the test sparging operations from June 6, 1988, to July 22, 1988. Phase 1 consisted of modifying existing piping in the demister drain system to allow sampling of the demister liquid; phase 2 consisted of testing the tank's sparge system in the west vault using existing compressor capacity. The sparging test was conducted prior to the EASC, which was conducted between mid-September 1988 and mid-January 1989.

The third phase will involve sequentially bringing tank spargers into service and increasing the sparge rate in each tank to 100 cfm. Additional air compression capacity will be required to operate the sparge system at this rate. To accomplish this, the air from the existing compressor in Building 7860, the New Hydrofracture Facility, will be piped to Building 7830 through 6-in.-diam steel piping and tied in with the existing MVST sparge system. Also during this phase, the off-gas line (external to the vault) which runs between the tank and the flow measuring device through the demister will be insulated and have electrical heat tracing installed. These modifications will be made to minimize condensation in this part of the line because liquids which accumulate there flow back to the tank (reflux). Phase 3 startup is scheduled for the fourth quarter of FY 1989.

The fourth, fifth, and sixth phases of ITE will be implemented sequentially depending on the results obtained during phase 3 operations. The fourth phase consists of raising the temperature of the liquid waste by heating the tank vaults. Increase of the tank temperature from ambient to 90°F should result in a tripling of the evaporation rate. The fifth phase would involve modifying the piping to the demister drain to allow collection of the demister liquid into a separate tank and recycling the liquid through the LLLW and/or PWTP in Bethel Valley. The sixth phase would involve the removal of carbon dioxide from sparge air, if necessary, to prevent precipitation of carbonates. However, during bench-scale sparging tests using a filtered sample of the supernatant liquid from tank W-29, no carbonate precipitation was observed.

As indicated above, in the intermediate term the method for handling and disposal of LLLW will be that of processing through WHPP for shipment and entombment at WIPP. The scope of the WHPP project includes processing of both stored liquid and solid TRU wastes. Stored solid waste will be retrieved in the original concrete casks. The waste material inside the casks will be removed in WHPP and then sorted, processed, repackaged, and certified to meet the WIPP waste acceptance criteria (WAC) before being transported to WIPP for final entombment. The slurry processing portion of the plant includes mobilization of liquids and sludges from the MVSTs, adjustment of the loading of salt and TRU solids in the slurried material, transport of the slurry to WHPP, and processing to form a transportable waste that meets the WIPP WAC. A major development program has been initiated to enable successful design and operation of WHPP for slurry processing. Activities for slurry treatment include identifying and evaluating equipment to mobilize, transport, and concentrate a liquid/sludge slurry to derive design information and to ensure that the final waste form meets the WIPP WAC. The key elements of the slurry treatment development work consist of the following subtasks: (1) remote-handled and special-case sludge solidification and (2) remote-handled and special-case sludge mobilization technology demonstration.

Long-term LLLW processing will enable handling of newly generated (post-WHPP processing) wastes. The work elements of this task include (1) integration with the system analysis and planning function which provides the overall definition of the R&D program, (2) bench-scale

screening of candidate processing steps, (3) development of potential flow sheets for evaluation, (4) experiments to allow selection of the best flow sheet, and (5) a pilot scale demonstration of the selected flow sheet with actual waste.

LLLW CAT System. The active LLLW CAT system is presently covered by the permit by rule. However, the permit could be withdrawn in the future; therefore, the ORNL strategy is to upgrade the system to meet the technical standards for RCRA Subtitle C.

These standards will be met when double-contained, remote-handled LLLW piping and tanks are installed through the three line items described below:

- Bethel Valley (not including the Isotopes Area) LLLW CAT system, FY 1992, total estimated cost (TEC) \$35 million;
- Isotopes Area LLLW CAT system, FY 1991, TEC \$31 million plus cost of decontamination, estimated to be \$7 million;
- Melton Valley LLLW CAT system, FY 1992, TEC to be determined during conceptual design.

Expense-funded activities are required to support the cost-effective implementation of project criteria. The general design criteria for these projects can be summarized as follows:

1. All pipelines and tanks that handle LLLW shall have an active system for leak detection.
2. All pipelines and tanks that handle LLLW shall have double containment to ensure that the environment is not contaminated should a leak occur in the primary containment system.
3. Metal surfaces in contact with soil shall be cathodically protected to reduce the potential for external corrosion.
4. Transported waste shall meet all ORNL, DOE, and Department of Transportation requirements for transporting regulated substances.

Portions of the CAT system that do not meet these requirements will be deactivated through these projects. The RAP will close these systems based on the schedule negotiated by the EPA-DOE Interagency Agreement. The schedule will be based on risk assessment.

Process Waste System

The long-term strategy for the process waste system is to improve waste collection and treatment facilities in order to lower hazardous and radioactive discharges and to minimize secondary waste generation.

Improved treatment of process waste for the removal of radioactivity is planned through upgrades to the PWTP. Extensive research and development studies have been used to optimize the treatment flowsheet. Scoping studies indicate that the most efficient flowsheet utilizes zeolite ion-exchange columns. The zeolite would be disposed of as solid waste. This would completely decouple the PWTP from the LLLW system as well as minimize total waste generation. Present plans are to install this process at the NRWTF site.

Upgrades to the existing PWTP are being considered for the interim period. Upgrades under consideration include installation of hardware to remove ^{137}Cs , equipment to reduce plugging in the existing ion-exchange columns and extend the life of the columns, resin dewatering equipment, and upgrades to the PWTP evaporator system.

Improved treatment of nonradioactive wastewater is planned through installation of the NRWTF. This plant will remove heavy metals, solids, and organics. All process wastewater will be discharged from this one monitored release point.

Process waste presently drains to four open ponds in Melton Valley and to three open ponds in Bethel Valley. A pathway may exist for contamination to migrate from surface impoundments to the watershed. The active surface impoundments must be removed from service before remedial actions can be taken; therefore, surface impoundments are being replaced with tanks installed adjacent to the NRWTF. Elimination of these ponds will improve stream operations by reducing the rainwater and runoff that enters the collection system. New tanks will provide space for segregating waste by required treatment. The three categories of process waste are radioactively contaminated waste, metal-contaminated waste, and process waste that does not contain metals or radioactivity. Segregation of waste by required treatment will improve the effectiveness of the treatment plants.

The equalization basin for the PWTP leaks at a rate of approximately 19 L/min (5 gal/min). This leakage is pumped back to the basin for subsequent treatment. A management review of the condition of the basin resulted in the conclusion that no action would be necessary to mitigate environmental contamination before the pond is remediated. The equalization basin berm integrity was compromised by groundhog holes, which have since been filled with concrete to improve the stability of the berm.

ORNL characterized the groundwater contaminants in the vicinity of the surface impoundments and found that RCRA-classified hazardous contaminants were not present. The ponds are therefore not classified as interim status and do not require closure in the near term. The RAP and the EMC Section have submitted a data package to the TDHE to substantiate removing the surface impoundments from RCRA control except as outlined under the 3004(u) provisions of RCRA. This approach has been approved by TDHE and has been approved verbally by EPA.

Area Sources

An ORNL strategy for management of contaminated surface water and groundwater has been developed to prepare for implementing evolving regulations. The strategy is to evaluate the public risk due to groundwater contamination. The RAP will determine the quantity and extent of groundwater treatment required to limit public risk.

If the risk to the public is acceptable, treatment of selected sources of contaminated groundwater will be discontinued. Whether the cost incurred by treatment of this water is the most environmentally beneficial way to spend available funds will be determined.

If the risk to the public is unacceptable, contamination will, when possible, be fixed at the source. If public risk continues to be unacceptable after methods to prevent groundwater contamination have been implemented, groundwater collection and treatment will be evaluated, developed, and implemented. Options for segregating contaminated surface water and groundwater from clean surface water and groundwater and for collecting contaminated groundwater should be evaluated jointly by the Water Pollution Control Program and the RAP staff to prepare for compliance with groundwater regulations.

Contaminated surface water and groundwater are discharged to WOC from unidentified sources in Bethel Valley and to Melton Branch from the Solid Waste Storage Areas (SWSAs). Approximately 30% of the radioactivity discharged over White Oak Dam comes from unidentified sources in Bethel Valley, and another 30% is due to leakage from the SWSAs. Efforts to divert surface water and to fix the contamination at its source are being studied and implemented. Collection and treatment of contaminated groundwater from Bethel Valley and the SWSAs are expected to be required when state regulations are developed under the Water Quality Control Act.

The RAP will determine the extent of collection and treatment required by state regulation. Development of an effective and efficient method for groundwater treatment is a priority for ORNL.

Point Sources

Cooling tower effluent releases are regulated under several sections of the NPDES permit. Chemical pollutants are regulated through miscellaneous sources and toxicity control and monitoring. Radioactivity in wastewater is regulated in two ways: (1) a proposal must be submitted for the radiological monitoring for all outfalls that have the potential for discharging radioactivity to the watershed, and (2) radioactivity in wastewater discharges must meet an annual average limit.

The chemical limits that apply to cooling tower discharges that do not mix with other discharges (e.g., storm drainage) and have flow rates greater than 37,850 L/d (10,000 gal/d) per day discharge are shown in Table 3.4. The plan for minimizing chemical water pollution from cooling tower discharge takes a conservative approach by addressing all active cooling towers at ORNL under the miscellaneous category of the NPDES permit, even though 79% of the cooling tower blowdown does mix with other discharges and 75% of the cooling towers have blowdown rates less than 37,850 L/d.

There is concern that chlorine concentrations in all cooling tower discharges and the temperature of the cooling tower discharge at the HFIR may exceed specified limits. Chlorine is added at concentrations as high as 30 mg/L. Past experience indicates that chlorine chemically reacts or evaporates during treatment to dischargeable levels if operating procedures are strictly followed.

There is uncertainty in the application of the NPDES permit limits for radionuclides. Release of radionuclides to the watershed is currently being negotiated with the TDHE. Operating procedures are currently in effect to control the release of radionuclides from reactor cooling towers.

The Bulk Shielding Reactor (BSR) and the HFIR have the potential for discharging radionuclides to the watershed through cooling tower water systems. Heat exchanger tube leaks may allow ^{24}Na to enter the cooling tower water system. Sodium-24 has a short half-life and decays to nonradioactive sodium during retention. The control of radionuclide pollutants in the cooling tower water for each of these reactors is discussed below.

The Oak Ridge Research Reactor (ORR) was shut down in 1987. The concentration of radionuclides in the reactor primary cooling system will decrease with time since the reactor is shut

Table 3.4. Chemical pollutant limits for cooling tower discharges

Parameter	Average	Maximum	Sample frequency
Chromium		1.0 mg/L	Quarterly
Zinc	0.5 mg/L	1.0 mg/L	Quarterly
Copper	0.5 mg/L	1.0 mg/L	Quarterly
Chlorine, residual		0.2 mg/L	Quarterly
Temperature, °C	35	38	Quarterly
pH	6.0-9.0		Quarterly

down, thus reducing the potential for radioactive contamination of the secondary cooling system (cooling tower). The existing ORR heat exchanger system has a radiation monitor that checks the effluent from the heat exchanger loop. The monitor is set to alarm at 10 mR, and a daily sample of the secondary cooling water is analyzed for gross beta-gamma activity. When the radiation alarm sounds or the sample contains elevated levels of radioactivity, the ORR operating procedures require the heat exchangers to be shut off sequentially until it is determined which heat exchanger is leaking. An increase in the flow rate of makeup primary cooling water would indicate a potential heat exchanger tube leak. The existing continuous monitoring of the makeup water flow rate is an additional safeguard against polluting the cooling tower system with radioactivity.

The reactor primary cooling water system for the BSR contains approximately 4800 Bq/mL ^{24}Na . New research activities are scheduled for the BSR. The existing system does not have radiation monitors. Daily samples of the secondary cooling water are analyzed for gross beta-gamma activity. If the sample contains elevated levels of radioactivity, BSR operating procedures require the heat exchanger to be shut off.

A HFIR heat exchanger tube leak that permits reactor primary cooling water to contaminate cooling tower water is currently identified by three techniques:

1. Cooling tower blowdown is monitored for radioactivity and is automatically diverted to a holding pond if radiation is detected above the operational limit.
2. A daily sample of cooling tower water is analyzed for gross beta-gamma activity.
3. The change in primary coolant water flow rate is monitored.

When a heat exchanger tube leak is suspected, reactor operators sequentially shut off the heat exchangers until it is determined which heat exchanger is leaking. If the radiation level of the cooling tower blowdown exceeds discharge requirements, the HFIR will be shut down. The probability of heat exchanger tube leaks occurring has been reduced since HFIR heat exchangers were recently replaced.

Facilities at Y-12 and Sanitary Sewage Waste

Major improvements for these systems have been completed. The streams will be monitored and evaluated for additional upgrades as necessary. Waste minimization and segregation efforts will also continue.

Detailed Project Information

Detailed project information and financial summaries for the Water Pollution Control Program are provided in the remaining pages of this section. Detailed project information is provided in the form of PDSs and PSSs, which are listed in Table 3.5. The PDSs provide details for each project, such as scope, justification, facilities, estimated costs, and a detailed funding breakdown by fiscal years from 1988 through 1995, as well as funding beyond FY 1995. The PSSs give details of project activities over the span of each project, enumerating the steps to complete the project, most of which are program milestones.

Following the PDS and PSS package, detailed and summary-level financial information for the Water Pollution Control Program is presented. Tables 3.6 and 3.7 summarize the capital and expense funding, respectively, for all defined projects in this program area. Table 3.8 provides the overall funding summary by source.

Table 3.5. Water Pollution Control Program detailed project data

Project number	Project	Funding year	Total estimated cost (\$ × 1000)
3.00	Water Pollution Control Program	85-93	148,155
3.21	Nonradiological Wastewater Treatment Project	86-89	18,000
3.30	Wastewater Piping Replacement	88	300
3.32	Wastewater/Storm Drain Isolation	88	450
3.36	Melton Valley Process Waste Transfer Line Replacement	86-87	520
3.37	Bethel Valley LLLW Collection and Transfer System Upgrade	88-91	35,300
3.38	PWTP Process Improvements	90	1,100
3.41	Groundwater Treatment Facility	92	1,000
3.44	Isotopes Area LLLW Collection and Transfer System Upgrade	91	38,600
3.45	Melton Valley LLLW Collection and Transfer System Upgrade	89-95	36,300
3.50	Manhole Monitors—Process Waste	89	300
3.59	West Addition to Bldg. 3544	88	593
3.76	Decontamination Facility	93	21,300
3.77	Equipment Decontamination Facility	92	1,000
3.78	Upgrade Floor, Bldg. 3544	89	1,000
3.79	BSR/ORR LLW Upgrade	89	1,000
3.80	Clean Water Act Compliance Project	89	550
3.81	Graphite Reactor Canal LLW Storage and Transfer	91	500
3.82	Coal Yard Runoff Improvements, Bldgs. 2545 and 2644	92	500
3.85	New Liners in the Secondary Sewage Treatment Ponds	90	800
3.86	Replace 25,000-gal. Fuel Oil Tank, 7600 Area	92	125

WATER POLLUTION CONTROL PROGRAM

DETAILED INFORMATION

***PROJECT DATA SHEETS**

***PROJECT SCHEDULE SHEETS (AS SUMMARIZED IN TABLE 3.5)**

***FINANCIAL SUMMARY TABLES**

- 3.6 Water Pollution Control Program project summary—capital funding
- 3.7 Water Pollution Control Program project summary—expense funding
- 3.8 Water Pollution Control Program funding summary

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: WATER POLLUTION CONTROL PROGRAM

CONTACT: PEPPER/SCAMLAN

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3 0

STATUTORY REQ: CWA, RCRA, DOE

NEEDS ASSESSMENT CAT:

FMP NO: ERKG002, DPGF101, 106, 107, 108

ERG, PROJ. NO:

KFMP NO: 2.2.00

SCOPE: This data sheet is not a summary of the Water Pollution Control Program. It covers the expense and capital equipment funding necessary to support program activities, including strategy development, studies and assessments, capital project definition, and technical support. It includes the outyear GPP budgets which are not covered by specific data sheets. Line-Item, GPP, and expense funding which has been specifically defined is designated on the data sheet for each of these projects.

JUSTIFICATION: This activity provides the expense, operating, and miscellaneous capital support necessary to provide an integrated strategy for and implementation of water pollution control measures. This includes management of radioactive, hazardous, and mixed wastes and ensures compliance with CWA, RCRA, NEPA, and DOE orders. General Plant Equipment includes 1) chemical transfer truck and 2) continuous ion exchange equipment.

FACILITIES: None

STATUS/COMMENTS: This is an ongoing activity which supports the development of project definitions. After projects are defined, capital funding is requested through GPPs. Currently defined GPPs are included in the following listing.

FUNDING YEARS: 85-93			XEC (\$M1989): 146155											BEYOND
REQ CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
AR 05/DPGF107	BA	CE	399	399	0	0	0	0	0	0	0	0	0	0
AR 05/DPGF107	BO	EXP	2925	2925	0	0	0	0	0	0	0	0	0	0
AT	BA	GPP	2000	0	0	0	0	0	0	500	500	500	500	0
GF 01 02 06 0	BO	EXP	3441	0	3441	0	0	0	0	0	0	0	0	0
GF 01 02 06 0	BA	EXP	1050	0	0	0	50	50	50	300	50	50	500	0
GF 01 02 06 0	BA	CE	3334	0	589	270	500	500	400	450	350	275	0	0
GF 01 02 06 0	BA	EXP	39414	0	0	1864	3030	3250	3100	225	3200	3175	18550	0
GF 01 02 06 0	BO	EXP	2544	0	2544	0	0	0	0	0	0	0	0	0
GF 01 02 06 0	BA	EXP	28163	0	0	363	2100	2650	2800	2400	2550	2550	12750	0
GF 01 02 06 0	BO	EXP	804	0	804	0	0	0	0	0	0	0	0	0
GF(349)/DPGF1	BA	EXP	5445	0	0	865	680	750	750	775	800	825	0	0
KG 02	BA	GPP	6500	0	0	0	0	0	500	1500	1500	1500	1500	0
KG 02 EP/ERKG	BA	EXP	16302	0	0	0	1300	1702	1300	1500	1500	1500	7500	0
KG 02 EP/ERKG	BO	EXP	1918	0	1160	758	0	0	0	0	0	0	0	0
KG 02 WMCO/ER	BA	EXP	23933	0	0	0	1675	1508	2350	2300	2300	2300	11500	0
KG 02 WMCO/ER	BO	EXP	9039	5926	1898	1215	0	0	0	0	0	0	0	0
KG 03/ERKG023	BA	CE	944	224	80	50	30	160	80	80	80	80	80	0
TOTAL:			146155	9474	10516	5385	9385	10570	11330	13030	12830	12755	52880	

1. Program Category ENVIRONMENTAL COMPLIANCE		2. Reporting Period 7/01/89 through 7/31/89		Funding Type	
3. Project Title WATER POLLUTION CONTROL PROGRAM		4. Program Representative C. M. KENDRICK/T. F. SCANLAN		Funding Year	
FWP NO ERN0002		5. Project Engineer S. M. ROBINSON		Funding Year	
ACTIVITY NO KG 02 00 0					
6. Project Number		7. Subproject Title		8. Fiscal Year and Months	
WBS 3.00				FY-1989	
				FY-1990	
				O N D J F M A M J J A S O N D J F M A M J J A S	
ISSUE INPUT FOR LONG-RANGE PLAN (MS K-3.11A (R-1 9/89) *					
PROVIDE INPUT FOR FIELD WORK PROPOSAL (MS K-3.11B (R-1 2/89)					
ISSUE DRAFT CURRENT YEAR WORK PLAN (MS K-3.11C (R-1 9/89)					
ISSUE STATUS REPORT ON LIQUID WASTE GENERATOR AWARENESS PROGRAM (MS K-3.12 (R-0 7/89)					
ISSUE LETTER REPORT ON EVALUATION OF LIQUID WASTE CHARGE-BACK SYSTEM (MS K-3.13 (R-2 5/89)					
ISSUE REPORT SUMMARIZING TESTING OF PILOT-SCALE, CONTINUOUS COUNTER CURRENT ION EXCHANGE COLUMN (MS K-3.21 TM 1 8/89)					
ISSUE LETTER REPORT SUMMARIZING STUDY ON ZEPHIRE COLUMN PLUGGING (MS K-3.22 A (R-1 1/89)					
CONTINUED NEXT PAGE					

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 MONTH

FORECAST

SYMBOL

MILESTONE LEVEL 0 1 2 3 4

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Comments

* April distribution delayed by ORO. Proposal for 9/89 draft LRP submitted to ORO

1. Program Category ENVIRONMENTAL COMPLIANCE		2. Reporting Period 7/01/89 through 7/31/89		
3. Project Title WATER POLLUTION CONTROL PROGRAM FWP NO : ERK0002 ACTMITY NO : KG 02 00 0		4. Program Representative C. M. KENDRICK/T. F. SCANLAN		Funding Type
		5. Project Engineer S. M. ROBINSON		Funding Year
6. Project Number WBS 3.00	7. Subproject Title	8. Fiscal Year and Months FY-1989 FY-1990		
		O N D J F M A M J J A S O N D J F M A M J J A S		
	<p>ISSUE REPORT ON SCALE-UP AND DESIGN OPTIMIZATION FOR ZEOLITE COLUMN (MS K-3.2.2.B TM-2 9/89)</p> <p>ISSUE LETTER REPORT RECOMMENDING TREATMENT STRATEGY FOR LLW GENERATED BY THE PWTP (MS K-3.2.3 LR-2 3/89)</p> <p>ISSUE STATUS REPORT ON CO-60 TREATABILITY STUDIES (MS K-3.2.4 LR-1 9/89)</p> <p>ISSUE LETTER REPORT ON MONITORING AND SEGREGATION OF LIQUID WASTE STREAMS (MS K-3.2.5 LR-1 6/89)</p> <p>ISSUE LETTER REPORT ON UNDERGROUND TANK RANKING (MS K-3.2.6 LR-1 9/89)</p>			
<div> <div> SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE </div> <div> 12 MONTH FORECAST </div> <div> SYMBOL MILESTONE LEVEL 0 1 2 3 4 </div> </div> <div> Comments: • April distribution delayed by ORO. Proposal for 8/89 draft LRP submitted to ORO. </div>				

1 Program Category
ENVIRONMENTAL COMPLIANCE
 3 Project Title
WATER POLLUTION CONTROL PROGRAM
 FWP NO ERN0002
 ACTIVITY NO KG 02 00 0

2 Reporting Period
 7/01/89 through 7/31/89
 4 Program Representative
 C. E. PLEPPER
 5 Project Engineer
 F. P. DELOZER

Funding Type
 Funding Year

6 Project Number
 7 Subproject Title

8 Fiscal Year and Months
 FY-1989

FY-1990

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INITIATE USE OF NRWTP COLLECTION SYSTEM
 (MS K-3 2 7 LR-4 6/89)

ISSUE LETTER REPORT ON LIQUID WASTE LEAK
 DETECTION DEMONSTRATION
 (MS K-3 2 8 A LR-2 4/89)

ISSUE LETTER REPORT ON FIELD RADIATION
 SCREENING OF SOILS
 (MS K-3 2 8 B LR-1 12/88)

CDR COMPLETION FOR ISOTOPES AREA LIQUID
 LLW CAT UPGRADE
 (MS K-3 3 1 CLW-2 5/89)

3 21 NONRADIOLOGICAL WASTEWATER TREATMENT
 PROJECT (MS K-3 3 1-3 21 LR-2 3/90)

3 30 WASTEWATER PIPING REPLACEMENT,
 4500S, ORNL
 (MS 3 3 1-3 30 LR-2 5/90)

3 32 WASTEWATER/STORM DRAIN ISOLATION
 (MS 3 3 1-3 32 LR-2 4/89)

3 36 MELTON VALLEY PROCESS WASTE TRANSFER
 LINE REPLACEMENT
 (MS K-3 3 1-3 36 LR-2 4/89)

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SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

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Comments

1. Program Category: ENVIRONMENTAL COMPLIANCE		2. Reporting Period: 7/01/89 through 7/31/89		Funding Type:	
3. Project Title: WATER POLLUTION CONTROL PROGRAM		4. Program Representative: C. E. PEPPER		Funding Year:	
FWP NO: ERAG002		5. Project Engineer: F. P. DELOZER			
ACTIVITY NO: KG 02 00 0					
6. Project Number: WBS 3 00	7. Subproject Title:	8. Fiscal Year and Months: FY-1989 | FY-1990 O N D J F M A M J J A S O N D J F M A M J J A S			
3 37	BETHEL VALLEY (QUINCY) W COLLECTION TRANSFER SYSTEM UPGRADE, ORNL (MS K-3 3 1-3 37 LR-2 7/89)	[Gantt bar from Jan 1989 to Jun 1989]			
	COMPLETE CONSTRUCTION OF NON- RADIOLOGICAL WASTEWATER TREATMENT PROJECT (MS K-3 3 2 LR-4 8/89)	[Gantt bar from Jan 1989 to Jun 1989] X			
	SUBMIT PRELIMINARY PROPOSALS FOR ALL ERAG02-SPONSORED UPPs IN FY 1989 AND FY 1990 TO DOE/ORO FOR APPROVAL (MS K-3 3 3 LR-4 8/89)	[Gantt bar from Jan 1989 to Jun 1989] X			
	ISSUE FY 1990 KG02 GPP PLANNING BASE LETTER FOR DOE APPROVAL (MS K-3 3 4 LR-4 12/89)	[Gantt bar from Dec 1989 to Dec 1989] X			

SHADING INDICATES STATUS
AND COMPLETION
ACTIVITY SCHEDULE

12 MONTH
FORECAST

SYMBOL
MILESTONE LEVEL 0 1 2 3 4

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: NON-RADIOLOGICAL WASTEWATER TREATMENT PROJECT

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.21

STATUTORY REQ: CWA, DOE

NEEDS ASSESSMENT CAT:

FWP NO:

ENG. PROJ. NO: 86-RB01

EPMP NO: 2.3.21

SCOPE: To modify process systems (eliminate nitric acid regeneration of demineralizer), collect & treat wastewaters as required to meet discharge parameters as established by the Environmental Protection Agency (EPA) & the state of Tennessee to eliminate the discharge of process wastewater into surface impoundments.

JUSTIFICATION: To resolve the major Clean Water Act concerns at ORNL about discharge of nonradiological process wastewater (without proper treatment) and to eliminate the discharge of process wastewater into surface impoundments to comply with the Federal Facility Compliance Agreement.

FACILITIES: Pumps, tanks, and piping to transfer wastewater to treatment facilities, tankage to replace surface impoundments, process modification to reduce pollutant loading, special equipment to handle & treat wastewater & resultant solid waste, computerized monitoring & control equipment, & new building.

STATUS/COMMENTS: Construction of the collection system is complete. The collection system has been placed in operation. Construction activities on the treatment facility are approximately 90% complete.

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FUNDING YEARS: 86-89				TEC (\$K1000): 18000									BEYOND FY-95
B&R CODE	BA/BQ	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
KG 02	BA	LIP	18000	9887	7000	1113	0	0	0	0	0	0	0
TOTAL:			18000	9887	7000	1113	0	0	0	0	0	0	0

1. Program Category		2. Reporting Period		3. Funding Type													
WATER POLLUTION CONTROL PROGRAM		7/01/89 through 7/31/89		LIP													
4. Project Title		4. Program Representative		5. Funding Year													
NONRADIOLOGICAL WASTEWATER TREATMENT PROJECT		M. L. WILLOUGHBY		FY-1986													
5. Project Engineer		6. Project Engineer															
R. A. DEAN																	
6. Project Number	7. Subproject Title	8. Fiscal Year and Months															
3.21	COLLECTION SYSTEMS BETHEL VALLEY & MELTON VALLEY	FY 1986				FY 1987				FY 1988				FY 1989			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	A/E DESIGN COLLECTION SYSTEM	[Shaded Bar]															
	FECA DATE TO COMPLETE FINAL PLANS					4											
	DOE BID & AWARD COLLECTION SYSTEMS					[Shaded Bar]											
	EPYC CONSTRUCT COLLECTION SYSTEMS									[Shaded Bar]							
	FECA DATE TO COMPLETE CONSTRUCTION OF COLLECTION SYSTEMS													11			

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 MONTH

12 MONTH

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Comments

1 Program Category WATER POLLUTION CONTROL PROGRAM		2 Reporting Period 7/01/89 through 7/31/89		Funding Type LIP																
3 Project Title NONRADIOLOGICAL WASTEWATER TREATMENT PROJECT		4 Program Representative M. L. WELLOUGHBY		Funding Year FY-1986																
5 Activity No. ERR0002		6 Project Engineer R. A. DEAN																		
7 Subproject Title TREATMENT FACILITY	8 Fiscal Year and Months																			
	FY-1986				FY-1987				FY-1988				FY-1989				FY-1990			
WBS 3.21	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FPM CONSTRUCT/EQUIP																				
MMS CONTROL SYSTEM CHECKOUT AND CALIBRATION																				
COMPLETE CONSTRUCTION OF NONRADIOLOGICAL WASTEWATER TREATMENT PROJECT (2-3.46)																				
MMS TOTAL SYSTEM PRE OPERATIONAL TESTING																				
FECA DATE FULL COMPLIANCE

1. Program Category WATER POLLUTION CONTROL PROGRAM		2. Reporting Period 7/01/89 through 7/31/89																																																			
3. Project Title NONRADIOLOGICAL WASTEWATER TREATMENT PROJECT		4. Program Representative M. L. WILLOUGHBY	Funding Type LIP																																																		
FWP NO FRK0002 ACTIVITY NO		5. Project Engineer R. A. DEAN	Funding Year FY-1986																																																		
6. Project Number WBS 321	7. Subproject Title SUMMARY SCHEDULE	8. Fiscal Year and Months																																																			
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	FFCA COMPLIANCE LEVEL ATTAINED																																																				

SHADING INDICATES STATUS AND COMPLETION
ACTIVITY SCHEDULE

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Comments:

• FFCA = Federal Facility Compliance Agreement
 • FPFC = Fixed Price Prime Contractor

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: WASTEWATER PIPING REPLACEMENT

CONTACT: L. R. SIMMONS

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.30

STATUTORY REQ: CWA, SDWA, DOE, RCRA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 87-2

EPMP NO: 2.3.30

SCOPE: This project will provide cooling water recycle system for the Creep Laboratory in Bldg. 4500S.

JUSTIFICATION: The Creep Laboratory in 4500S uses large quantities of once through cooling water which is discharged to White Oak Creek. In-stream biological monitoring has indicated that mortality of aquatic life is high near the point where cooling water is discharged to White Oak Creek. This project will eliminate the potential for environmental insult from this source.

FACILITIES: This project will provide modifications to existing cooling water system to recycle water.

STATUS/COMMENTS: Preliminary Proposal has received approval from DOE in 12/88. Comments from DOE on the Environmental ALARA Memorandum were received during 1/89 and a letter responding to these comments was sent to DOE during March. A schedule delay is expected as a result of addressing the DOE comments.

FUNDING YEARS: 88		TEC (\$1000):											BEYOND FY-95
REQ CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
KG 02	BA	GPP	300	0	300	0	0	0	0	0	0	0	0
TOTAL:			300	0	300	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: WASTEWATER/STORM DRAIN ISOLATION

CONTACT: L. R. SIMMONS

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.32

STATUTORY REQ: CWA, DOE ORDERS

NEEDS ASSESSMENT CAT:

FMP NO:

EMG. PROJ. NO: 88-2

EPMP NO: 2.3.32

SCOPE: This project will segregate radioactively contaminated groundwater from storm drainage by lining storm sewer piping with formed-in-place liners.

JUSTIFICATION: Segregation of process waste from storm drainage and sanitary sewage will reduce the pollutant loading on the watershed. This project will contribute to bringing the ORNL Liquid Waste Systems into compliance with the Clean Water Act, the Safe Drinking Water Act and DOE Orders by adhering to the requirements established in the NPDES permit to eliminate direct discharge of pollutants to area streams.

FACILITIES: No operational facilities will be provided.

STATUS/COMMENTS: Approximately 50% of the identified pipe footage has been lined. The remaining piping sections will be lined after the needed point excavations are completed. After Engineering transmits the CFC drawing to the cost plus Award Fee contractor construction activities will resume.

FUNDING YEARS: 88			TEC (\$M1000): 450										
ACR CODE	BA/BO	FUNDING	TOTAL	PRIOR									BEYOND
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
AT	BA	GPP	450	0	450	0	0	0	0	0	0	0	0
		TOTAL:	450	0	450	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: MELTON VALLEY PROCESS WASTE TRANSFER LINE REPLACEMENT

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.36

STATUTORY REQ: CWA, DOE

NEEDS ASSESSMENT CAT:

FNP NO:

ENG. PROJ. NO: 87-2

EPMP NO: 2.3.36

SCOPE: This project will replace approximately 6300 linear ft of carbon steel piping which transfers process waste from Melton Valley to the Process Waste Treatment Plant (PWTP) in Bethel Valley.

JUSTIFICATION: The existing carbon steel piping (installed in the 1960s) will continue to deteriorate, and the likelihood of leaks occurring will be significantly increased with the passage of time. The resulting environmental insult potential is not acceptable. There is an increased probability of failure as the pipeline integrity declines since the pipeline is a pressurized system. Failure of this pipeline may cause significant environmental contamination.

FACILITIES: A new 6" pipeline approximately 6000 ft. in length is being installed over Haw Ridge from Melton Valley to Bethel Valley.

STATUS/COMMENTS: FY-86 Design only - 30K. FY-87 Construction only - 490K. Construction activities are approximately 99% complete. The TEC has been reduced from \$520K to \$340K.

FUNDING YEARS: 86-87			TEC (\$M1000): 520										BEYOND
BSR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR									
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
KG 02	BA	GPP	520	520	0	0	0	0	0	0	0	0	0
TOTAL:			520	520	0	0	0	0	0	0	0	0	0

1 Program Category
WATER POLLUTION CONTROL PROGRAM

3 Project Title
MELTON VALLEY PROCESS WASTE TRANSFER LINE REPLACEMENT

FWP NO ERK0002

ACTIVITY NO -

2 Reporting Period
 7/01/89 through 7/31/89
 4 Program Representative
 M I WILLOUGHBY
 5 Project Engineer
 R A DEAN

Funding Type
 GNP
 Funding Year
 FY 1989

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 7 MONTH

SYMBOL
 MILESTONE LEVEL 0 1 2 3 4

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: BETHEL VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE

CONTACT: C. E. PEPPER

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.37

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.37

SCOPE: To upgrade a significant portion of ORNLs LLW-CAT system in a cost effective manner which will protect personnel and public safety and health and the environment and meet all applicable regulations as it supports the Laboratorys research mission.

JUSTIFICATION: Required to meet requirements of DOE and EPA regulations. The existing liquid LLW system is not in compliance with these orders because it does not have an active leak detection system or full secondary containment except for a few short line segments which have been upgraded recently (by GPPs).

FACILITIES: The project involves installing approx. one mile of 2" within 3" doubly contained SS pipeline with five collection & neutralization tanks of 1000 gal. capacity located in SS lined underground concrete vaults.

STATUS/COMMENTS: A/E (Gilbert Commonwealth) has been selected. First draft of Design Criteria has been issued. First draft of Management Plan due now. Both Design Criteria and Management Plan final copy due at end of FY-87. TWRP & MCS sites have been identified.

FUNDING YEARS: 88-91

TEC (\$M1000): 35300

R&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR										BEYOND
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
KG 02	BA	LIP	35000	0	4800	11787	10500	7913	0	0	0	0	0	
KG 02	BA	EXP	300	0	0	100	100	100	0	0	0	0	0	
TOTAL:			35300	0	4800	11887	10600	8013	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: PROCESS WASTE TREATMENT PLANT (PWTP) PROCESS IMPROVEMENTS

CONTACT: R. C. MASON

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.38

STATUTORY REQ: CWA, DOE SDWA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO: 89-2

EPMP NO: 2.3.38

SCOPE: This project provides for modifications to the Process Waste Treatment Plant (PWTP) to meet new discharge limits and to reduce the volume of waste which must be treated by the Laboratorys Liquid Low-Level (LLW) System, by replacing the clarified, and adding a new zeolite system and Ph adjustment system and a condensate holding tank.

JUSTIFICATION: The Laboratory is committed to meeting the new discharge limits and to reduce the amount of LLW generated. The subject project will decouple the PWTP from the LLLW System. Implementation of this project will reduce the potential for by-passing the PWTP should the LLLW storage tanks be filled to capacity. This will significantly reduce risks to the environment and public health.

FACILITIES: This project will add treatment equipment at the PWTP.

STATUS/COMMENTS: This project has been rescoped to do design only in FY-90.

<u>FUNDING YEARS:</u> 90				<u>TEC (\$x1000):</u> 1100									
<u>BER CODE</u>	<u>BA/BO</u>	<u>FUNDING TYPE</u>	<u>TOTAL</u>	<u>PRIOR</u>									
				<u>FY-88</u>	<u>FY-88</u>	<u>FY-89</u>	<u>FY-90</u>	<u>FY-91</u>	<u>FY-92</u>	<u>FY-93</u>	<u>FY-94</u>	<u>FY-95</u>	<u>BEYOND FY-95</u>
GF 01	BA	GPP	1100	0	0	0	1100	0	0	0	0	0	0
<u>TOTAL:</u>			1100	0	0	0	1100	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: GROUNDWATER TREATMENT FACILITY

CONTACT: S. P. du MONT

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.41

STATUTORY REQ: CWA, SDWA, RCRA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO: 88-2

EPMP NO: 2.3.41

SCOPE: Satisfy environmental regulations by incorporating the collection of contaminated groundwater by way of a well point system or collector trench pumping system to lower groundwater table below sit', control groundwater flow direction, and contain contaminated plumes if present. Provide proper treatment prior to discharge.

JUSTIFICATION: Proposed action is necessary to enable ORNL to be in a position to comply with the regulations and meet commitments in closure of remedial action sites.

3-65

FACILITIES: Proposed project will provide the engineered method for preventing further contamination of groundwater. The project will be consistent with requirements that will be established by the state of Tennessee.

STATUS/COMMENTS:

FUNDING YEARS: 92				TEC (\$*1000): 1000									
B&R CODE	BA/BO	FUNDING	TOTAL	PRIOR									BEYOND
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
KG 02	BA	GPP	1000	0	0	0	0	0	1000	0	0	0	0
TOTAL:			1000	0	0	0	0	0	1000	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: ISOTOPES AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE

CONTACT: W. J. ARMENTO

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.44

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

EMP NO: ERKG002

ENG. PROJ. NO:

EPMP NO: 2.3.44

SCOPE: Provide a fully, doubly contained system for collection, neutralization, and transfer of liquid low-level radioactive waste from the Isotopes Area waste generating facilities to the evaporator at ORNL.

JUSTIFICATION: Required to meet requirements of DOE, State, and EPA regulations. The existing liquid LLW systems ORNL is not in compliance with these orders because it does not have upgraded active leak detection system or full secondary containment except for a few live segments replaced during recent upgrade projects (GPPs).

FACILITIES: Stainless steel lined, underground, concrete vaults, collection tanks, and double-walled stainless steel transfer lines equipped with state-of-art cathodic protection leak detection and process control systems.

STATUS/COMMENTS: The Conceptual Design Report and the Preliminary Safety Analysis Report have been completed. Validation for the project is complete. Design Criteria and A-E selection criteria will be developed in FY-91. No activity is planned for FY-90 except for revalidation as a FY-92 project.

FUNDING YEARS: 91				TEC (\$M1000): 38600									
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AF	BA	LIP	31000	0	0	0	0	6500	12800	8400	3300	0	0
AF/NEAF800	BA	EXP	7000	0	0	0	0	0	3500	3500	0	0	0
NG 02/ERKG023	BA	EXP	600	0	0	0	600	0	0	0	0	0	0
TOTAL:			38600	0	0	0	600	6500	16300	11900	3300	0	0

1. Program Category WATER POLLUTION CONTROL PROGRAM				2. Reporting Period 7/01/89 through 7/31/89																					
3. Project Title ISOTOPES AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM				4. Program Representative J. ARMENTO				Funding Type: LIP																	
FWP NO: NEAF 01				5. Project Engineer J. F. LAWSON				Funding Year: FY-1991																	
ACTIVITY NO:																									
6. Project Number WBS 3.44	7. Subproject Title	8. Fiscal Year and Months																							
		FY-1987				FY-1988				FY-1989				FY-1990				FY-1991				FY-1992			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	SYSTEM REQUIREMENT DOCUMENT
	PRE-CONCEPTUAL (STUDY/ANALYSIS)
	CONCEPTUAL DESIGN
	DESIGN CRITERIA
<div> <div> SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE </div> <div> </div> </div> <div> SYMBOL MILESTONE LEVEL </div> <div> </div>																									
Comments: • CDR was issued approved to DOE 1/89																									

[illegible]

ORNL ENVIRONMENTAL PROGRAM DATA SHEET

8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: MELTON VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE

CONTACT: W. J. ARMENTO

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 3.45

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

FHP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.45

SCOPE: Provide new and upgraded system to collect, neutralized, and transfer liquid low-level radioactive waste from the Melton Valley waste generating and processing facilities to the evaporator at ORNL.

JUSTIFICATION: Required to meet requirements of DOE, STATE, and EPA regulations. The existing liquid LLW system at ORNL is not in compliance with these orders because it does not have an active leak detection system or full secondary containment except for a few short line segments which have been upgraded recently (by GPPs) because they were leaking.

FACILITIES: Stainless steel lined, underground, concrete vaults, collection tanks, and double-walled stainless steel transfer lines equipped with state-of-the-art cathodic protection, leak detection, and process control systems.

STATUS/COMMENTS: This project is the third of three proposed Line Items which will be required to upgrade the entire ORNL LLW-CAT system. The other two projects are planned as FY-88 and FY-92 Line Items. The CDR will be completed in FY-90 for a FY-93 validation.

FUNDING YEARS: 89-95

TEC (\$M1000): 36300

B&R CODE	BA/BO	FUNDING		TOTAL	PRIOR		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
		TYPE														
KG 02	BA	LIP		35000			0	0	0	0	0	6000	12000	12000	5000	0
KG 02	BA	EXP		1000			0	0	0	300	300	100	100	100	100	0
KG 02	BO	EXP		300			0	0	300	0	0	0	0	0	0	0
TOTAL:				36300			0	0	300	300	300	6100	12100	12100	5100	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: MANHOLE MONITORS - PROCESS WASTE

CONTACT: L. R. SIMMONS

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.50

STATUTORY REQ: CWA

NEEDS ASSESSMENT CAT:

FNP NO:

ENG. PROJ. NO: 89-2

EPMP NO: 2.3.50

SCOPE: This project will install 6 new process waste manhole monitors in Bethel Valley to characterize groundwater inleakage and provide sufficient data for chargeback of process waste costs.

JUSTIFICATION: The actual volume and composition of contaminated groundwater collected by the process waste system would not be known, which would reduce the efforts to characterize and control contaminated groundwater. Without proper data, chargeback of process waste operating cost, scheduled to begin in FY 1988, could not be distributed based on the volume of waste generated.

FACILITIES: Six process waste flow monitors and associated housing.

STATUS/COMMENTS: Preparation of Preliminary Proposal and supporting documents is in progress. A review of cost estimate is being performed.

<u>FUNDING YEARS:</u> 89		<u>TEC (\$*1000):</u> 300											
		<u>FUNDING</u>		<u>PRIOR</u>									<u>BEYOND</u>
<u>BCR CODE</u>	<u>BA/BO</u>	<u>TYPE</u>	<u>TOTAL</u>	<u>FY-88</u>	<u>FY-88</u>	<u>FY-89</u>	<u>FY-90</u>	<u>FY-91</u>	<u>FY-92</u>	<u>FY-93</u>	<u>FY-94</u>	<u>FY-95</u>	<u>FY-95</u>
GF 01 02 06 0	BA	GPP	300	0	0	300	0	0	0	0	0	0	0
<u>TOTAL:</u>			300	0	0	300	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: WEST ADDITION TO BUILDING 3544

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.59

STATUTORY REQ: CWA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.59

SCOPE: To provide additional floor space in building 3544 for additional instrumentation systems.

JUSTIFICATION: Due to the installation of new and improved instrumentation and control systems in the Process Waste Treatment Plant (PWTP), the control room area has become over crowded. To compound the present situation, additional instrumentation systems are planned for installation in the control room.

FACILITIES: An approximately 23 ft. by 63 ft. additional floor space in the west side of bldg. 3544.

STATUS/COMMENTS: Program is in the process of determining the impact of contaminated soil found at the site.

3-72

FUNDING YEARS: 88							TEC (\$x1000):							593						
B&R CODE		BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95						
GF 01 02 06 0	BO	GPP		593	0	593	0	0	0	0	0	0	0	0						
TOTAL:				593	0	593	0	0	0	0	0	0	0

1. Program Category WATER POLLUTION CONTROL PROGRAM					2. Reporting Period 7/01/89 through 7/31/89									
3. Project Title WEST ADDITION TO BUILDING 3544 FWP NO: ERK0002 ACTIVITY NO:					4. Program Representative M. L. WILLOUGHBY					Funding Type: OPP				
					5. Project Engineer D. A. CONATSER					Funding Year: FY-1988				

6. Project Number	7. Subproject Title	8. Fiscal Year and Months																					
		FY-1987				FY-1988				FY-1989				FY-1990				FY-1991					
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
WBS 3.59	COMPLETE CONSTRUCTION OF WEST ADDITION TO BUILDING 3544 (2-3.4)																						

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 ← MONTH

← FORECAST

SYMBOL MILESTONE LEVEL

▽□◇☆✕

0 1 2 3 4

Comments:

No Progress

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: ORNL PLANT DECONTAMINATION FACILITY

CONTACT: R. C. MASON

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.76

STATUTORY REQ: CWA, RCRA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.76

SCOPE: The scope of this project is to establish a facility within ORNL for use as a decontamination facility for large and medium plant equipment, vehicles and other devices or apparatus used for construction activities. This facility will employ the latest in technological innovations relating to decontamination of equipment, as well as all necessary systems required for environmental compliance, ALARA, and personnel safety.

JUSTIFICATION: The anticipated increase in activity within the laboratory associated with new construction and D&D in support of the Remedial Actions Program (RAP) will require the periodic decontamination of plant equipment construction vehicles and tools, prior to their removal from the site, and in some cases prior to their use at other construction/D&D areas on-site. These decontamination activities must be performed in a manner consistent with present and anticipated environmental regulations, as well as, ALARA and personnel safety considerations. Presently, no such facility exists within ORNL, and transport of contaminated item to other sites for decontamination is not considered feasible.

FACILITIES: New or possibly existin facility to be renovated - as yet undefined.

STATUS/COMMENTS: Conceptual Design to begin in FY-1991.

FUNDING YEARS: 89			TEC (\$M1000): 21300										BEYOND
R&R CODE	RA/RQ	FUNDING	TOTAL	PRIOR									
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
NG 02	BA	LIP	20200	0	0	0	0	0	0	5000	10100	5100	0
NG 02	BA	EXP	1100	0	0	100	200	250	250	100	100	100	0
TOTAL:			21300	0	0	100	200	250	250	5100	10200	5200	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: EQUIPMENT DECONTAMINATION FACILITY

CONTACT: R. C. MASON

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.77

STATUTORY REQ: RCRA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 90-2

EPMP NO: 2.3.77

SCOPE: To provide an interim decontamination facility for contact and remote decontamination of large, medium, and small equipment using state-of-the art technology.

JUSTIFICATION: This action alleviates the risk of an unexpected environmental insult due to inadequate decontamination facilities or an incident during use of temporary facilities.

FACILITIES: Facilities will be defined by an assessment.

STATUS/COMMENTS: Assessment to be performed through a subcontract during FY 1988.

3-76

FUNDING YEARS: 92			TEC (\$x1000): 1000										BEYOND
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
KG 02	BA	GPP	1000	0	0	0	0	0	1000	0	0	0	0
TOTAL:			1000	0	0	0	0	0	1000	0	0	0	0

1. Program Category SOLID WASTE MANAGEMENT				2. Reporting Period 7/01/89 through 7/31/89																					
3. Project Title EQUIPMENT DECONTAMINATION FACILITY				4. Program Representative R. C. MASON				Funding Type: GPP																	
FWP NO: ERK0002				5. Project Engineer				Funding Year: FY-1992																	
ACTMITY NO:																									
6. Project Number WBS 3.77	7. Subproject Title	8. Fiscal Year and Months																							
		FY-1990				FY-1991				FY-1992				FY-1993				FY-1994				FY-1995			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
	SYSTEM REQUIREMENTS DOCUMENT																								
	STUDY & ESTIMATE																								
	SITE SELECTION & SUBSURFACE INVESTIG.																								
	DESIGN CRITERIA																								
	TITLE II DESIGN A/E SELECTED 2/89																								
	CONSTRUCTION																								
	START UP																								
	OPERATION																								
<div style="display: flex; justify-content: space-between;"> <div> <p>SHADING INDICATES STATUS AND COMPLETION</p> <p>ACTIVITY SCHEDULE</p> </div> <div> <p>SYMBOL MILESTONE LEVEL</p> <p>▽ □ ◇ ☆ X</p> <p>0 1 2 3 4</p> </div> <div> <p>Comments:</p> </div> </div>																									

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: BUILDING 3544 ION EXCHANGE/EVAPORATOR ROOM UPGRADE

CONTACT: C. E. PEPPER

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.78

STATUTORY REQ: CWA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO: 88-2

EPMP NO: 2.3.78

SCOPE: The scope of this activity is the upgrade of the floor within the "Column Room" of Bldg. 3544. As a consequence of the displacement of processing equipment during the floor upgrade, a number of roof panels will need to be replaced in this area, as well as cleaning and epoxy coating of some structural members.

JUSTIFICATION: The floor within this area of the Process Waste Treatment Plant (PWTTP) has become badly deteriorated by acid spills and waste streams. In certain areas, the floor is deteriorated to the point of allowing Process and liquid-low-level waste to be introduced into the ground under the PWTTP. This project will remove the existing surface to a point of integrity, and replace it with a new acid-resistant concrete floor to its original finished floor elevation. Seal-less pumps will also be introduced to prevent a recurrence of the deterioration.

FACILITIES: Process Waste Treatment Plant (PWTTP), Building 3544, Column Room.

STATUS/COMMENTS: Conceptual Design underway. Preparation of Systems Requirements Documents nearly complete, Detailed Design to begin before end of FY-1988.

FUNDING YEARS: 89		TEC (\$x1000): 1000											
		PRIOR											
BER CODE	BA/BO	FUNDING TYPE	TOTAL	FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
GF 01 02 06 0	BO	GPP	1000	0	0	1000	0	0	0	0	0	0	0
TOTAL:			1000	0	0	1000	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: BSR/ORR LLW UPGRADE

CONTACT: W. J. ARMENTO

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.79

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 90-2

FPMP NO: 2.3.79

SCOPE: This project will upgrade the LLW-CAT System for handling of liquid low-level waste including demineralizer waste, emergency pool overflow, and floor drains from the Bulk Shielding Reactor (BSR).

JUSTIFICATION: The BSR and ORR will not have a liquid low-level waste disposal capability for demineralizer regeneration solutions upon isolation of waste tank MC-19, planned as part of the shutdown of single-contained portions of the liquid low-level waste system.

FACILITIES: Stainless-steel piping, a stainless-steel-lined reinforced-concrete vault, stainless-steel tank, and sealed concrete trucking station will be part of this project.

STATUS/COMMENTS: The revision to the SRD will be revised and issued in 1990. The study and Estimate will be completed in 1990. A new schedule must be developed in 1990.

3-79

FUNDING YEARS: 89			TEC (\$M1000):										BEYOND FY-95
BAR CODE	BA/RQ	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
KG 02	BO	GPP	1000	0	0	1000	0	0	0	0	0	0	0
TOTAL:			1000	0	0	1000	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: CLEAN WATER ACT COMPLIANCE PROJECT

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.80

STATUTORY REQ: CWA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.80

SCOPE: This project consists of installing wastewater pumping stations and wastewater pipelines to reroute 3000 area nonradioactive process wastewater from the radioactive process waste system to the Nonradiological Wastewater Treatment Plant.

JUSTIFICATION: This project is necessary for rerouting nonradiological wastewater out of the radioactive process waste system which is frequently operating at peak capacity. The nonradioactive process waste streams will be routed to the appropriate treatment facility. This project will reduce the hydraulic load on an overloaded treatment facility.

FACILITIES: This project will provide piping for transfer of nonradioactive process wastewater to the Nonradiological Wastewater Treatment Plant.

STATUS/COMMENTS: The Preliminary Proposal and support documents are being prepared for this project.

FUNDING YEARS: 89				TEC (\$x1000): 550									
RER CODE	RA/RO	FUNDING	TOTAL	PRIOR									
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
KG 02	BO	GPP	550	0	0	550	0	0	0	0	0	0	0
		TOTAL:	550	0	0	550	0	0	0	0	0	0	0

1. Program Category WATER POLLUTION CONTROL PROGRAM				2. Reporting Period 7/01/89 through 7/31/89															
3. Project Title CLEAN WATER ACT COMPLIANCE FWP NO : KG02 ACTIVITY NO :				4. Program Representative M. L. WILLOUGHBY				Funding Type: OPP											
				5. Project Engineer T. J. NEWSON				Funding Year: FY-1989											
6. Project Number WBS 3.80	7. Subproject Title	8. Fiscal Year and Months																	
		FY-1989				FY-1990				FY-1991				FY-1992					
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
	FUNCTIONAL REQUIREMENTS
	STUDY AND ESTIMATE
	PRELIMINARY PROPOSAL
	DOE APPROVAL
	DESIGN
	BID AND AWARD
	CONSTRUCTION
	TEST & CHECKOUT
<div style="display: flex; justify-content: space-between;"> <div> <p>SHADING INDICATES STATUS AND COMPLETION</p> <p>ACTIVITY SCHEDULE</p> </div> <div> <p>SYMBOL MILESTONE LEVEL</p> <p>0 1 2 3 4</p> </div> <div> <p>Comments:</p> <p>Preliminary Proposal in approval cycle on 7/25/89.</p> </div> </div>																			

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: GRAPHITE REACTOR CANAL LLW STORAGE AND TRANSFER

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.81

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

FMP NO:

EMG. PROJ. NO:

EPMP NO: 2.3.81

SCOPE: This project will install a liquid low-level waste (LLW) storage tank (3,000 gal.), piping, pumps, electrical and electronic systems, and improvements to the truck access area west of Building 3001. Truck access improvements will include diking and filling apparatus to permit the transfer of LLW from the LLW tank located adjacent to the ion exchange columns to a loading station for truck transport.

JUSTIFICATION: Environmental regulations require that all underground LLW lines that are not doubly-contained and cathodically protected be removed from service. This will prevent the continued operation of the ion exchange columns as presently configured, and require substantial capital costs to be incurred to reconfigure the water clean-up system. Reconfiguration to a solid disposal bed would also add significantly to both operation costs for the system (waste disposal costs) and exposure to personnel required for bed removal, packaging, and disposal.

FACILITIES: Installation of storage tank, piping, pumps, electrical and electronic systems, and associated components.

STATUS/COMMENTS: Functional Requirements need to be developed.

FUNDING YEARS: 91				TEC (\$M1000):										500	
R&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR									BEYOND		
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95		
KG 02	BA	GPP	500	0	0	0	0	500	0	0	0	0	0		
TOTAL:			500	0	0	0	0	500	0	0	0	0	0		

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: COAL YARD RUNOFF IMPROVEMENTS, BUILDING 2545 AND 2644

CONTACT: W. K. SIMON

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.82

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FWP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.82

SCOPE: Project encompasses dredging coal yard settling basin, installing a concrete/vinyl liner in the basin and enlarging the clarifier tanks at the coal yard runoff treatment facility.

JUSTIFICATION: Additional environmental discharge regulations have significantly increased the volume of water which must be treated at the coal yard runoff treatment facility. Enlarging the clarifier tanks will improve the treatment capabilities at the facility. Likewise, increased volume requires additional hold-up, storing and settling capabilities. The concrete liner in the basin will simplify the removal of 'fines' and ash and enable us to maintain maximum treatment and storage capabilities.

FACILITIES: 2545, 2644

STATUS/COMMENTS: Study and Estimate

FUNDING YEARS: 92				TEC (\$x1000):										500		
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95			
AT	BA	OPP	500	0	0	0	0	0	500	0	0	0	0			
TOTAL:			500	0	0	0	0	0	500	0	0	0	0			

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: NEW LINERS IN THE SECONDARY SEWAGE TREATMENT PONDS

CONTACT: W. K. SIMON

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.85

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.85

SCOPE: Drain and remove sludge from the secondary sewage treatment ponds and install new impermeable lining.

JUSTIFICATION: Liner installed in ponds in 1977 is split and rotted and offers no protection from release of potentially hazardous substances into the environment.

3-84

FACILITIES: 2543, 2544

STATUS/COMMENTS: Study and Estimate

FUNDING YEARS: 90				TEC (\$x1000):									
				800									
BER CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
KG(350)	BA	GPP	800	0	0	0	800	0	0	0	0	0	0
		TOTAL:	800	0	0	0	800	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: REPLACE 25,000 GALLON FUEL OIL TANK AT 7600 AREA

CONTACT: W. K. SIMON

PROGRAM CATEGORY: Water Pollution Control Program

PLANT: ORNL

PROJECT NO: 3.86

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.3.86

SCOPE: Replace fuel tank at 7600 with double contained fuel tank, natural gas or propane.

JUSTIFICATION: Fuel tank requires replacement to meet current environmental guidelines. Study addresses different options available.

FACILITIES: 7601-7603

STATUS/COMMENTS: ESO Study.

FUNDING YEARS: 92			TEC (\$x1000):										
				125									
ACR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AT	BA	GPP	125	0	0	0	0	0	125	0	0	0	0
TOTAL:			125	0	0	0	0	0	125	0	0	0	0

Table 3.7. Water Pollution Control Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$M1000)									BEYOND FY-95
		TYPE	SOURCE		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95		
3.00	WATER POLLUTION CONTROL PROGRAM	EXP	GF	80861	6789	3092	5880	6700	6700	6700	6600	6600	31800	
3.00	WATER POLLUTION CONTROL PROGRAM	EXP	KG	45266	3058	1973	2975	3210	3650	3800	3800	3800	19000	
3.37	RETHEL VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	KG	300	0	100	100	100	0	0	0	0	0	
3.44	ISOTOPES AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	AF	7000	0	0	0	0	3500	3500	0	0	0	
3.44	ISOTOPES AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	KG	600	0	0	600	0	0	0	0	0	0	
3.45	MELTON VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	KG	1300	0	300	300	300	100	100	100	100	0	
3.54	ENGINEERING EVALUATION OF COAL YARD RUNOFF TREATMENT FACILITY	EXP	KG	20	20	0	0	0	0	0	0	0	0	
3.76	ORNL PLANT DECONTAMINATION FACILITY	EXP	KG	1100	0	100	200	250	250	100	100	100	0	
3.91	UNDERGROUND STORAGE TANKS (UST) INSTALLED AFTER 1965	EXP	KG	4000	0	0	0	2000	2000	0	0	0	0	
FUNDING TOTALS:				140447	9867	5565	10055	12560	16200	14200	10600	10600	50800	

Table 3.8. Water Pollution Control Program funding summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)						FY-95	FY-94	FY-93	FY-92	FY-91	FY-90	FY-89	FY-88	BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95							
AF	Capital-LIP	31000	0	0	0	6500	12800	8400	3300	0	0	0	0	0	0	0	0
	Expense	7000	0	0	0	0	3500	3500	0	0	0	0	0	0	0	0	0
	Subtotal	38000	0	0	0	6500	16300	11900	3300	0	0	0	0	0	0	0	0
AT	Capital-GPP	3075	450	0	0	0	625	500	500	500	500	500	500	500	500	500	500
	Subtotal	3075	450	0	0	0	625	500	500	500	500	500	500	500	500	500	500
GF	Capital-CE	3334	589	270	500	500	400	450	350	275	450	400	500	1100	1300	1593	0
	Capital-GPP	3993	1593	1300	1100	0	0	0	0	0	0	0	0	0	0	0	0
	Expense	80861	6789	3092	5880	6700	6700	6700	6600	6600	6700	6700	6700	6700	6700	6700	31800
	Subtotal	88188	8971	4662	7480	7200	7100	7150	6950	6875	7150	7100	7200	7480	4662	8971	31800
KG	Capital-LIP	98313	11800	12900	10500	7913	6000	17000	22100	10100	17000	6000	7913	10500	12900	11800	0
	Capital-CE	720	80	50	30	160	80	80	80	80	80	80	160	30	50	80	80
	Capital-GPP	18850	300	1550	800	500	4700	3500	3500	2500	3500	4700	500	800	1550	300	1500
	Expense	52586	3078	2473	4175	5860	6000	4000	4000	4000	4000	6000	5860	4175	2473	3078	19000
	Subtotal	170469	15258	16973	15505	14433	16780	24580	29680	16680	24580	16780	14433	15505	16973	15258	20530
Program Totals	Capital	15,85	14812	16070	12930	15573	24605	29930	29830	13455	29930	24605	15573	12930	16070	14812	2080
	Expense	140447	9867	5565	10055	12560	16200	14200	10600	10600	14200	16200	12560	10055	5565	9867	50800
Grand Total		299732	24679	21635	22985	28133	40805	44130	40430	24055	44130	40805	28133	22985	21635	24679	52880

4. SOLID WASTE MANAGEMENT PROGRAM

OVERVIEW

The primary objectives of solid waste management at ORNL are to

- protect the health and safety of ORNL employees and the public;
- protect the environment;
- comply with local, state, and national environmental regulations and DOE orders;
- minimize solid waste generation in compliance with the ALARA concept; and
- provide and maintain isolation of the major waste categories to reduce cross-contamination between radioactive, hazardous, and conventional wastes.

Solid waste generated as a result of ORNL operations and research can be classified into three broad categories—radioactive, hazardous/mixed, and conventional, as illustrated in Fig. 4.1. These three categories are subdivided into specific types of waste having more distinct and clearly defined characteristics. Each subcategory of solid waste generated at ORNL is addressed in greater detail in the following sections of this report.

RADIOACTIVE WASTE

Radioactive solid waste materials are distinguished by the presence of radionuclides and can be separated into two basic types: TRU waste and LLW (see Fig. 4.2). TRU waste is generally characterized by the presence of alpha-emitting nuclides that have long half-lives. TRU wastes contain nuclides that have atomic numbers greater than that for uranium (92) and have an activity level >100 nCi/g and a half-life >20 years. LLW may contain <100 nCi/g of TRU nuclides and typically contains beta- or gamma-emitting nuclides having short half-lives.

Generators of solid radioactive waste at ORNL are charged with the costs for managing the waste. Rates include management, supplies, recordkeeping, utilities, equipment, engineering, waste handling and transportation, inspection, certification, processing (e.g., compaction), maintenance, and Health Physics coverage. Charging generators for costs associated with the management of their own wastes provides greater incentive for the generator to minimize waste generation and appropriately segregate and package wastes.

Transuranic Waste

Current Status of Solid TRU Waste Management. The distinction between LLW and TRU waste is defined by DOE Order 5820.2A, which became effective in September 1988. In addition, the order provides to individual field offices the flexibility to declare other radionuclides (not meeting the above definition) TRU waste for purposes of handling and disposal if the field office determines that wastes contaminated with these materials represent an equivalent hazard.

Fig. 4.1. General classification of solid waste generated at ORNL.

TRU wastes are categorized as either contact-handled (CH) TRU or remote-handled (RH) TRU, based on the maximum radiation level at the surface of the package. Those wastes exhibiting a surface dose rate of <200 mrem/h are handled as CH-TRU, whereas those wastes exhibiting a surface dose rate of >200 mrem/h are handled as RH-TRU (Fig. 4.2).

TRU wastes can be further characterized as either newly generated or stored. This distinction is based on approval of the ORNL TRU Waste Certification Plan by WIPP and is used both in defining financial liability for repackaging unacceptable waste—since it is the responsibility of the generator to repack nonconforming newly generated CH-TRU waste—and in defining the appropriate certification requirements. The requirements for certification of newly generated TRU waste packages are more stringent than for stored TRU. July 1986, the date when ORNL was approved to certify newly generated CH-TRU waste, is the demarcation date between newly generated waste and stored CH-TRU waste.

Fig. 4.2. Classification of solid radioactive waste at ORNL.

Before 1970, TRU-contaminated solid material was not segregated from other SLLW and was disposed of by shallow land burial in the ORNL SWSAs. Approximately 6200 m³ (2.2×10^5 ft³) of waste buried at ORNL is currently estimated as meeting the definition of TRU waste. There is little information specific to the buried TRU waste, although in some cases, trenches containing alpha wastes were capped with a layer of concrete. Because of the lack of segregation 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.

Approximately 1800 m³ (6.5×10^4 ft³) of TRU waste has been accumulated since 1970 and is in retrievable storage at ORNL. RH-TRU waste accounts for 1300 m³ (4.7×10^4 ft³) of this storage as of December 31, 1988. The generation rate for RH-TRU waste is expected to be 4 to 5 m³/year (153 ft³/year). CH-TRU waste makes up the remaining 500 m³ (2.0×10^4 ft³). The generation rate for CH-TRU waste is projected to be 15 m³/year (530 ft³/year). The CH-TRU waste in storage at ORNL has been placed in stainless or mild steel drums (55 or 30 gal), and the RH-TRU waste has been placed predominantly in large concrete casks.

ORNL generates a small quantity of TRU waste that could be considered mixed waste. Approximately 10% of the current inventory of ORNL CH-TRU drums may contain mixed waste, with the major RCRA contaminant being lead. The waste acceptance criteria for WIPP allows for the disposal of RCRA-regulated materials that are co-contaminated with TRU waste.

The Consolidated Edison Uranium Solidification Project (CEUSP) campaign, which ended in 1986, generated cans of solidified waste. The waste contains fissile materials with cadmium and gadolinium as neutron absorbers. This material is expected to be packaged and shipped to WIPP for disposal.

About 440,000 L (116,000 gal) of sludge currently stored in the gunite tanks and in the Melton Valley service tanks have been reclassified as RH-TRU waste. The gunite tank sludges are residuals from sluicing operations to remove tank contents. These sludges will have to be removed from the tanks and stabilized prior to permanent disposal. However, ORNL does not currently have the capability to process and package these sludges. (Further discussion of this waste stream is included in Sect. 3, the Water Pollution Control Program)

The *DOE Long-Range Master Plan for Defense Transuranic Waste Management* has identified WIPP, a deep geologic repository under construction in New Mexico, as the permanent disposal facility for TRU waste. TRU waste management at ORNL is therefore devoted to retrievably storing these wastes until WIPP is operating. Shipment of ORNL CH-TRU waste to WIPP is scheduled to begin in approximately FY 1994, although that date remains uncertain.

Because TRU wastes are subject to RCRA requirements, CH-TRU wastes stored after 1992 must meet RCRA technical and permitting requirements. As a result of the anticipated further delay in the opening of WIPP, additional CH-TRU storage will probably be needed to meet RCRA requirements. The retrievable waste storage capacity for RH-TRU wastes is also inadequate, and additional facilities for storing concrete casks and other RH-TRU waste packages is needed.

TRU waste must be properly packaged and certified before shipment for permanent disposal. Inspection, assay, and certification of CH-TRU containers has been initiated in preparation for shipments to the WIPP when that facility opens. A repackaging facility for CH-TRU waste will be needed to ensure conformance with the WIPP WAC. Some RH-TRU waste currently in retrievable storage is not suitably packaged for shipment and permanent disposal. A facility to process, repackage, and certify these wastes is currently in conceptual design and is planned as a 1991 GPP.

The strategies for the retrieval and certification of TRU waste at ORNL are based on the *DOE Long-Range Master Plan for Defense Transuranic Waste Management*. Existing facilities and operations, as well as additional technology for the certification and transportation of TRU waste to WIPP, are integral parts of the overall plan. For CH-TRU waste, certification can be performed in existing facilities, although improvements will be necessary. However, additional facilities will be needed to accommodate the RH-TRU waste. An overview of ORNL TRU waste strategies and options is presented in Figs. 4.3 (CH), 4.4 (RH), 4.5 (newly generated RH), 4.6 (RH sludge), and 4.7 (CEUSP).

In summary, the ORNL approach to TRU waste is to (1) segregate TRU wastes, (2) certify these wastes to meet the WIPP waste acceptance criteria, (3) maintain these wastes in safe interim storage, (4) develop the facilities necessary to package the waste for shipment, and (5) ship the TRU wastes to the WIPP for disposal.

Plans and Strategy for Solid TRU Waste Management. Figures 4.3 through 4.7 illustrate the decision, actions, current planning, and facilities necessary to ship ORNL TRU wastes to the WIPP. Figure 4.8 summarizes the strategy for TRU waste management at ORNL.

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Fig. 4.3. Contact-handled transuranic waste.

Fig. 4.4. Stored remote-handled transuranic waste.

CH wastes are packaged in 30- or 55-gal drums, which are collected and placed in temporary storage. Batches of drums are then processed through the Waste Examination Assay Facility (WEAF), where nondestructive assays and examinations (the final steps in the certification process) are performed. After these assays and examinations, waste drums are placed in retrievable storage. Certified drums will be retrieved and shipped to WIPP at such time as the plant is able to receive waste. Wastes determined to be non-TRU will be managed as LLW. Waste currently in containers that does not meet the criteria of CH-TRU waste will be placed in overpack containers or repackaged and shipped to WIPP.

Solid RH-TRU wastes are packaged predominantly in concrete casks. Today, the concrete casks are placed in retrievable storage; however, before 1979, the concrete casks were buried in SWSA 5. Retrieval of the buried casks has been demonstrated.

Before RH-TRU wastes are shipped to WIPP, the materials will have to be processed through the proposed repackaging facility—the WHPP. This proposed facility would repackage wastes from the concrete casks into RH-TRU canisters and then certify that WIPP waste acceptance criteria are met. This facility will also serve as a central processing site for DOE RH-TRU wastes and potentially for special-case TRU wastes. The WHPP is necessary for RH-TRU processing and shipping. This facility is proposed as an FY 1993 line-item project costing \$230 million and is

Fig. 4.5. Newly generated remote-handled transuranic waste.

projected to be operational by the start of FY 1999 to meet current WIPP waste shipment milestones. To meet the shipping schedule, the conceptual design and related activities were begun in FY 1988. Additional information can be found in the *ORNL Remote Handled and Special-Case TRU Waste Strategy Implementation Plan*.

According to the By-product Rule agreement between the DOE and EPA during FY 1987, TRU waste containing hazardous materials is subject to both radioactive and RCRA waste regulations. Therefore, facilities processing or storing mixed TRU wastes for longer than 90 days will require RCRA permits and are subject to RCRA technical requirements. Exceptions to RCRA rules are granted when adherence is in conflict with ALARA concerns. Permitting or closure of such facilities is required by 1992. Applications for RCRA permits or closure plans for existing mixed TRU facilities have been submitted. Permit applications for proposed facilities will be prepared during project execution phases.

Additional space for concrete casks will be required in about 2 years. A GPP providing for this space is currently scheduled in FY 1990. A new staging facility for CH-TRU and solid low-level waste is also planned as an FY 1989 GPP.

Fig. 4.6. Melton Valley and granite tank sludge.

Low-Level Waste

Current Status of LLW Management. LLW, as defined in DOE Order 5820.2A, is radioactive waste not classified as high-level waste, TRU waste, spent nuclear fuel, or a by-product material. In general, the radionuclides in LLW are beta/gamma emitters having short half-lives. LLW may contain up to 100 nCi/g of TRU radionuclides. Most of the LLW generated at ORNL consists of contact-handled waste such as shoe covers, waste wipes, and disposable clothing.

The general steps in the management of LLW are shown in Fig. 4.9. The generating facility is responsible for preparing LLW for transport, storage, and disposal. Nondestructive examinations and administrative checks performed at the WEAFF are designed to exclude free liquids and lead from newly generated drummed waste. The drummed waste is processed for disposal by compaction

Fig. 4.7. Canned transuranic waste.

and cement encasement. If the waste package has a contact radiation of 50 mrem/h or less, it may be stored at ORGDP.

Since June 1986, LLW disposal on the ORNL site has utilized greater confinement disposal (GCD) techniques, such as below-grade concrete silos, auger holes, and above-grade tumulus disposal units. These techniques are being developed in conjunction with the Low-Level Waste Disposal Development and Demonstration (LLWDDD) Program and provide both improved waste management operations and the demonstration of new disposal technologies. GCD methods are used to reduce the potential for release from new disposal operations.

Concrete silos are nominally 8 ft in diameter, 20 ft deep, and 6 in. thick. The concrete silos are constructed by nesting an 8-ft-diam corrugated metal pipe inside a 9-ft-diam corrugated metal pipe,

WASTE CATEGORY	FISCAL YEAR											
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<u>CH-TRU:</u>			RTR AND ASSAY									
			WEAF - SWSA 5N						.....		RTR AND ASSAY	
NEWLY GENERATED			GENERATORS CERTIFY			.....						WCCF - SWSA 7
			STORE AT 7826 & 7834			.....						
STORED									STORE AT NEW CH-TRU STORAGE FACILITY			
									SHIP TO WIPP			
<u>RH-TRU:</u>									STORE AT NEW CH-TRU STORAGE FACILITY			
									REPACKAGE AND CERTIFY			
NEWLY GENERATED CASKS									ORNL CH-TRU REPACKAGING FACILITY			
									SHIP TO WIPP			
STORED CASKS						GENERATORS CERTIFY						
						STORE AT NEW RH-TRU BUNKERS						
BURIED CASKS									REPACKAGE & CERTIFY AT WHPP			
									SHIP TO WIPP			
SLUDGES									REPACKAGE & CERTIFY AT WHPP			
									SHIP TO WIPP			
									STORE AT NEW RH-TRU BUNKERS?			
									REPACKAGE & CERTIFY AT WHPP?			
									SHIP TO WIPP?			
									STORE IN MVST - IN-TANK EVAPORATION - SOLIDIFICATION CAMPAIGNS			
									PROCESS, PACKAGE & CERTIFY AT WHPP			
									SHIP TO WIPP			

Fig. 4.8. Strategy for ORNL transuranic waste.

Fig. 4.9. Low-level waste at ORNL.

then pouring cement in the annulus. They are installed vertically in the ground with the top of the pipe near the original surface elevation. Steel-reinforced concrete bottoms about 12 in. thick are formed in place. The bottoms of the culverts are located at least 0.6 m (2 ft) above the known high-water table level, as defined by the best currently available hydrologic profiles.

Lined auger holes are basically a specialized form of disposal that allows greater control of radiation exposure during disposal operations and prevents excessive quantities of fissionable material from accumulating in a given area. Auger hole disposal is used for either special-case RH-LLW (>1 rem/h) or fissionable (primarily ^{235}U) waste. The fissile content for auger hole disposal is limited to 300 g. Greater amounts require Criticality Committee approval via a Request for Nuclear Review. Auger hole liners usually consist of cast iron or carbon steel pipe with concrete plugs at the base and for the cap. Auger hole diameters are 20 and 30 in., depending primarily on

the function of the individual hole. Each auger hole is assigned a unique number, and records are maintained on the contents of each hole. Hole locations are indicated on site drawings. Engineering coordinates are surveyed, and a permanent record is maintained.

A combination of these two disposal techniques is also being used. Some concrete silos are being used as containers for nesting pipe liners that are usually used for lining auger holes. The annulus between these pipes is filled with concrete. RH-LLW is then loaded into these liners in a manner similar to that used for the lined auger holes.

As part of the LLWDDD program, a tumulus demonstration facility was built in SWSA 6 during FY 1987. The tumulus consists of an above-grade, reinforced concrete pad, a liner, and a leachate collection system. LLW is placed in concrete vaults that are then back-filled with grout and stacked on the pad. After vault emplacement is completed, a multilayer cover will be constructed. The tumulus will provide 28,000 ft³ of disposal capacity. The engineered tumulus disposal technology has been proposed as the primary method for managing Class II waste on the ORR.

The segregation of LLW as practiced at ORNL is presented in Fig. 4.10. LLW is generally categorized by the gamma surface radiation intensity. If the maximum intensity is >200 mrem/h, the waste is classified as RH waste. If the maximum surface exposure rate is <200 mrem/h, the waste is designated as CH waste. CH waste is further subdivided into compactible and bulk categories. RH waste is subdivided into two categories for handling purposes. The first category is defined as waste with a maximum contact radiation intensity between 200 mrem/h and ≤ 1 rem/h (high-range), and the second is defined as waste with a contact intensity >1 rem/h (special-case).

Waste that meets the lower intensity criteria is currently being transported via a lead-lined pan to a below-grade concrete silo disposal unit in SWSA 6. Waste that qualifies for the higher contact intensity level is transported via 20-in.-diam lead-shielded casks to either a below-grade concrete silo that is configured with seven internally arranged 20-in.-diam cast iron pipes or to below-grade 20-in.-diam cast iron pipe-lined auger holes. The highest-intensity waste is placed in lined auger holes because they are best configured to reduce operator exposure. Special-case RH waste (which is sometimes placed in 55-gal drums) can also be transported via a bottom-loading, lead-lined drum carrier that discharges to below-grade 30-in.-diam corrugated, steel-lined auger holes.

A box compactor, located in Building 7831 in SWSA 5, is used with compactible materials such as paper, plastic, and rubber, as well as with glass, light-weight metals, buckets, trash cans, and filters. The waste is compacted into 4 x 4 x 6-ft metal boxes. Waste feed is restricted to low specific activity (LSA) CH LLW (≤ 50 mrem/h) so that disposition may be by either storage at ORGDP or disposal in SWSA 6.

CH compactible drummed waste consists of waste that does not meet the acceptance criteria established for the box compactor but is easily packaged in a 55-gal drum. This can include waste wipes, mopheads, piping, wood, heavy glass containers, and various metal objects. CH bulk waste consists of wastes inappropriate for reaction in the box compactor or too large for packaging in a 55-gal drum. CH bulk waste is disposed of in below-grade concrete silos in SWSA 6.

Drummed waste that meets the ORGDP dose rate acceptance criteria (currently ≤ 50 mrem/h) may be transported for interim storage at ORGDP. Drummed waste that cannot meet the ORGDP dose rate acceptance criteria is stored for future supercompaction. In the past, supercompacted drums were placed in overpack drums. Final disposal is planned in an above-grade tumulus unit.

Some sludges, such as the clarifier sludge from the PWTP (Bldg. 3544), qualify as CH LLW. Drums of sludge that meet ORGDP criteria may be transported to interim storage at that facility. Drums that exceed the ORGDP criteria are disposed of in SWSA 6.

Fig. 4.10. Current ORNL solid radioactive waste segregation, storage, and disposal practices.

Several waste types are identified as LLW exceptions. These types include asbestos, suspect, and fissile wastes. Asbestos contaminated with radioactive materials is disposed of using concrete silos distinctly identified and separate from concrete silos used for the disposal of other subcategories of LLW. Suspect LLW is defined as material with no measurable levels of radioactivity (by field survey techniques) but judged, because of its history, to be contaminated with radioactive materials and therefore unsuitable for release from waste management control. Suspect waste is currently being disposed of in SWSA 6 using landfill techniques. This subcategory of LLW waste will be phased out by 1992 when the new certification program is fully operational.

Plans and Strategy for LLW Management. The use of shallow land burial at ORNL has in the past been viewed as an adequate, safe practice that was in full compliance with DOE orders. Regulations have changed, and the principal DOE policy statement for management of LLW is now stated in DOE Order 5820.2A. Efforts are also being made to reduce the potential for releases from new disposal operations to ALARA in accordance with DOE/EV/1830-T5, *A Guide to Reducing Radiation Exposure to As-Low-As-Reasonably-Achievable (ALARA)*.

The space remaining in SWSA 6 and the lifetime of this burial facility are limited. The number of years of operation remaining for SWSA 6 depends on future waste generation rates, waste reduction efforts, waste volume reduction efficiencies, applicability of disposal demonstrations, use of the storage areas, and regulatory compliance requirements.

Efforts have been initiated and will continue to be pursued at ORNL to reduce the volume of LLW going to SWSA 6. Volume reduction capabilities have been expanded with the installation of a box compactor and the demonstration of supercompaction techniques. Interim storage capabilities at ORGDP are being utilized for uniform and easily certifiable CH LLW streams. In addition, new efforts are being directed at reducing the LLW generation rate; therefore, reduction includes not only reducing the total volume of LLW that has been generated, but also reducing the rate at which it is generated at the source.

To meet the requirements of DOE Order 5820.2A, issued September 26, 1988, and the LLWDDD program strategy, new LLW management facilities are needed for the plants located on the ORR. The new order requires that performance-based LLW management operations be implemented at DOE sites. Key requirements of this order include the following:

- Establishment of disposal waste acceptance criteria based on site performance considerations;
- Characterization of LLW and certification that it meets WAC before it can be disposed of on-site; and
- Storage of waste on-site or shipment of waste off-site that does not meet the disposal WAC.

WAC will be established through the Environmental Impact Statement (EIS) on proposed waste management activities at the ORR as well as through site-specific performance assessments required by 5820.2A.

Based on the LLWDDD strategy, five classes of waste are expected to be managed on the ORR. Waste that is below regulatory concern (BRC) is that which is planned to be disposed of in a sanitary landfill facility and will meet a performance dose criteria of 4 mrem/year at the time of disposal. Class I waste is planned to be disposed of in an industrial landfill and will meet a dose performance criteria of 10 mrem/year at the time of disposal. Class II waste, primarily containing fission product radionuclides with half-lives of <30 years, is planned to be disposed of in engineered facilities designed to isolate the waste from the environment for a period extending 100 to 500 years. During this period, significant decay will occur such that radionuclides present at the end of the performance period will meet a 10-mrem/year dose performance criteria. Class III waste is that with a long half-life planned to be disposed of in facilities that provide intruder protection. Class IV waste is that which does not meet dose performance criteria and is planned to be stored until off-site disposal becomes available.

The newly formed RWMD, housed organizationally at ORGDP, has been assigned responsibility for planning, development, construction, and operation of SLLW disposal facilities that meet the DOE Order 5820.2A requirements. ORNL retains responsibility for characterization, certification, and storage of its SLLW. Plans include construction of a Waste Characterization and

Certification Facility (WCCF), a Class III/IV Retrievable Storage Facility, a Waste Stabilization Facility, and Class I and II disposal facilities and supporting buildings.

Figure 4.11 shows the schedule for activities affecting the ORNL SI LW management strategy. Figure 4.12 provides a schedule for using current and planned facilities for SLLW management.

Waste characterization and certification. One of the major difficulties in implementing the LLW classification strategy at ORNL is certification, which is defined as verifying that the LLW meets the appropriate WAC. An important criterion will be the segregation of LLW streams into the LLWDDD classes, based on the radionuclide concentration of each waste container.

Measuring the specific concentration of each individual radionuclide in each waste container would be too time-consuming and prohibitively expensive. Therefore, different techniques are being investigated to determine their applicability to LLW certification. For wastes containing radionuclides that have an associated gamma emission, a preliminary screening measurement combined with spectroscopic analysis can be used to measure the concentration in bulk waste. For wastes containing radionuclides that have only an associated weak beta particle emission, the task of determining concentration is more difficult, particularly since commercially available instruments are not designed for this purpose. A series of demonstration projects will be conducted to develop the appropriate LLW certification techniques.

The capability to characterize and certify LLW will require special facilities using various examination and assay techniques. These techniques are currently being developed in the existing WEA. WEA houses the latest state-of-the-art equipment for the examination and assay of containerized LLW. This equipment will remain the most appropriate for this purpose for many years to come but will need to be housed in a new building where operations can be made more efficient and throughput can be increased. A proposal has been made for a new Waste Characterization and Certification Facility (WCCF) that would provide a building and associated handling equipment for the assay instruments used to certify LLW. Equipment currently installed in the WEA would be moved to the WCCF.

Waste storage. To properly manage those wastes that will not meet the waste disposal acceptance criteria, it will be necessary to construct a special storage facility—the Class I/IV Retrievable Storage Facility. As required by DOE Order 5820.2A, Class IV waste will require off-site shipment for disposal. It is anticipated that an off-site disposal location will be identified at some point in the future. The proposed Class III/IV Retrievable Storage Facility will be planned to provide interim storage capability until off-site shipment is available and will also provide capacity for ~10 years of waste generation. If no off-site disposal facility is identified in this time frame, additional Class IV storage facilities will have to be built to continue storage on-site.

Waste stabilization. The stabilization of LLW plays a critical role in providing the performance needed to meet the new requirements of DOE Order 5820.2A. Stabilization involves injecting a grout mixture into containerized waste or placing waste in structurally stable overpacks. The goal is to reduce voids and provide stability for the waste to minimize the potential for subsidence of the disposal facility cover. In addition, the grouting operation reduces the potential for contact with water.

A new Waste Stabilization Facility where grouting of the waste packages and other preparations for disposal can be performed in a protected environment is planned to meet performance-based requirements of engineered disposal technology and DOE Order 5820.2A. This facility will be constructed and operated by the RWMD in West Bear Creek Valley (WBCV).

Fig. 4.11. Activities affecting the strategy for the management of solid low-level waste for ORNL.

	CALENDAR YEAR									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
SWSA 6 CONTINUING OPERATIONS				...						
CH LLW C SILOS										
RH LLW C SILOS										
RH LLW CI AUGER HOLES				.....						
RH LLW CE AUGER HOLES				.....						
FISSILE LLW CI AUGER HOLES				.....						
TUMULUS I		..								
TUMULUS II		-								
BIOLOGICAL TRENCH			.....							
SUSPECT LANDFILL										
ORGDP INTERM STORAGE				...						
LLW <50 mrem/h				...						
GTCC <50 mrem/h				...						
TRANSITION IN STRATEGY FOR ULTIMATE DISPOSITION OF LLW										
DISPOSITION BASED ON DOSE/FORM				...						
DISPOSITION BASED ON CONCENTRATION/DOSE/FORM				.....						
SWSA 6 IWMF				.....					.....	
BRC, CLASS I, CLASS II				.....					.....	
ORGDP INTERIM STORAGE				.....						
BRC, CLASS I, CLASS II <50 mrem/h				.....						
CLASS III, CLASS IV <50 mrem/h				.....						
GTCC <50 mrem/h				.....						
BRC	BELOW REGULATORY CONCERN									
C	CONCRETE									
CE	CONCRETE ENCAPSULATED									
CI	CAST IRON									
CH	CONTACT HANDLED									
GTCC	GREATER THAN CLASS C									
IWMF	INTERIM WASTE MANAGEMENT FACILITY									
LLW	LOW-LEVEL WASTE									
RH	REMOTE HANDLED									
SWSA	SOLID WASTE STORAGE AREA									

Fig. 4.12. Projected availability of low-level treatment, storage, and disposal facilities.

	CALENDAR YEAR									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
BEAR CREEK VALLEY CI DF BRC. CLASS I										
BEAR CREEK VALLEY CII DF CLASS II										
MELTON VALLEY CIII/CIV SF CLASS III, CLASS IV (>50 mrem/h) GTCC (>50 mrem/h)										
MELTON VALLEY DRY CASK SF GTCC NFM										
SWSA 5 NORTH GTCC (7827) NFM (7827, 7829)										
TSCA INCINERATOR LLW-BIOLOGICAL										

BRC BELOW REGULATORY CONCERN
 CI DF CLASS I DISPOSAL FACILITY
 CII DF CLASS II DISPOSAL FACILITY
 CIII CLASS III

LLW LOW-LEVEL WASTE
 NFM NUCLEAR FUEL MATERIAL
 CIV CLASS IV
 GTCC GREATER THAN CLASS C

SF STORAGE FACILITY
 SWSA SOLID WASTE STORAGE AREA
 TSCA TOXIC SUBSTANCE CONTROL ACT

Fig. 4.12 (continued).

Waste disposal. Low-level waste is currently being disposed of in SWSA 6; however, the capacity of SWSA 6 is projected to be exhausted by 1997. Site studies of the ORR have been performed to evaluate and identify a suitable new site for Class II waste disposal. The results of these studies indicate that the most attractive site is WBCV, located 4 miles north of ORNL. This site exhibits good hydrogeology and topography and is of sufficient size to support at least 40 years of disposal operations. Use of this site will be confirmed by the EIS, which is being prepared for proposed waste management activities on the ORR.

In order to meet the performance-based disposal criteria contained in DOE Order 5820.2A, an engineered disposal facility with performance monitoring capability is proposed. The above-grade tumulus disposal technology is being proposed for use at the WBCV site. The tumulus and three other disposal technologies were compared in an Alternatives Evaluation study conducted as a part of the LLWDDD Program. The tumulus technology involves placing stabilized waste in concrete disposal vaults; stacking the vaults on a high-strength grade-level concrete pad with drainage systems that allow collection and monitoring of surface pad water that may come in contact with the waste; providing temporary weather protection for the stacked waste; and constructing a permanent, low-permeability earth mound over the waste at closure.

To support Class II disposal activities at WBCV, an administration building is planned to provide offices, restrooms, and change areas. The disposal area will be secured by fencing and a new guard station to control entry. A new equipment storage building is planned to provide protected storage of operating equipment and a location to perform routine maintenance. The WBCV disposal facilities will be planned, constructed, and operated by the RWMD.

HAZARDOUS/MIXED WASTE

Current Status of Hazardous/Mixed Waste Management

Hazardous waste can present a substantial hazard (actual or potential) to personnel or to the environment if it is improperly managed, stored, transported, treated, or disposed. Hazardous wastes include a broad array of materials that can be generated by manufacturing processes or other activity. A waste is classified as hazardous under EPA regulations if, when discarded, it exhibits any of the characteristics of being corrosive, reactive, toxic, or ignitable as defined in 40 CFR 261, or if it is included in the over 400 hazardous wastes listed in 40 CFR 261. Detailed records that track wastes from origin to ultimate disposal must be maintained on any waste classified as hazardous.

Mixed wastes are those that contain both hazardous and radioactive constituents. Examples of mixed wastes are cleaning fluids and oils from systems in radiation environments and liquid scintillation counting wastes containing radioactive contaminants. Because much of the research at ORNL uses radioactive and hazardous materials, the generation of mixed waste is inevitable. Radioactive oils and scintillation fluids compose most of ORNL's mixed wastes and typically contain small concentrations of radioactive material.

A 1984 court decision clarified the regulatory authority for wastes generated at DOE facilities, giving EPA the authority to regulate hazardous wastes and DOE the authority to regulate radioactive wastes. ORNL applied for and received an interim status classification by EPA for treatment, storage, and disposal of hazardous waste; one storage building on-site (Bldg. 7652) has received a final RCRA permit. ORNL has also received an EPA identification number, which allows it to transport hazardous waste between facilities on the ORR.

At ORNL, the handling methods for hazardous and mixed wastes are similar. Hazardous wastes that are not classified as mixed wastes are routinely collected, identified, and packed into appropriate containers to be shipped to EPA-approved treatment, storage, and disposal sites or to be stored on-site to await further disposition. Mixed wastes are routinely packaged, collected, identified, and stored on-site pending development of appropriate treatment or disposal capabilities. ORNL currently has the capability to collect and store hazardous and mixed waste, with several of the facilities being interim or temporary and new, more permanent facilities having been recently put into operation. Some treatment capability for wastes is also provided on-site, primarily to recycle valuable materials and detonate shock-sensitive chemicals. Hazardous and mixed waste facilities at ORNL are inspected annually by both EPA and TDHE to verify the continuance of compliance with regulatory requirements.

Most of ORNL's mixed wastes are stored on-site. Scintillation fluids and vials that meet commercial facility WAC are packed and stored in sealed 55-gal drums. Periodically, these wastes are shipped off-site for commercial incineration. When the incinerator at K-25 is available, scintillation fluids and several other mixed waste streams, including contaminated oils, may be shipped there for treatment.

Most of the hazardous and mixed waste storage facilities are consolidated in a centralized Hazardous Waste Management Area (HWMA). The HWMA includes five facilities: the Chemical Waste Storage Facility (CWSF), the Hazardous Waste Storage Facility (HWSF), the Long-Term Hazardous Waste Storage Facility (LTHWSF), the Emergency Environmental Response Facility (EERF), and a storage pad (Bldg. 7651). The CWSF (Bldg. 7653) provides separate, sumped, diked bays for storing and packaging small containers of hazardous waste into lab packs. The facility will accommodate a total of sixty 55-gal drums until they can be disposed of off-site at commercial treatment facilities. The HWSF (Bldg. 7652) provides short-term storage for ~275 55-gal drums of hazardous waste until they can be transported off-site to commercial treatment/disposal facilities. These two facilities provide adequate storage capacity for the hazardous wastes currently generated, but capacity for storage of mixed waste is severely limited. The LTHWSF (Bldg. 7654) is designed for the long-term storage of mixed waste and has a capacity of 350 drums. The available space is rapidly being filled, however, and few alternatives for additional storage exist.

The EERF (Bldg. 7566) houses a multitude of equipment that can be utilized in the event of a large spill of hazardous material or waste. Types of emergency response equipment consolidated in this facility include tank trucks and trailers, absorbent materials, sand bags, booms, bladders, and skimmers.

Building 7651, which is a covered concrete pad, is used primarily for the storage of used oils not contaminated with radionuclides or PCBs. The oils are accumulated in drums awaiting shipment for incineration at a commercial facility.

Some hazardous wastes are treated at ORNL prior to disposal either on-site or off-site. These wastes include explosive or shock-sensitive materials, compressed gases, photographic wastes, and some acids. Uncontaminated lead is refabricated on-site for reuse. The facilities providing these capabilities include the Chemical Detonation Facility (CDF), the Sandia site, the Silver Recovery Facility (SRF), and the Acid Neutralization Facility (Bldg. 3518).

The CDF is located near the HWMA and consists of two storage magazines, an isolated detonation trench, and a control area. Explosive or shock-sensitive wastes are placed in the specially designed trench and are remotely detonated using plastic blasting caps. A Part B permit application

has been submitted for both of these facilities under the recently promulgated Subpart X regulations for miscellaneous units. At the Sandia site, leaking gas cylinders and those with unidentified contents are chained to a rack and allowed to vent to the atmosphere.

The SRF is designed to recover marketable silver sludge from spent photographic solutions, with the effluent then being suitable for discharge into the sanitary sewage system. The process, which was developed at ORNL, achieves a volume reduction of ~100:1 for the hazardous waste stream. The process is not currently operating, pending approval of the discharge into the sanitary sewer through modification of ORNL's NPDES permit. However, during the interim, the dilute waste solutions are being treated by a commercial facility to recover the silver.

The Acid Neutralization Facility mixes non-nitrate bulk acids and regenerant solution from the ORNL Steam Plant with caustic to neutralize the wastewater prior to its discharge to WOC.

Medical and infectious waste management policies are currently under development by the Central Waste Management Office (CWMO) and ORNL. Infectious wastes presently are autoclaved on-site and disposed of at the Y-12 landfill. Animal carcasses are transported to an incinerator at the University of Tennessee, with cage bedding materials being disposed of at Centralized Sanitary Landfill II (CSLF II).

A computerized database is used to track hazardous and mixed-waste generation and handling at ORNL. Information is entered into the database from forms completed by generators who request collection of wastes at the facility. The data are then used for recordkeeping, accounting, and billing. Information extracted from the database is combined with information from other sources and is used to generate annual reports required by TDHE and EPA. Improvements to this database are planned for FY 1989 and will provide increased accessibility to various users.

ORNL implements a charge-back program for hazardous and mixed waste, whereby generators are directly charged with the costs of both on-site and off-site waste management. On-site handling costs include waste pickup, transport to storage, packaging, classification, storage, database maintenance, auditing, training, procedures maintenance, safety and emergency equipment, and on-site treatment, if applicable. Off-site charges are incurred and borne by the generator if the waste is transported to a commercial disposal facility.

Quantities of hazardous and mixed waste generated at ORNL facilities vary from year to year (see Table 4.1), primarily because of construction and demolition projects. For example, the total quantity of hazardous and mixed waste generated at ORNL during 1988 was 160,000 kg, down 46% from 1987. The significant decrease was principally due to a decrease in nonroutinely generated waste, which, in 1987, included excavation of large quantities of lead-contaminated soil during construction operations. The 1988 total reflects little of this type of nonroutine waste. However, contaminated soil is expected to contribute significantly to the total hazardous and mixed waste generation rate for several years.

Plans and Strategy for Hazardous/Mixed Waste Management

A major purpose of the Hazardous Waste Management Program is to provide sufficient facilities to track, handle, and treat the amounts and types of hazardous and mixed waste produced at ORNL, including the ability to modify or expand those facilities as needed. Treatment capabilities may in the future need to include those hazardous wastes now disposed of off-site at commercial facilities. Another purpose is to minimize the generation of hazardous/mixed waste. The ORNL Hazardous Waste Management Program is a comprehensive approach to hazardous

Table 4.1. ORNL hazardous waste^a generation

Calendar year	Waste category	Waste generation (kg)	
		Subtotal	Total
1984			172,900
1985			182,400
1986	Routine	124,000	160,000
	Nonroutine	36,000	
1987	Routine	127,470	297,710
	Nonroutine	170,240	
1988	Routine	90,930	161,420
	Nonroutine	70,490	
	Cleanout	42,450	
	Construction/ remediation	11,750	
	Spills	9,180	
	Other	7,110	

^aIncludes mixed radioactive and nonradioactive, RCRA and non-RCRA wastes from ORNL facilities at the Y-12 Plant as well as those in Bethel and Melton valleys.

and mixed waste management that provides the primary mechanism for implementing this long-term strategy.

Specific objectives include

- ongoing identification and characterization of all hazardous and mixed-waste streams;
- assessment of future needs for certification, treatment, storage, and disposal of hazardous/mixed waste;
- planning for technology development and demonstration to meet the identified needs, as well as for construction of the technologically proven facilities; and
- facilitation of waste reduction activities.

Figure 4.13 presents a projection of the long-term strategy for storing, treating, and disposing of major hazardous and mixed-waste streams generated at ORNL. Although there are many pressing solid waste management concerns at ORNL, the most serious at the present time is that of providing adequate storage capacity for mixed waste until appropriate treatment or disposal alternatives can be developed. This need is being addressed by the capital projects "Expand Mixed Waste Storage" (FY 1989 KG02 GPP).

Waste Reduction Program

A congressional revision to RCRA has led to the requirement that all waste generators establish a plan to reduce the volume and toxicity of hazardous waste generated at their facilities. In response, a Hazardous Waste Reduction Program was established at ORNL to direct this policy. The objectives of the program are to

WASTE CATEGORY	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99
ASBESTOS (NON-RAD)			LANDFILL V-12									
MEDICAL			AUTOClave LANDFILL AT V-12									
BIOLOGICAL (NON-RAD)			LANDFILL V-12					INCINERATE ORGP				
(RAD)			LANDFILL SWBA 6					INCINERATE ORGP				
ANIMAL CARCASSES			INCINERATE UNIVERSITY OF TENNESSEE									
GAS CYLINDERS (NON-RAD)			VENT TO ATMOSPHERE SANDIA SITE ON V-12							.....	TREATMENT	
(RAD)			VENT TO OFF-GAS SYSTEM									
LAB PACKS			STORAGE AT CWSF (BLDG. 7653) COMMERCIAL DISPOSAL									
LEAD (NON-RAD) ^a			REFABRICATE ORNL LEAD SHOP									
LEAD (SURFACE- CONTAMINATED RAD) ^a	STORAGE SWBA 6	.....			STORAGE 7607				RECLAMATION			
MIXED (<10 mrem/h)	STORAGE LTHWSF	.....			STORAGE NEW MIXED WASTE STORAGE BLDG.				INCINERATION ORGP			
									.....	TREATMENT TECHNOLOGY DEVELOPMENT		

^a NOT CLASSIFIED AS "WASTE"

Fig. 4.13. Strategy for ORNL solid hazardous and mixed waste.

Fig. 4.13 (continued).

WASTE CATEGORY	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99
SOILS AND CONSTRUCTION DEBRIS (RAD)	STORAGE 7507W & LYNNRF											
	STORAGE BULK MIXED WASTE STORAGE											
	 TREATMENT TECHNOLOGY DEVELOPMENT											
	(NON-RAD)											
SOLVENTS (NON-RAD)	STORAGE HWSF											
	INCINERATE COMMERCIALY INCINERATE ORGP											
	STORAGE LYNNRF											
	 INCINERATE ORGP											
(RAD)	STORAGE AT 7053											
	COMMERCIAL TREATMENT/DISPOSAL											
WATER REACTIVES												
EXPLOSIVE/SHOCK-SENSITIVE	DETONATE											
	CHEMICAL DETONATION FACILITY											
MISC. BULK CHEMICALS	STORAGE AT 7053											
	COMMERCIAL TREATMENT/DISPOSAL											
BULK ACIDS (NONNITRATES)	NEUTRALIZATION AND DISCHARGE TO NEWTF OR WATERSHED											
	3518											
PHOTOGRAPHIC	SILVER RECOVERY											
	ORNL SILVER RECOVERY FACILITY OR COMMERCIAL FACILITY											

Fig. 4.13 (continued).

- eliminate or minimize the generation of hazardous waste to the lowest reasonable achievable level through recycle, reuse, substitution, segregation, and process innovation;
- ensure that environmental regulations are met, that their impacts on ORNL operations are assessed, and that proper actions are taken to comply with these regulations;
- maintain procedures and guidelines for generators and transporters of hazardous waste and for handling facilities that will be reinforced through personnel training;
- identify and characterize all hazardous and mixed waste generated or treated at the ORNL facilities; and
- control and monitor the handling of hazardous waste at ORNL.

Key elements of ORNL's waste reduction program include the Hazardous Waste Tracking System, charge-back of waste management costs to generators, distribution of surplus chemicals to new users, project reviews, and training and incentive programs.

CONVENTIONAL WASTE

Current Status of Conventional Waste Management

Conventional solid wastes contain no radioactive or hazardous materials or free liquids. Conventional solid wastes managed by ORNL include filter cake from the Coal Yard Runoff Treatment System, fly ash from the ORNL steam plant, general refuse collected in trash cans and dumpsters, and construction debris.

Most of the conventional waste generated at ORNL is disposed of at the CSLF II, the primary conventional waste landfill operation for the ORR. This landfill is located on Chestnut Ridge, south of the Y-12 Plant site and about 6 miles east of the ORNL site.

The ORNL Contractor's Landfill, which is located at the west end of ORNL, was developed to receive conventional waste from on-site construction and upgrade projects but reached permitted capacity in FY 1988 and is now being closed. Soil and rock from construction and demolition activities are deposited in the Recontour Site, located northwest of Building 1000 at ORNL. Deliveries to the site are carefully controlled and recorded to prevent the introduction of prohibited materials. The site is planned to be used for construction in future years. Generators are charged for the cost of sanitary and construction waste management, including costs for collection, transportation, and facility operation.

State Laws and Regulations Related to Conventional Waste. The state of Tennessee regulates the operation of solid, sanitary waste landfills in accordance with the Tennessee Solid Waste Disposal Act, as amended, and Rules Governing Solid Waste Processing and Disposal in Tennessee. The CSLF II was permitted by the state in 1982. The permit requires that no liquids, industrial special waste, or waste requiring special handling be accepted unless prior written approval for each individual waste is obtained. Wastes in these categories that are generated at ORNL and have received approval for disposal at the landfill include asbestos, fly ash, and coal yard runoff sludge. No hazardous waste is accepted at the facility.

In addition to these general requirements, the CSLF II permit establishes minimum daily and weekly cover requirements. It also states that only waste specified in the site operations manual shall be deposited, unless prior written approval for each individual waste is obtained. Radioactive waste is specifically excluded from disposal.

Coal Yard Runoff Treatment System Filter Cake. Acidic rainwater runoff from the ORNL Coal Storage Yard is collected in a clay-lined basin. Neutralization of the acid with lime in the Coal Yard Runoff Treatment System (Bldg. 2544) causes precipitation of contaminants that have been leached from the coal pile. The precipitated solids are removed by clarification and are further processed by vacuum filtration with diatomaceous earth. The resulting filter cake, a nonhazardous material generated at an average rate of 3 yd³/week, is disposed of at the CSLF II.

ORNL Steam Plant Ash. About 28,000 tons per year of coal containing about 8% ash is burned for steam generation at the ORNL steam plant. Bottom ash from the fire side of the boilers is pneumatically conveyed to the storage silo, as is fly ash from the electrostatic precipitators that capture the airborne fraction. The ash is loaded from the silo into dump trucks and is transported to the CSLF II at an average rate of about 11.5 yd³/d, 7 d/week. Steam plant ash is specifically cited in the state permit for the landfill.

General Refuse. General refuse is collected at each ORNL building from trash cans and placed in dumpsters at each site. These dumpsters are transported to an on-site trash compactor, and the refuse is compacted and reloaded onto trucks for transport to the CSLF II for disposal. The volume of general refuse is estimated to be 37 yd³ per normal work day.

Bulky material, such as large cardboard boxes that cannot conveniently fit into dumpsters, is temporarily stored at the building loading docks until the boxes are carried, uncompacted, to the CSLF II. The generation rate of this material is estimated to be 24 yd³ per normal work day.

Construction and Demolition Debris. Varying amounts of nonhazardous, uncontaminated wastes are generated from ongoing construction and demolition activities at ORNL. Nonbiodegradable clean soil and rocks are deposited at the ORNL Recontour Site. All other conventional construction/demolition materials, including concrete and asphalt, are disposed of at the CSLF II.

A procedure for the management of soils from excavation activities at ORNL has been developed allowing management of uncontaminated soil on the ORNL site. Further refinements to the handling and certification process for contaminated soils are still being developed.

Plans and Strategy for Conventional Waste Management

Most of ORNL's conventional waste is disposed of at Y-12's CSLF II. Present strategy at Y-12 is to extend the life of the CSLF II, which is projected to be full in FY 1993, by utilizing alternative disposal methods for selected sanitary/industrial wastes. Also being planned at Y-12 to provide for continued disposal of conventional wastes is a new landfill, Industrial Landfill V, to be constructed as part of a FY 1990 project. This landfill is expected to contain trenches with liners and leachate collection systems in response to increased requirements in the proposed Tennessee Solid Waste Regulations.

Like Y-12, ORNL is examining alternatives to landfilling for various conventional wastes. Programs under way this year that were conceived to reduce wastes requiring landfill disposal include recycling paper trash and aluminum cans. Other uncontaminated aluminum is already recovered as scrap metal, but aluminum cans are collected with other office trash and disposed of at the CSLF II. Recycling the considerable volume of waste paper and cans generated at ORNL would conserve both valuable landfill space at ORR and natural resources. Full impact from these recycling programs is not anticipated to occur until FY 1991 and beyond.

A major issue in conventional waste management at this time is certification that the waste meets WAC for the disposal facility. Exclusion of radioactive and hazardous materials is the primary concern. A certification program is needed to develop and implement screening methodologies and administrative controls, with attendant generator training and documentation.

The general strategy for management of ORNL's conventional waste is depicted in Fig. 4.14. Detailed project information and financial summaries for the Solid Waste Management Program are provided in the remaining pages of this section. Project information is provided in the form of PDSs and PSSs, which are listed in Table 4.2.

Fig. 4.14. Strategy for ORNL conventional waste.

Table 4.2. Solid Waste Management Program detailed project information

Project number	Project	Funding year	Total estimated cost (\$ × 1000)
4.00	Solid Waste Management Program	85-93	85,938
4.01	Gas Cylinder Recontainerization Facility	92	750
4.12	RH-TRU Waste Storage Bunker	90	1,100
4.13	Waste Handling and Packaging Plant	87-96	143,240
4.21	Expand Mixed Waste Storage Capacity	89	450
4.23	Waste Exam. Assay Facility (WEAF) Upgrade	87	260
4.29	SWSA 6 Improvements	89	388
4.30	Upgrade Bldg. 7507 Mixed Waste	90	150
4.31	Bulk Mixed Waste Storage Facility	91	900
4.33	Interim Waste Management Facilities (IWMF)	89	1,100
4.37	Class III and IV Retrievable Storage Facilities	90	1,000
4.38	Interim Waste Management Facility—Certification and Segregation	92	1,000
4.39	CH-TRU Repackaging Facility	91	1,000
4.40	SWSA 6 Staging Area Upgrade	90	900
4.43	PCB Hazardous Waste Storage, Bldg. 7652	89	100
4.44	Underground Storage Building Upgrade	91	150
4.47	Sludge Volume Reduction Facility	92	900
4.48	Waste Characterization and Certification Facility	90-94	8,300
4.50	Underground Storage Tanks Older Than 25 Years	91	3,960

SOLID WASTE MANAGEMENT PROGRAM

DETAILED INFORMATION

***PROJECT DATA SHEETS**

***PROJECT SCHEDULE SHEETS** **(AS SUMMARIZED IN TABLE 4.2)**

***FINANCIAL SUMMARY TABLES**

4.3 Solid Waste Management Program project summary—capital funding

4.4 Solid Waste Management Program project summary—expense funding

4.5 Solid Waste Management Program funding summary

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8-18-1989
LAST UPDATE: 8-17-89

ACTIVITY PROJECT SOLID WASTE MANAGEMENT PROGRAM
CONTACT PEPPER-SCAMMAN PROGRAM CATEGORY Solid Waste Management Program PLANT ORNL
PROJECT NO 4 00 STATUTORY RES RCRA RCRA ASSESSMENT CAT
FMP NO ERNG003, DP0101, 103, 107, 108, 110 ERG PROJ NO ERMP NO 3.4.00

SCOPE This data sheet is not a summary of the Solid Waste Management Program. It covers the expense and capital equipment funding necessary to support program activities, including strategy development, studies and assessments, capital project definition, and technical support. It includes the outyear GPP budgets which are not covered by specific data sheets. Line-item and GPP funding which has been specifically defined is designated on the data sheet for each of these projects.

JUSTIFICATION This activity provides the expense, operating and equipment support necessary to provide an integrated strategy and implementation for management of solid waste at ORNL. This includes management of radioactive, hazardous, mixed and conventional wastes and ensures compliance with RCRA, TSCA, NEPA, and DOE orders.

FACILITIES None

STATUS/COMMENTS

FUNDING YEARS: 85-93			FUNDING PRIOR										BEYOND	
			FUNDING PRIOR											
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1 Program Category ENVIRONMENTAL COMPLIANCE		2 Reporting Period 7/01/89 through 7/31/89		3 Funding Type													
3 Project Title SOLID WASTE MANAGEMENT PROGRAM		4 Program Representative C. M. KENDRICK/T. F. SCANLAN		5 Funding Year													
FWP NO. TRK0002		5 Project Engineer KIMBRO/SMITH															
ACTIVITY NO. KG 02 00 0																	
6 Project Number WBS 4.00	7 Subproject Title	8 Local Year and Months															
		FY-1989				FY-1990				FY-1991				FY-1992			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	ISSUE INPUT FOR LONG RANGE PLAN (MS K-41A LR 1 9/89)	[Bar from month 2 to 4]				[Bar from month 2 to 3]											
	PROVIDE INPUT FOR FIELD WORK PLAN (MS K 41B LR 1 2/89)	[Bar from month 1 to 2]															
	ISSUE DRAFT CURRENT YEAR WORK PLAN (MS K 41C LR 1 9/89)	[Bar from month 3 to 4]															
	ISSUE TSA UPGRADE REVIEW SUMMARY REPORT (MS K 421A LR 1 12/89)	[Bar from month 1 to 2]															
	COMPLETE TRAINING ON WMO DOCUMENT CONTROL CENTER PROCEDURES (MS K-421B LR 1 12/89)	[Bar from month 1 to 2]															
	ISSUE DOCUMENTATION CONTROL PLAN FOR NNWTP (MS K 421C LR 2 1/89)	[Bar from month 1 to 2]															
	ISSUE UPDATED ORNI HAZWODD PLAN (MS K 422 CF 2 7/89)	[Bar from month 1 to 4]															
	ISSUE RECOMMENDATIONS FOR RECYCLING OF ORNI WASTE PAPER (MS K 423 LR 1 7/89)	[Bar from month 2 to 4]															
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SHADING INDICATES STATUS AND COMPLETION		SYMBOL		Comments	
ACTIVITY SCHEDULE	1	2	3	4	
					April distribution delayed by ORO. Proposal for 9/89 draft LRP submitted to ORO.

1 Program Category:

ENVIRONMENTAL COMPLIANCE

3 Project Title:

SOLID WASTE MANAGEMENT PROGRAM

FWP NO: ERK002

ACTIVITY NO: K002000

6 Project Number:

WBS
400

7 Subproject Title:

ISSUE RECOMMENDATIONS FOR RECYCLING OF
ORNL ALUMINUM
(MSK 424 LR 1 8/89)

ISSUE REPORT ON ORNL SCINTILLATOR
COUNT RATE REPLACEMENT
(MSK 425 LR 1 1/89)

ISSUE STATUS REPORT ON HAZARDOUS WASTE
TRACKING SYSTEM UPGRADE
(MSK 426 LR 1 8/89)

ISSUE REPORT ON ETHYLENE GLYCOL
REPLACEMENT STUDY
(MSK 427 LR 1 8/89)

ISSUE DRAFT ORNL SSW CERTIFICATION
STRATEGY (MSK 428 TM 4 9/89)

ISSUE STATUS REPORT ON ORNL SSW
CERTIFICATION DEMONSTRATIONS
(MSK 429 LR 1 9/89)

ISSUE STATUS REPORT ON ORNL WASTE
GENERATOR TRAINING PROGRAM
(MSK 4210 LR 1 8/89)

COMPLETE DEVELOPMENT OF HAZARDOUS
WASTE TRAINING MODULE
(MSK 4210 LR 1 12/89)

CONTINUED NEXT PAGE

2. Reporting Period

7/01/89 through 7/31/89

A Program Representative

C. M. KENDRICK / T. J. SCANLAN

B Project Engineer

KIMBRO/SMITH

Funding Type:

Funding Year:

8 Fiscal Year and Months

FY 1989

1 2 3 4

FY 1990

1 2 3 4

FY 1991

1 2 3 4

FY 1992

1 2 3 4

SHADING INDICATES STATUS

AND COMPLETION

ACTIVITY SCHEDULE

1 MONTH

2 MONTH

3 MONTH

SYMBOL
MILESTONE LEVEL

0 1 2 3 4

Comments

* April distribution delayed by ORO. Proposal for 9/89 draft LRP submitted to ORO.

1 Program Category ENVIRONMENTAL COMPLIANCE		2 Reporting Period 7/01/89 through 7/31/89																																																																																																												
3 Project Title SOLID WASTE MANAGEMENT PROGRAM FWP NO: ERK0002 ACTIVITY NO: AG 02 0010		4 Program Representative C. M. KENDRICK/T. F. SCANLAN		Funding Type																																																																																																										
		5 Project Engineer KMBRO/SMITH		Funding Year																																																																																																										
6 Project Number WBS 4 00	7 Subproject Title ISSUE DRNL WASTE MINIMIZATION REPORT FOR CY 1988 (MS R-42 11A TM 2 2/89) ISSUE REVISED DRNL WASTE MINIMIZATION PROGRAM PLAN (MS R-42 11B TM 1 8/89) ISSUE STATUS REPORT ON SWIMS UPGRADE (MS R-42 12 LR 1 9/89) ISSUE REPORT ON LARGE VOLUME SOIL MANAGEMENT (MS R-42 13 LR 1 8/89)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th colspan="4">8 Fiscal Year and Months</th> <th colspan="4">FY-1989</th> <th colspan="4">FY-1990</th> <th colspan="4">FY-1991</th> <th colspan="4">FY-1992</th> </tr> <tr> <th></th><th>1</th><th>2</th><th>3</th><th>4</th> <th>1</th><th>2</th><th>3</th><th>4</th> <th>1</th><th>2</th><th>3</th><th>4</th> <th>1</th><th>2</th><th>3</th><th>4</th> </tr> <tr> <td></td><td colspan="4"> </td> <td colspan="4"></td> <td colspan="4"></td> <td colspan="4"></td> </tr> <tr> <td></td><td colspan="4"></td> <td colspan="4"> </td> <td colspan="4"></td> <td colspan="4"></td> </tr> <tr> <td></td><td colspan="4"> </td> <td colspan="4"></td> <td colspan="4"></td> <td colspan="4"></td> </tr> <tr> <td></td><td colspan="4"> </td> <td colspan="4"></td> <td colspan="4"></td> <td colspan="4"></td> </tr> </table>				8 Fiscal Year and Months				FY-1989				FY-1990				FY-1991				FY-1992					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																																																				
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SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

MONTH

SYMBOL

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Comments

• April distribution delayed by ORO. Proposal for 9/89 draft LRP submitted to ORO

1. Program Category ENVIRONMENTAL COMPLIANCE				2. Reporting Period 7/01/89 through 7/31/89																	
3. Project Title SOLID WASTE MANAGEMENT PROGRAM FWP NO: ERKG002 ACTIVITY NO: KG 02 00 0				4. Program Representative C. E. PEPPER				Funding Type.													
				5. Project Engineer F. P. DELOZIER				Funding Year.													
6. Project Number WBS 4 00		7. Subproject Title		8. Fiscal Year and Months																	
				FY-1989				FY-1990				FY-1991				FY-1992					
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4 21		SUBMIT PRELIMINARY PROPOSALS FOR ALL ERKG02- SPONSORED GPPs IN FY 1989 AND FY 1990 TO DOE/ORD FOR APPROVAL (MS K-4.31 LR-4 8/89) EXPAND MIXED WASTE STORAGE CAPACITY (MS K-4.31-4.21 LR-2 9/91)																			
4 30		UPGRADE BUILDING 7507 MIXED WASTE (MS K-4.31-4.30 LR-2 9/91)																			
4 31		BULK MIXED WASTE STORAGE FACILITY (MS K-4.31-4.31 LR-2 12/91)																			
		ISSUE FY 1990 KG02 GPP PLANNING BASE LETTER FOR DOE APPROVAL (MS K-4.32 LR-4 12/88)																			
		COMPLETE DESIGN PCB STORAGE HAZARDOUS WASTE STORAGE FACILITY (HWSF), BLDG 7652 (MS P-2.2-4.3 LR-0 8/89)																			

SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE 		12 ← MONTH ← FORECAST	SYMBOL MILESTONE LEVEL 0 1 2 3 4 ▽ □ ◇ ☆ X	Comments.
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ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: GAS CYLINDER RECONTAINERIZATION FACILITY

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.01

STATUTORY REQ: RCRA, CAA

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO:

EPMP NO: 2.4.01

SCOPE: A facility to capture compressed gases from leaking and/or damaged as well as unknown gas cylinders in a surrounding pressure vessel will be provided. This project will provide facilities for recontainerization and transport of problem cylinders for proper treatment and disposal.

JUSTIFICATION: Presently, leaking cylinders are secured and left to bleed to the atmosphere. Cylinders with stuck valves are periodically punctured and allowed to vent to the atmosphere. These practices are not considered environmentally desirable.

FACILITIES: The proposed facility will consist of a transportable pressure vessel, which will allow the safe transport of leaking or damaged cylinders and support facilities that will provide the recontainerization capabilities.

STATUS/COMMENTS: This is a proposed GPP. The need for the facility will be defined by a technical assessment.

4-38

FUNDING YEARS: 92				TEC (\$x1000):										BEYOND	
R&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR										750	
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95		
KG 02	BA	GPP	750	0	0	0	0	0	750	0	0	0	0		
TOTAL:			750	0	0	0	0	0	750	0	0	0	0		

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: REMOTE-HANDLED TRANSURANIC (RM TRU) WASTE STORAGE BUNKER

CONTACT: R. C. STEWART

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.12

STATUTORY REQ: DOE, RCRA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 88-2

EPMP NO: 2.4.12

SCOPE: Provide an additional storage facility similar to an existing ORNL Building 7855. This is a cave-type structure of reinforced concrete and concrete block for storage of concrete casks containing remote-handled transuranic waste.

JUSTIFICATION: ORNL will run out of TRU waste storage space for concrete casks by mid 1991 at current generation rates. It will likely be in the late-1990s before the TRU waste currently stored at ORNL can be shipped off-site to WIPP. This facility will provide the additional interim storage required beyond the existing capacity of Building 7855.

140

FACILITIES: A storage building of reinforced concrete and concrete block.

STATUS/COMMENTS: The Preliminary Proposal is approved and has been issued. Engineering has prepared the Design Criteria.

FUNDING YEARS: 90		FYC (\$x1000): 1100											BEYOND FY-95
BA/BO	BA	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
GF 01 02 06 0	BA	GPP	1100	0	0	0	1100	0	0	0	0	0	0
TOTAL:			1100	0	0	0	1100	0	0	0	0	0	0

1. Program Category SOLID WASTE MANAGEMENT PROGRAM						2. Reporting Period 7/01/89 through 7/31/89															
3. Project Title BH-TTU WASTE STORAGE BUNKER FHW NO : DPCF 101 ACTIVITY NO :						4. Program Representative R. C. STEWART						Funding Type GPP									
						5. Project Engineer S. D. VAN HOESEN						Funding Year: FY-1990									
6. Project Number 4.12	7. Subproject Title	8. Fiscal Year and Months																			
		FY-1987				FY-1988				FY-1989				FY-1990				FY-1991			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	PRE-OP CHECKOUT																				
	PERFORMANCE CONFIRMATION																				

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

SYMBOL MILESTONE LEVEL 0 1 2 3 4

Comments:

The Design Criteria has been issued.

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: WASTE HANDLING AND PACKAGING PLANT (WNPP)

CONTACT: D. M. TURNER

PROGRAM CATEGORY: Solid Waste Management Program

PLANT ORNL

PROJECT NO: 4.13

STATUTORY REQ: DOE, NEPA, RCRA

NEEDS ASSESSMENT CAT:

FNP NO: DPGF401, 402, 107, 410

ENG. PROJ. NO:

EXP. NO: 2.4.13

SCOPE: The WNPP will be the facility to perform the required processing/packaging for shipment of defense, remote-handled transuranic waste (RM TRU) to the Waste Isolation Pilot Plant (WIPP) in accordance with established waste acceptance criteria. This facility will be capable of processing both newly-generated (NG) and stored ORNL RM TRU wastes and can accommodate specific RM TRU and special case wastes from other DOE sites consistent with the mission and design of the facility.

JUSTIFICATION: The WIPP is being constructed in the state of New Mexico for the purpose of permanently disposing of both contact-handled (CH) and RM TRU waste. ORNL is developing plans and actions to package, certify and ship its wastes to the WIPP. The major volume of ORNL-generated RM TRU wastes are packaged in concrete casks which are not acceptable for transport to WIPP. This material must be processed and loaded into approved RM packages and certified to be in compliance with WIPP acceptance criteria before it can be shipped and emplaced at WIPP.

FACILITIES: The WNPP will be a RM TRU processing, handling, and packaging facility. As now conceived, this facility will contain shielded process cells in which the wastes can be assayed, examined, sorted, stabilized, repackaged in RM canisters, and certified acceptable for WIPP disposal. In addition to these cells will be a receiving and shipping area, an operating area, equipment rooms, change facilities, and some office space.

STATUS/COMMENTS: Budget levels presented assume FY 1993 Line Item Project.

FUNDING YEARS: 87-96				TEC (\$M1000): 143240										
		FUNDING		PRIOR										BEYOND
B&R CODE	BA/BO	TYPE	TOTAL	FY-88	FY-89	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
AR 05 15 20/D	BO	EXP	472	472	0	0	0	0	0	0	0	0	0	
GF 01 02 06 0	BA	LIP	130000	0	0	0	0	0	20000	25000	50000	25000	10000	
GF 01 03 06 0	BA	EXP	474	0	124	350	0	0	0	0	0	0	0	
GF 01 03 06 0	BA	CE	464	0	249	215	0	0	0	0	0	0	0	
GF 01 03 06 0	BO	EXP	3034	0	1550	1484	0	0	0	0	0	0	0	
GF 01 03 06 0	BO	EXP	203	0	153	50	0	0	0	0	0	0	0	
GF 02 07 00 0	BA	CE	750	0	0	0	150	250	250	100	0	0	0	
GF 02 07 00 0	BO	CE	444	0	444	0	0	0	0	0	0	0	0	
GF(342)	BA	EXP	7399	0	0	940	1534	1300	1125	1100	800	600	0	
TOTAL:			143240	472	2520	3039	1684	1550	21375	26200	50800	25600	10000	

1. Program Category SOLID WASTE MANAGEMENT PROGRAM					2. Reporting Period 7/01/89 through 7/31/89									
3. Project Title WASTE HANDLING AND PACKAGING PLANT (WHPP) FWP NO: DPGF107 ACTIVITY NO:					4. Program Representative D. W. TURNER					Funding Type LIP				
					5. Project Engineer D. L. LENNON					Funding Year: FY-1993				

6. Project Number	7. Subproject Title	8. Fiscal Year and Months																									
		FY-1990				FY-1991				FY-1992				FY-1993				FY-1994				FY-1995					
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
WBS 4.13	ORNL RH TRU PROGRAM PLAN																										
	DESIGN CRITERIA																										
	PROJECT MANAGEMENT PLAN																										
	TITLE II DESIGN																										
	CONSTRUCTION																										
	FINAL SAFETY ANALYSIS REPORT																										
	ENVIRONMENTAL ASSESSMENT																										

SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE <div style="border: 1px solid black; width: 100px; height: 15px; background-color: black; margin-top: 5px;"></div>	12 MONTH FORECAST	SYMBOL WRESTONE LEVEL 0 1 2 3 4 <div style="display: flex; justify-content: space-around; align-items: center;"> ▽ □ ◇ ☆ ✕ </div>	Comments WHPP has been moved to a FY-93 L.I.
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1 Program Category SOLID WASTE MANAGEMENT PROGRAM					2 Reporting Period 7/01/89 through 7/31/89																						
3 Project Title WASTE HANDLING AND PACKAGING PLANT (WHPP)										4 Program Representative D. W. TURNER					Funding Type LIP												
FWP NO DPGFW										5 Project Engineer D. L. LENNON					Funding Year FY-1993												
ACTIVITY NO.																											
6 Project Number WBS 413		7 Subproject Title ORNL RH TRU PROGRAM PLAN								8 Fiscal Year and Months																	
		FY-1996				FY-1997				FY-1998				FY-1999				FY-2000									
		1 2 3 4				1 2 3 4				1 2 3 4				1 2 3 4				1 2 3 4									
		CONSTRUCTION												9													
		WHPP STARTUP																9									

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 ← MONTH

← FORECAST

SYMBOL MILESTONE LEVEL

▽ □ ◇ ☆ ✕

0 1 2 3 4

Comments

WHPP has been moved to a FY-93 L.I.

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: EXPAND MIXED WASTE STORAGE CAPACITY

CONTACT: R. E. HELMS

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.21

STATUTORY REQ: RCRA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

FMP NO: 2.4.21

SCOPE: Provide additional mixed waste storage capacity by either expanding the existing Building 7654, modifying another existing building, or constructing a new facility.

JUSTIFICATION: To continue to accumulate mixed wastes in temporary storage areas may lead to curtailment of some waste generator operations when temporary storage capacity is no longer available. Current mixed waste storage capacity is inadequate for presently stored wastes. Mixed waste generation continues at approximately 100 drums/year

FACILITIES: Modification of Building 7654 would include extending foundations, floor pads, and secondary containment, extending wall and roof sections, modifying truck access roads, tying in new floor drains to existing drain lines, and installing general utilities such as lighting and unit heaters. Alternately, another existing building might be modified or a new building may be constructed.

STATUS/COMMENTS: A technical assessment completed in mid FY 1987 verified the need for additional mixed waste storage. Preliminary Proposal has been submitted to DOE for approval and design criteria for the project is in preparation.

FUNDING YEARS: 89			TEC (\$x1000): 450											
R&R CODE	BA/NO	FUNDING TYPE	TOTAL	PRIOR										BEYOND
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
K8 02	BA	GPP	450	0	0	450	0	0	0	0	0	0	0	0
TOTAL:			450	0	0	450	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: WASTE EXAMINATION AND ASSAY FACILITY (WEAF) UPGRADE

CONTACT: W. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.23

STATUTORY REQ: DOE, NEPA, ALL

NEEDS ASSESSMENT CAT:

FMP NO: DPGF107

ENG. PROJ. NO:

EPMP NO: 2.4.23

SCOPE: Additional space is needed at the Waste Examination Assay Facility, Bldg. 7824, for staging of drums, for installation of a total radiation dose rate measurement station, and for additional office space. The proposed project will provide a nominal 1,600 ft2 addition to the existing 5,000 ft2 facility.

JUSTIFICATION: Additional space at some location must be made available or operations must be curtailed. In both cases scheduled milestones would be missed and the cost of certifying drums of waste would increase.

FACILITIES: The new structure will be an insulated pre-engineered metal building complete with smoke detectors, automatic fire suppressure systems, heating and office air conditioning and electrical services. An existing roadway and power pole will be relocated.

STATUS/COMMENTS: Design Criteria is being prepared.

FUNDING YEARS: 87				TEC (\$x1000): 260									
B&R CODE	BA/RO	FUNDING TYPE	TOTAL	PRIOR									
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AR 05	BA	GPP	260	260	0	0	0	0	0	0	0	0	0
		TOTAL:	260	260	0	0	0	0	0	0	0	0	0

1. Program Category SOLID WASTE MANAGEMENT PROGRAM		2. Reporting Period 7/01/89 through 7/31/89	
3. Project Title WASTE EXAMINATION ASSAY FACILITY UPGRADE		4. Program Representative F. J. SCHULTZ	Funding Type GPP
FWP NO. (PAGE 101)		5. Project Engineer S. D. VAN HOESEN	Funding Year FY-1987
6. Project Number WBS 423	7. Subproject Title	8. Fiscal Year and Months	
		FY-1987	FY-1988
		1 2 3 4	1 2 3 4
		1 2 3 4	1 2 3 4
	FUNCTIONAL CRITERIA		
	PRELIMINARY PROPOSAL		
	PERFORM ELECTRICAL & HVAC STUDY AND ESTIMATE		
	ISSUE REVISED WO		
	DESIGN CRITERIA		
	BID & AWARD		
	START CONSTRUCTION		

SHADING INDICATES STATUS AND COMPLETION	12 MONTH	SYMBOL	▽ □ ◇ ☆ X
ACTIVITY SCHEDULE	● FORECAST	MILESTONE LEVEL	0 1 2 3 4

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: SWSA 6 IMPROVEMENTS

CONTACT: W. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.29

STATUTORY REQ: DOE, ALL

NEEDS ASSESSMENT CAT:

FMP NO: DPGF107

ENG. PROJ. NO: 89-2

EPMP NO: 2.4.29

SCOPE: This project will improve an existing portable-type trailer for use as an office facility outside and adjacent to the SWSA 6 entrance; tie Buildings 7842 and 7878, located in SWSA 6, into the ORNL fire department alarm system; and upgrade and pave the existing exterior northern perimeter road for use with the new entrance also being provided which will have a new side gate for trucks.

JUSTIFICATION: These projects will upgrade the SWSA 6 operation at least to minimal standards and allow work to continue while closure of part of SWSA 6 proceeds.

FACILITIES: The site work will include grading, leveling, and paving the existing northern perimeter roadway and providing a new entrance gate. Telephone service will be provided to the existing office facility being improved, and the office access and site will be improved.

STATUS/COMMENTS: The existing office facility was provided by MMES, Inc. and all field work will be accomplished by a combination of fixed-price subcontractor, and Energy Systems, Inc., personnel. The telephone service will provide needed emergency communications to SWSA 6.

FUNDING YEARS: 89		TEC (\$x1000): 388											
R&R CODE	BA/RO	FUNDING TYPE	TOTAL	PRIOR	BEYOND								
				FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
GF 01 02 06 0	BA	GPP	388	0	0	250	138	0	0	0	0	0	0
TOTAL:			388	0	0	250	138	0	0	0	0	0	0

1 Program Category
SOLID WASTE MANAGEMENT PROGRAM
 3 Project Title
SWSA 6 IMPROVEMENTS
 FWP NO. (DPL-101)
 ACTIVITY NO.

2 Reporting Period
 7/01/89 through 7/31/89
 4 Program Representative
 1 C. WILLIAMS
 5 Project Engineer

Funding Type
 GMP
 Funding Year
 FY - 1989

6 Project Number
 WBS
 429

7 Subproject Title

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 1 MONTH

SYMBOL
 MILESTONE LEVEL 0 1 2 3 4

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: UPGRADE BUILDING 7507 MIXED WASTE

CONTACT: P. E. HELMS

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.30

STATUTORY REQ: RCRA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.4.30

SCOPE: Modification of Building 7507 to provide safe, RCRA compliant storage space for contaminated lead awaiting decontamination for reuse.

JUSTIFICATION: Building 7507 will be vacated after the impending transfer of hazardous waste to the new Hazardous Waste Management Area. With some modifications, the building can be adapted for storage of contaminated lead awaiting decontamination for reuse.

FACILITIES: Modification of existing Building 7507.

STATUS/COMMENTS: Rescoped to subdirective

FUNDING YEARS: 90			TEC (\$M1000): 150										BEYOND
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
KG 02	BA	GPP	150	0	0	0	150	0	0	0	0	0	0
TOTAL:			150	0	0	0	150	0	0	0	0	0	0

1 Program Category
SOLID WASTE MANAGEMENT PROGRAM

3 Project Title
UPGRADE BLDG 7807 MIXED WASTE
 FWP NO ERK002

ACTIVITY NO

6 Project Number
 4.30

7 Subproject Title

2 Reporting Period
7/01/89 through 7/31/89

4 Program Representative
 R. E. HF, WS

5 Project Engineer
 D. A. CONATSER/L. COX

Funding Type
 OPP

Funding Year
 FY-1990

8 Fiscal Year and Months

FY-1988
 1 2 3 4

FY-1989
 1 2 3 4

FY-1990
 1 2 3 4

FY-1991
 1 2 3 4

FY-1992
 1 2 3 4

FUNCTIONAL REQUIREMENTS

STUDY & ESTIMATE

PRELIMINARY PROPOSAL

DOE APPROVAL

DESIGN

BID & AWARD

CONSTRUCTION

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

12 MONTH
 FORECAST

SYMBOL
 MILESTONE LEVEL 0 1 2 3 +

Comments:

Rescoped to subd active. Planning documents are in the approval process

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: BULK MIXED WASTE STORAGE FACILITY

CONTACT: W. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.31

STATUTORY REQ: 3004(u), RCRA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 90-2

EPMP NO: 2.4.31

SCOPE: Provide capability for management of potentially large volumes of mixed waste generated by remedial actions for solid waste management units.

JUSTIFICATION: Over 250 Solid Waste Management Units (SWMU) have been identified by the Remedial Action Program. These SWMUs include contaminated sites and other sources with potential for continuing release of contaminants to the environment. To meet the requirements of RCRA 3004(u), the sites will be assessed, characterized, and prioritized for remediation. Alternatives for remediation will be assessed and corrective actions will be implemented where justified. In the remediation process, generation of large volumes of mixed waste is likely. ORNL must develop a management plan and facilities to accommodate this need as it becomes more clearly defined.

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FACILITIES: Specific facility requirements are undefined at this stage. Possibilities include, but are not limited to, above-grade storage, below-grade storage or disposal and treatment facilities.

STATUS/COMMENTS:

FUNDING YEARS: 91				TEC (\$x1000):										BEYOND FY-95	
R&R CODE	BA/BO	FUNDING	TOTAL	900											
		PRIOR FY-88		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95				
KG 02	BA	GPP	900	0	0	0	0	900	0	0	0	0	0		
		TOTAL:	900	0	0	0	0	900	0	0	0	0			

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: INTERIM WASTE MANAGEMENT FACILITIES (IWMF), ORNL

CONTACT: M. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT HQ: 4.33

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

FMP HQ: DPGF107

EMG PROJ. HQ: 89-2

EPMP HQ: 2.4.33

SCOPE: Facilities for disposal of solid LLW will be developed at SWSA 6 (southwest) site as a part of the Interim Waste Management Facilities (IWMF) development.

JUSTIFICATION: The LLWDDD strategy has identified the need for a disposal facility for Class II LLW (short half-life). This facility, which will be developed as a part of the IWMF with operation to be initiated at the end of FY 1991, is planned to be developed by ORNL at SWSA 6 (southwest).

FACILITIES: Developments will include: site access roads, electrical supply, initial tumulus design disposal units, area for future disposal unit construction, and monitoring facilities.

STATUS/COMMENTS: Detailed design completed and forwarded to DOE for state of Tennessee review.

FUNDING YEARS: 89		FEC (\$M1000): 1100											
		FUNDING		PRIOR									BEYOND
BAR CODE	BA/BO	TYPE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
GF 01 02 06 0	BO	GPP	1100	0	0	1100	0	0	0	0	0	0	0
TOTAL:			1100	0	0	1100	0	0	0	0	0	0	0

1. Program Category SOLID WASTE MANAGEMENT PROGRAM		2. Reporting Period 7/01/89 through 7/31/89																							
3. Project Title INTERIM WASTE MANAGEMENT FACILITIES (IWMP), ORNL		4. Program Representative W. C. YEE	Funding Type GPP																						
FWP NO. DPCE 107		5. Project Engineer S. D. VAN HOESEN	Funding Year FY-1989																						
ACTIVITY NO.																									
6. Project Number WBS 4.3.3	7. Subproject Title	8. Fiscal Year and Months																							
		FY-1988				FY-1989				FY-1990				FY-1991				FY-1992				FY-1993			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	FUNCTIONAL REQUIREMENTS																								
	STUDY AND ESTIMATE																								
	PRELIMINARY PROPOSAL																								
	SUBMIT CDR TO HQ																								
	DOE APPROVAL																								
	DESIGN																								
	BID AND AWARD																								
	CONSTRUCTION																								

SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE 	12 MONTH 1 MONTH 1 WEEK	SYMBOL MILESTONE LEVEL 0 1 2 3 4	Comments Detailed design completed and forwarded to DOE for state of Tennessee review
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ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: CLASS III & IV RETREIVABLE STORAGE FACILITIES

CONTACT: S. D. VAN NOESEN

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.37

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

FHP NO: DPGF107

ENG. PROJ. NO:

EPMP NO: 2.4.37

SCOPE: Currently no facility exists on the Oak Ridge Reservation that is designed to meet the long term storage and monitoring requirements of greater than Class II LLW. The proposed facility would be located in Melton Valley near existing waste facilities and would be capable of retrievably storing greater than Class II LLW in monitored shielded storage units so as to protect the environment and facility operators consistent with ALARA requirements.

JUSTIFICATION: Failure to approve the proposed facility will result in either shutdown of facilities and/or operations that generate these wastes or useage of on-site alternatives for storage that may be more costly and less timely to implement.

FACILITIES: Modular storage units are planned so capacity can be expanded as additional waste is generated. This project will provide required site preparation and the initial storage units.

STATUS/COMMENTS:

FUNDING YEARS: 90				TEC (\$M1000):									
RER CODE	BA/BD	FUNDING TYPE	TOTAL	1000									
				PRIOR	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND
KG 02	BA	GPP	1000	0	0	0	150	850	0	0	0	0	0
		TOTAL:	1000	0	0	0	150	850	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: CERTIFICATION AND SEGREGATION FOR (IWMF) INTERIM WASTE MANAGEMENT FACILITY

CONTACT: W. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.38

STATUTORY REQ: DOE, CERCLA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 93

EPMP NO: 2.4.38

SCOPE: Facilities will be developed for the segregation and certification of Solid Low-Level (Radioactive) Waste (SLLW) according to the LLWDDD Program classification scheme. Facilities may be provided in a centralized location or in major waste generators' existing satellite facilities. Radiation-measuring instrumentation, handling equipment, and temporary storage facilities will be included.

JUSTIFICATION: The strategy developed by the LLWDDD Program calls for the segregation and separate management of SLLW into four classes. With its complex mix of radionuclides and diverse waste forms, ORNL does not possess the capabilities to perform the prescribed waste segregation and subsequent verification. ORNL also cannot meet certification requirements imposed by the revised DOE Order 5820.2A. Facilities will be developed for the segregation and certification of Solid Low-Level (Radioactive) Waste (SLLW).

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FACILITIES:

STATUS/COMMENTS:

FUNDING YEARS: 93				TEC (\$M1000):		1000								
B&R CODE	BA/BO	FUNDING	TOTAL	PRIOR									BEYOND	
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
NG 02	BA	GPP	1000	0	0	0	0	0	1000	0	0	0	0	
		TOTAL:	1000	0	0	0	0	0	1000	0	0	0	0	

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: CONTACT-HANDLED TRANSURANIC (CH-TRU) REPACKAGING FACILITY

CONTACT: R. E. HELMS

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.39

STATUTORY REQ: RCRA, DOE

NEEDS ASSESSMENT CAT:

EMP NO: DPGF107

ENG. PROJ. NO: 93

EPMP NO: 2.4.39

SCOPE: The facility will include sufficient storage for waste awaiting repackaging, a liquid waste collection system, other non-conforming waste storage, and adequate waste handling and truck access.

JUSTIFICATION: Current CH-TRU waste interim storage facilities do not meet Resource Conservation and Recovery Act (RCRA) requirements. Utilization of these inadequate facilities must cease and closure must be initiated by November 1992. Delays in the opening of WIPP for the receipt of waste extends the period of needed storage. As a result it will be necessary to construct a new interim storage facility for CH-TRU waste.

FACILITIES: The facility will store 2800 stainless steel drums of CH-TRU waste and approximately 50 type A steel boxes. The facility will include three concrete storage pads and the building is about 56 feet wide and 136 feet long.

STATUS/COMMENTS: The functional requirements document for the CH-TRU Storage Facility has been prepared and submitted for approval.

FUNDING YEARS: 91		TEC (\$M1000): 1000												
		FUNDING	TOTAL	P IOR										BEYOND
B&R CODE	BA/BO	TYPE		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	FY-97	FY-98
GF 01 02 06 0	BA	GPP	1000	0	0	0	0	1000	0	0	0	0	0	0
TOTAL:			1000	0	0	0	0	1000	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: SWSA 6 STAGING AREA UPGRADE

CONTACT: M. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.40

STATUTORY REQ: DOE, ALL

NEEDS ASSESSMENT CAT:

FMP NO: DPGF107

ENG. PROJ. NO: 90

EPMP NO: 2.4.40

SCOPE: This FY 1990 General Plant Project will modify Building 7878 to provide the capability to both to inject a grout/cement into SLLW containers to meet the waste acceptance criteria within the building, and encapsulate waste packages inside overpack containers outside the building. The SWSA 6 interior access roads will also be upgraded.

JUSTIFICATION: Failure to provide these facilities would continue the risk of: (a) fire involving LLW with on on-site water supply, (b) the off-site spread of contamination from vehicles not sufficiently monitored before departure from SWSA 6, and (c) not meeting LLW disposal acceptance criteria for waste package structural stability.

FACILITIES: This project will upgrade Building 7878 to provide the capability for grout injection into waste packages, including ventilation capability.

STATUS/COMMENTS: Preliminary proposal has been submitted for approval.

<u>FUNDING YEARS:</u> 90		<u>TEC (\$M1000):</u> 900											
<u>ACR CODE</u>	<u>BA/RO</u>	<u>FUNDING TYPE</u>	<u>TOTAL</u>	<u>PRIOR FY-88</u>	<u>FY-88</u>	<u>FY-89</u>	<u>FY-90</u>	<u>FY-91</u>	<u>FY-92</u>	<u>FY-93</u>	<u>FY-94</u>	<u>FY-95</u>	<u>BEYOND FY-95</u>
GF 01 02 06 0	BA	GPP	900	0	0	0	900	0	0	0	0	0	0
<u>TOTAL:</u>			900	0	0	0	900	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: PCB/HAZARDOUS WASTE STORAGE, BUILDING 7652

CONTACT: P. E. HELMS

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.43

STATUTORY REQ: RCRA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.4.43

SCOPE: The enclosure and modification of Building 7652 will provide safe storage space for waste contaminated with PCB's.

JUSTIFICATION: The Hazardous Waste Storage Facility, Building 7652, has been placed in service for storage of hazardous waste under a current Resource Conservation and Recovery Act (RCRA) Part B permit. With some modifications to the open bay on the northwest end of the building, waste contaminated with PCB's can be stored in that area in accordance with the Toxic Substances Control Act.

FACILITIES: The northwest bay of Building 7652 is presently open on three sides; this project will enclose the bay and be used to store waste contaminated with PCB's.

STATUS/COMMENTS: Rescoped to subdirective

461

FUNDING YEARS: 89			TEC (\$M1000):										BEYOND	
RER CODE	BA/BO	FUNDING	TOTAL	PRIOR									FY-95	FY-95
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95		
KG 02/ERN002	BO	GPP	100	0	0	100	0	0	0	0	0	0	0	0
TOTAL:			100	0	0	100	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
9/15/1989

LAST UPDATE: 8/30/89

ACTIVITY/PROJECT: UNDERGROUND STORAGE BUILDING UPGRADE

CONTACT: S. P. du Mont

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.44

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FWP NO:

ENG. PROJ. NO:

EPMP NO: 7.4.44

SCOPE: This project will provide upgrading of the Underground Storage Building to meet minimum standards for a Low Level Waste Storage Area. Project will provide a curbed, concrete floor area, approximately 4700 feet, add roll-up door to truck entrance door for weather protection and add (1) floor sump for liquid collection.

JUSTIFICATION: Current facility has gravel floors and no weather protection at entrance. RCRA Regulations prohibit current operations.

FACILITIES:

STATUS/COMMENTS:

FUNDING YEARS: 91		TEC (\$M1000): 150											
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
GF 01 02 06 0	BA	GPP	150	0	0	0	0	150	0	0	0	0	0
TOTAL:			150	0	0	0	0	150	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: SLUDGE VOLUME REDUCTION FACILITY

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.47

STATUTORY REQ: CWA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 90-2

EPMP NO: 2.4.47

SCOPE: This project will provide facilities to reduce the water content and volume of sludge which is generated as a result of treatment of nonradioactive and radioactive process waste waters.

JUSTIFICATION: Treatment of radioactive process waste water at the Process Waste Treatment Plant (PWT) generates approximately 4,400 cubic feet per year of slightly radioactive sludge. Treatment of nonradioactive process waste water at the Nonradiological Wastewater Treatment Facility (NRWTF) may generate approximately 12,600 cubic feet per year of slightly radioactive sludge beginning in 1990. The current plan for handling the dewatered sludge is to store it at K-25 until a permanent disposal method can be implemented. This project will provide for a facility to reduce the water content and volume of the waste sludge which has to be stored in limited storage space at the Oak Ridge Gaseous Diffusion Plant.

FACILITIES: Facilities will include unit operations for sludge handling and sludge treatment. A conceptual design for the volume reduction process has not been developed. Unit operations could include sludge drying. Research, development and demonstration may be required to determine the appropriate engineered method for volume reduction of the sludge.

STATUS/COMMENTS:

FUNDING YEARS: 92				TEC (*1000): 900									
BAR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
KG 02	BA	GPP	900	0	0	0	0	0	900	0	0	0	0
TOTAL:			900	0	0	0	0	0	900	0	0	0	0

1. Program Category WATER POLLUTION CONTROL PROGRAM		2. Reporting Period 7/01/89 through 7/31/89			
3. Project Title SLUDGE VOLUME REDUCTION FACILITY FWP NO: DPGF101 ACTIVITY NO:		4. Program Representative S. T. RUDELL		Funding Type	
		5. Project Engineer R. W. MORROW		Funding Year FY-1992	

6. Project Number	7. Subproject Title	8. Fiscal Year and Months															
		FY-1989				FY-1990				FY-1991				FY-1992			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WBS 447	FUNCTIONAL REQUIREMENTS																
	STUDY & ESTIMATE																

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

SYMBOL MILESTONE LEVEL

0
 1
 2
 3
 4

Comments

Schedule and funding to be determined after the Study & Estimate is completed.

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: WASTE CHARACTERIZATION AND CERTIFICATION FACILITY

CONTACT: W. C. YEE

PROGRAM CATEGORY: Solid Waste Management Program

PLANT: ORNL

PROJECT NO: 4.48

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FMP NO: DPGF107

ENG. PROJ. NO:

EPMP NO: 2.4.48

SCOPE: The proposed facility will be equipped to mechanically handle solid low-level waste (SLLW) packages and characterize and certify that each package meets waste acceptance criteria for disposal. Non-destructive equipment will perform real-time-radiography, dose rate, gamma scan and neutron assay of pkg. SLLW containers.

JUSTIFICATION: MCCF is needed to respond to DOE Order No. 5820.2A and properly certify all waste that is to be disposed. Improperly classified waste could result in nola lens of environmental, health and/or safety regulations.

FACILITIES: The proposed facility will house new and existing state of the art equipment that will be used to characterize and certify solid, contact-handled low-level waste and Transuranic Waste.

STATUS/COMMENTS: Preparation of the functional requirements document is continuing.

FUNDING YEARS: 90-94				TEC (\$M1000): 8300									
R&R CODE	BA/BO	FUNDING	TOTAL	PRIOR									
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
KG 02	BA	LIP	8000	0	0	0	0	0	0	3000	5000	0	0
KG 02	BA	EXP	300	0	0	0	75	125	100	0	0	0	0
TOTAL:			8300	0	0	0	75	125	100	3000	5000	0	0

Table 4.4. Solid Waste Management Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$M1000)									BEYOND
		TYPE	SOURCE		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
4 00	SOLID WASTE MANAGEMENT PROGRAM	EXP	GF	33093	1693	2470	2700	3740	4065	4310	3520	3720	6875	
4 00	SOLID WASTE MANAGEMENT PROGRAM	EXP	KG	16762	421	856	1065	1270	1500	1500	1450	1450	7250	
4 13	WASTE HANDLING AND PACKAGING PLANT (WHPP)	EXP	GF	11110	1827	2824	1534	1300	1125	1100	800	600	0	
4 48	WASTE CHARACTERIZATION AND CERTIFICATION FACILITY	EXP	KG	300	0	0	75	125	100	0	0	0	0	
4 50	UNDERGROUND STORAGE TANKS OLDER THAN 25 YEARS	EXP	KG	1660	0	0	660	750	250	0	0	0	0	
FUNDING TOTALS:				62925	3941	6150	6034	7185	7040	6910	5770	5770	14125	

5. REMEDIAL ACTION PROGRAM

CURRENT STATUS

The RAP has been established to provide comprehensive management of those areas under ORNL control where past research, development, and waste management activities have been conducted and have resulted in residual contamination of facilities or the environment (including off-site contamination). Such areas include former SWSAs, waste ponds and seepage pits/trenches, radioactive waste processing and transfer facilities, research laboratories, dedicated environmental research sites, experimental reactors, radioisotope development facilities, the surrounding environments, and off-site contamination in the Clinch-Tennessee River system. Currently, the program is responsible for monitoring, control, and ultimate closure of some 169 identified sites grouped into 13 categories. A complete listing of these sites is provided in Table 5.1. Although the majority of the contaminated facilities are located in the main ORNL complex, several are associated with ORNL facilities at the Y-12 Plant or are remotely situated on the ORR (Fig. 5.1). The remainder of the remedial action sites are in the WOC watershed that drains the Bethel Valley and Melton Valley areas adjacent to the main ORNL complex. The RAP sites in the WOC watershed are shown in Fig. 5.2, and a detailed schematic diagram showing the sites in the main ORNL complex is provided in Fig. 5.3.

Monitoring and control of these contaminated areas to ensure that on-site personnel exposures and off-site releases are maintained within applicable DOE guidelines has been a continuing responsibility of ORNL. However, in the recent past, significant environmental legislation has been enacted at both the federal and state levels with the intent of providing more comprehensive control over facility discharges and the cleanup of contaminated sites. The most important of these legislative acts are the RCRA (including the 1984 Hazardous and Solid Waste Amendments), CERCLA (including SARA), the CWA, and the SDWA. Full compliance with these acts and their supporting federal and state regulations is now required for DOE-operated facilities such as ORNL. In keeping with the DOE policy of controlling the potential hazards associated with operation of the ORNL facilities, site remedial actions will be conducted, where appropriate, to meet both the applicable EPA-state requirements and guidance in DOE orders to ensure adequate personnel, public, and environmental protection.

The regulatory requirements associated with remedial actions are still evolving. Most of the ORNL sites have previously been treated as RCRA solid waste management units (SWMUs), subject to the Section 3004(u) provisions of the 1984 Hazardous and Solid Waste Amendments. Under the requirements of Section 3004(u), all SWMUs must be evaluated to determine if they are sources of continuing releases of hazardous materials to the environment. Similar requirements are imposed for off-site contamination under RCRA Section 3004(v). A comprehensive, stepwise program of site characterization (through RFIs under RCRA and RIs under CERCLA-SARA) and corrective measures definition [through corrective measures studies (CMSs) under RCRA and feasibility studies (FSs) under CERCLA-SARA] are required for sites determined to be sources of

Table 5.1. Remedial action projects summary

Category	Site
Solid waste storage areas (SWSAs)	SWSAs 1-6 White Wing Road storage area Closed contractor's landfill
Low-level waste (LLW) seepage pits and trenches	LLW Pits 1-4 LLW Trenches 5-7 Homogeneous Reactor Experiment (HRE) fuel disposal pits
Process ponds	High Flux Isotope Reactor/Transuranium Facility ponds (7905-7908) 190 Ponds (3539, 3540) Equalization Basin (3524) Waste Holding Basin (3513) 3512 pond SWSA-5 pond Sewage plant lagoon, East Basin Old Hydrofracture pond HRE pond Low-Intensity Test Reactor (LITR) pond
White Oak Creek watershed	White Oak Creek and tributaries White Oak Lake
LLW line leak sites	Bethel Valley: 3019 area (5 sites) Bethel Valley: Isotopes Area (8 sites) Bethel Valley: S. of Central Ave. (10 sites) Melton Valley: Melton Valley Drive (7 sites) Melton Valley: waste disposal areas (9 sites)
Radioisotope processing facilities	Fission Product Development Laboratory (3517) Metal Recovery Facility (3505) Storage Garden (3033) Waste Evaporator Facility (3506) Fission Product Pilot Plant (3515) Shielded transfer tanks Cobalt-60 Storage Garden Strontium-90 power generators (3028) Plutonium process condensate tank (9720-8, Y-12) Plutonium Processing Facility (9204-3, Y-12) Curium handling glovebox (9204-3, Y-12) 86-inch cyclotron (9201-3, Y-12)
Environmental research areas	Cesium-137-contaminated fields (0800 area) Cesium-137-contaminated forest areas Cesium-137 and Co-60-contaminated area Other areas contaminated with significantly lower quantities of residual radioactivity (33 sites)
Experimental reactor facilities	ORNL Graphite Reactor (3001) Molten Salt Reactor Experiment (7503) LITR (3005) HRE (7500) Oak Ridge Research Reactor water-to-air experimental facilities (3042) Heat Exchanger (3067) Tower Shielding Facility equipment (7702)

Table S.1 (continued)

Category	Site
Hazardous waste sites	Mercury-contaminated soil (4501) Mercury-contaminated soil (4508) Mercury-contaminated soil (3503) Mercury-contaminated soil (3592) Oil storage tank (7860A)
Radioactive waste facilities	Waste storage tanks: Tanks W-1 through W-4, W-13 through W-15, W1-A Tanks W-5 through W-10 Tank W-11 Tanks W-19, W-20 Tank WC-1 Tanks WC-15, WC-17 Tank T-30 Tanks TH-1 through TH-3 Tank TH-4 Old Hydrofracture Facility waste injection site and storage tanks (T1 through T4, T9) Fission Product Development Laboratory LLW transfer line Isotopes ductwork/3110 filter house Off-Gas filter house (3121) HRE waste evaporator and storage tanks (7560, 7562) Decontamination Facility (7819) Decontamination Facility (9419-1, Y-12)
Research laboratories	High-Level Chemical Development Laboratory (4507) High-Level Radiochemical Analytical Laboratory (3019-B) Remote Coating Furnace Loop (4508) Ceramic Processing Laboratory (4508) Transuranium Research Laboratory (5505) Molten Salt Reactor Experiment (MSRE) Fuel Handling Facility (9201-3, Y-12) Cesium Salt Technology Facility (9201-3, Y-12)
Inactive injection wells	New Hydrofracture Facility Old Hydrofracture Facility Test Injection 1 Test Injection 2
Other contaminated sites	Storage pad (3503-3504) Overflow of Graphite Reactor storage canal Ground contamination at 3019 area Contamination at base of 3019 stack Rupture of ORR decay tank Storage tank (9201-3, Y-12) Attic (9204-1, Y-12) East End basement (9204-1, Y-12)

Fig. 5.1. Location map for Remedial Action Program—remote sites.

Fig. 5.2. Location map for Remedial Action Program—X-10 area.

Fig. 5.3. Location map for Remedial Action Program—main ORNL complex.

continuing releases. In addition to the need for site-wide assessments of sources of continuing releases, RCRA regulatory requirements have led to (1) development of a comprehensive groundwater monitoring network for ORNL, (2) imminent closure and associated planning for SWSA 6, and (3) assessments and corrective-action planning for underground storage tanks containing radioactive/mixed wastes from the LLLW system. In concert with the RCRA strategy, the Underground Injection Control (UIC) regulations of the SDWA play a role in determining corrective actions at the hydrofracture facilities. The major impacts on the RAP from the CWA regulations are expected to arise through compliance schedules in the NPDES permit for the ORNL site and its associated planning documents. During FY 1989, the EPA has proposed the addition of the ORR, including ORNL, to the CERCLA-SARA National Priorities List (NPL)

and executed a Federal Facilities Agreement (FAA) defining RI (RFI)/FS (CMS) and corrective action (e.g., for LLW storage tanks) schedules. The mechanism for integrating CERCLA-SARA and RCRA requirements, however, has not been resolved.

Preliminary characterization studies indicate that the key contributors to off-site population exposures from ORNL taken as a whole currently are the radionuclides ^3H and ^{90}Sr , with principal sources in SWSA 5 and the main plant area, respectively. Initial groundwater sampling indicates that beta-emitting radionuclides are by far the primary contaminants. Stream sediment surveys revealed relatively little organic contamination and limited discharges of RCRA-listed hazardous metals. Most metal contamination of receiving streams appears to be traceable to operating facilities such as cooling towers. Finally, it was determined through the RCRA extraction-procedure toxicity-test protocol that none of ORNL's active surface impoundments contained chemically toxic sediments.

Review of such characterization information for ORNL facilities leads to the conclusion that radioactive materials are the principal hazardous materials present. Yet much of the pressure for corrective action and regulatory compliance is based on statutory provisions often directed solely at hazardous chemical wastes (RCRA regulations, for example). Resolution of this apparent mismatch of regulatory authority with actual site conditions should occur through parallel regulation under CERCLA-SARA and RCRA, following addition of the ORR to the NPL in FY 1989 and the subsequent negotiation of an FAA.

Another result of the early RAP characterization studies was the demonstration of area-wide groundwater contamination (mainly with radionuclides) not readily traceable to individual sites or SWMUs. Because of the large number of sites located close to one another and the proven hydrologic interconnections between many of these sites, individual monitoring and assessment were shown to be impractical. Hence, the concept of waste area groupings (WAGs) has been applied to site characterization studies and alternatives assessments. Under this, multiple sites are grouped into hydrologically defined areas for subsequent management and evaluation. For the current inventory of sites, twenty WAGs were defined and boundaries identified. These groupings are shown in Fig. 5.4. It was believed that, by grouping the sites into hydrologically related areas, it would be feasible to establish a suitably comprehensive groundwater and surface-water monitoring system in a time frame much shorter than that required to deal with every facility, site, and SWMU individually.

Corrective measures have been provided routinely throughout the history of ORNL operations to maintain control over on- and off-site releases. Extensive characterization efforts have been conducted in the WOC watershed (and the Clinch-Tennessee River system) over the past 20 years, focusing on the impacts of radionuclide releases from plant operations and past waste disposal practices. Hence, much is already known about the radionuclide inventories and release pathways of many of the remedial action sites. As summarized in Table 5.2, corrective actions have already been implemented in the burial grounds and pits and trench areas in an effort to reduce the transport of wastes through surface-water and groundwater pathways. Water diversion techniques and trench cap improvements have been employed in limited applications, resulting in much practical data on the effectiveness of such corrective measures. In addition, facility decontamination and decommissioning activities have been performed at several sites (Table 5.2), resulting in significant cost savings to DOE through facility and equipment reuse. The latest activity is the SWSA-6 Interim Corrective Measures (ICM) Project; this is the first step in the overall closure of the site. The ICM Project installed 10.5 acres of synthetic membrane over selected waste disposal

Fig. 5.4. Waste area group locations at ORNL.

Table 5.2. Completed remedial action projects (1975-1989)

Project	Scope of corrective actions	Time span	Approximate cost (\$ × 1000)
1. Solid Waste Storage Area (SWSA) 5—Water Controls	Construction of diversion ditches; installation of improved trench caps; construction of groundwater diversion dams	FY 1975	250
2. SWSA 4—Surface Drainage	Construction of diversion ditches, collection system, and discharge stations	FY 1975, FY 1983	300
3. Standard Pile and Health Physics Research Reactor Accelerator	Dismantlement of graphite pile; disassembly of accelerator and associated equipment	FY 1978-79	80
4. 3026-C Radiochemical Waste System	Removal of contaminated tanks, piping, and controls; entombment of remaining structure	FY 1980	200
5. Pits and Trenches Area—Improvements	Asphalt capping of disposal units; installation of fencing	FY 1981-83	300
6. Intermediate-Level Waste Transfer Line	Removal of 700 ft of pipe from floodplain; entombment of two leak sites	FY 1981-83	550
7. Curium Source Fabrication Facility	Removal of in-cell equipment; decontamination of cells and operating areas to levels for reuse	FY 1982-83	700
8. SWSA 6—French Drain	Construction of groundwater diversion system in 49-trench area	FY 1983	200
9. C-14 Laboratory	Removal of laboratory equipment; decontamination of facility to levels for reuse	FY 1984	55
10. PCB-Contaminated Equipment at Y-12	Disposal of PCB-contaminated equipment; recycle of usable oil	FY 1986-87	150
11. Interim Corrective Measure—SWSA 6	Installation of 1.5 acres of synthetic membrane over selected disposal areas and riprapping of drainage channels	FY 1988-89	3000

trenches and auger holes to serve as an infiltration barrier to reduce migration of hazardous wastes. The ICM Project was completed in May 1989.

As ORNL facilities continue to age and as waste management practices change, additional facilities will require management under the RAP. When facilities reach the end of their design lifetime, comprehensive maintenance and surveillance will be needed to ensure continued containment of residual contamination. In addition, facility decommissioning and closure will have to be provided through a dedicated program. Currently, funding for the RAP is provided through the DOE Assistant Secretaries for Defense Programs, Nuclear Energy, and Energy Research, with particular site responsibility defined by past programmatic support and operations or joint agreements. Responsibilities within DOE for future decommissioning or closure efforts are not yet defined.

PLANS AND STRATEGIES

It is indicative of the evolving regulatory situation that the RAP, having shifted its emphasis from CERCLA to RCRA compliance in FY 1986, is now faced with the prospect of superposition of CERCLA-SARA requirements on the current RCRA regulatory framework. It is not yet clear whether this will result in a major restructuring of RAP plans and strategies (from those presented in existing long-range planning documents). Although the potential for further change exists, the basic project work-breakdown structure and supporting project data sheets that follow are essentially the same as those presented for FY 1988. The new structure reflects the addition of the corrective measures phase (separating this activity from the facility decommissioning or closure phase). This structure will be utilized for future program tracking and reporting, unless regulatory changes warrant otherwise.

As outlined below and in Fig. 5.5, implementation of the RAP at ORNL has been divided into six major program phases and an overall program support phase:

- Preliminary Assessment and Site Investigation
- Maintenance and Surveillance
- Remedial Investigations and Feasibility Study (RI/FS)*
- Technology Demonstrations
- Corrective Measures
- Facility Decommissioning or Closure
- Remedial Action Program Support

The first step in the implementation process involved the establishment of a regulatory-approved inventory of sites to be evaluated in preparation for future remedial actions. Continued control over these sites is being provided through maintenance, surveillance, and interim corrective action to ensure adequate protection of human health and the environment until final site disposition has been accomplished. For each site in the RAP inventory, a detailed characterization and assessment of site conditions and the potential for environmental and health impacts will then be performed through the RI/FS process. This process will include an evaluation of alternatives for accomplishing any corrective actions needed. These alternatives (for interim corrective measures or for facility decommissioning or closure) will be screened for their applicability to ORNL environmental

*Nomenclature follows CERCLA-SARA guidance, but activities cover both RCRA and CERCLA-SARA requirements.

Fig. 5.5. Remedial Action Program implementation flowchart.

conditions, and field-scale technology demonstrations will be performed, where necessary, prior to full-scale implementation. Finally, facility decommissioning or closure will be carried out in accordance with priorities approved by regulatory authorities to provide long-term management of residual contaminants.

The RAP work-breakdown structure is presented in Table 5.3, along with an outline of the scope of work to be included in each program phase. During the next few years (Fig. 5.6), the major emphasis is expected to be on (1) completing preliminary assessments of all sites as required under RCRA (and now CERCLA-SARA) regulations, including establishment of a comprehensive groundwater monitoring program; (2) implementing a structured maintenance and surveillance program for all sites; (3) performing interim corrective actions on high-priority sites as necessary; (4) carrying out the RI/FS; and (5) closure of SWSA 6. This emphasis is reflected in the allocation of the bulk of the available funds for those activities through FY 1991. RAP project data are given in Tables 5.4 through 5.7. The remainder of the program budget will be allocated to demonstrating technologies for remedial actions, decommissioning or closure of high-priority sites, and support of the program management function. During the RI/FS, completion of several decommissioning projects is anticipated (e.g., the Fission Product Development Laboratory and the Metal Recovery Facility). Significant progress toward plugging and abandonment of inactive wells associated with hydrofracture facilities and decommissioning/closure of inactive waste storage tanks is also expected during this time frame.

The largest single component of the RAP currently is the comprehensive RI/FS program. Schedules have been developed for the primary WAGs based on a planned 10-year intensive effort. It was recognized that accomplishment of a project of this magnitude would require the assistance of one or more major support subcontractors, guided by RAP technical staff and a database generated by ORNL from historical and preliminary site characterization studies. A total expenditure of approximately \$224 million over the lifetime of the effort, including both ORNL and subcontractor involvement, is currently projected (Tables 5.4 through 5.7). The subcontractor selection and award process was completed in the fourth quarter of FY 1987. The award was made to a team consisting of Bechtel National, Inc. (lead organization), CH2MHill, EDGe/MCI, and PEER.

Preliminary schedules for completion of the RI/FS phase are provided in Fig. 5.7. The large number and considerable diversity of the remedial action sites to be investigated at ORNL, coupled with the hydrogeologic complexity of the ORNL environs, present a unique challenge to both DOE and regulatory authorities. In response to this challenge, an intensive effort has been outlined to provide the DOE equivalent of the EPA RI/FS sequence for all sites that require a detailed assessment. As the first step in this program, an RCRA Facility Assessment (RFA) was conducted in FY 1987 for all WAGs to document the site characteristics and determine the need for follow-up efforts. Ten of the groupings (WAGs 1 through 10) were known to require the full RI/FS treatment prior to completion of the RFA. Three of the remaining ten groupings (WAGs 11, 13, and 17) were determined by ORNL to require detailed site investigations and/or assessments of remedial action alternatives during the RFA. Although WAG 17 currently does not contain any remedial action sites (Fig. 5.4), it was shown to be a source of continuing releases of cadmium and organics. The origin of these releases is unknown, and, although perhaps attributable solely to contamination from active (operating) sites, it is also plausible that an undetected spill or leak site (i.e., a future RAP site) may be the source. Since RCRA regulations require corrective action for continuing releases from any SWMU (regardless of whether it is active or inactive), the source of contamination in WAG 17 will be characterized within the RI/FS program conducted by the RAP.

Table 5.3. Remedial Action Program (RAP) work-breakdown structure summary

Work-breakdown structure	Scope
1. Preliminary Assessment and Site Investigation	Provide preliminary surveys (FY 1986-87); prepare RCRA Facility Assessment (FY 1987); document existing knowledge for RI/FS data packages on compatible schedule; complete basic groundwater monitoring network (FY 1990) for all waste area groupings (WAGs); continue site characterization at selected sites; develop site performance models; and perform site-wide characterization and assessments.
2. Maintenance and surveillance	Plan and implement routine site maintenance and surveillance to ensure containment, continue document surveillance, and identify needed corrective actions; plan and implement corrective actions.
3. Remedial Investigations and Feasibility Study	Develop and implement characterization plans for all WAGs, define closure alternatives through alternatives assessments (CMS, FS, NEPA documents), and integrate the results through an ORNL-wide EIS; establish management and support organization; implement major support subcontract according to regulatory approved sequence for each WAG (FY 1987-99).
4. Technology demonstrations	Provide coordinated demonstrations and evaluations of remedial action technologies on a schedule compatible with future needs.
5. Corrective measures	Develop engineering designs and implement interim corrective measures for high-priority sites defined through the RI/FS process or by other regulatory requirements.
6. Facility decommissioning or closure	Develop engineering designs and implement site decommissioning or closure actions for cost-effective management of surplus facilities or for projects defined by the RI/FS process; decommission or close sites.
7. Remedial Action Program support	Provide management and database support for overall program Provide overall strategy through integration of information of Phases I-VI; analyze of institutional, regulatory, and technical issues; continue regulatory interface; and provide RAP documentation.

The ORNL RCRA permit is being amended to allow completion of RI plans for all sites by the end of the first quarter of FY 1991. The RI plans for WAGs 1, 3 through 10, and 17 have been completed and are undergoing DOE/EPA/state review; regulatory comments have been provided for WAG-10 RI plan implementation. The current strategy is to implement the RI plans in order of estimated priority, modified by other logistical or regulatory constraints. For example, the RIs for WAGs 1, 6, and 10 will be initiated early in response to specific regulatory concerns or requirements. Under the plan outlined in Figs. 5.6 and 5.7, detailed alternatives assessments (CMSs, FSs, NEPA documents) would be prepared for each WAG following completion of the RIs

Fig. 5.6. Remedial Action Program implementation schedule.

Fig. 5.7. Preliminary schedules for the completion of the RI/FS phase.

(Fig. 5.7). These would then be integrated/tiered into a single EIS for ORNL to provide a comprehensive assessment of the need, extent, priority, and timing for future remedial actions (in order to comply with the requirements of both EPA regulations and NEPA). An attempt will be made to refine further both the scope of the RI/FS activity and the preliminary schedules in Fig. 5.7 during FY 1990.

Upon completion of the RI/FS sequence, major closure or decommissioning actions will be implemented according to priorities and schedules negotiated with the EPA and the TDHE. The magnitude of the efforts for long-term management of ORNL sites can be only roughly approximated because site characterization information is currently only preliminary in nature. However, initial indications are that long-term solutions for dealing with the entire inventory of RAP sites will require more than 20 years and the expenditure of \$1 billion (unescalated) to implement. Meeting this objective (and schedule) will require that resources be made available when needed and that the concept of in situ stabilization be accepted. It must be stressed that the resource estimates are based principally on implementation of in situ measures to stabilize wastes at most ORNL sites. Significant alterations in that strategy could result in major increases in resources required for program implementation.

Schedules for carrying out decommissioning/closure actions will be developed during the latter phases of the RI/FS studies and will be submitted for DOE, EPA, and TDHE approval as they become finalized. Interim corrective measures or decommissioning/closure actions, as they are identified during individual WAG studies in the RI/FS sequence, are expected. For these higher-priority sites (e.g., SWSA-6 ICM, waste storage tanks), near-term corrective measures will be implemented; lower-priority sites will continue to be maintained while awaiting final action.

Detailed project information and financial summaries for the Remedial Action Program are provided in the remaining pages of this section. Project information is provided in the form of PDSs and PSSs, which are listed in Table 5.4.

Table 5.4. Remedial Action Program detailed project data

Project number	Project	Funding year	Total estimated cost (\$ × 1000)
5.01	Preliminary Assessment/Site Investigation	85-?	36,437
5.02	Maintenance and Surveillance	85-?	112,140
5.03	Remedial Investigations/Feasibility Study	85-98	232,474
5.04	Remedial Action Technology Demonstrations	85-?	17,022
5.05	Corrective Measures	89-?	980,485
5.06	Facility Decommissioning or Closure	85-?	123,602
5.08	Remedial Action Equipment	85-?	3,932
5.09	ORAU Facilities	90	550

REMEDIAL ACTION PROGRAM

DETAILED INFORMATION

***PROJECT DATA SHEETS**

***PROJECT SCHEDULE SHEETS (AS SUMMARIZED IN TABLE 5.4)**

***FINANCIAL SUMMARY TABLES**

- 5.5 Remedial Action Program project summary—capital funding
- 5.6 Remedial Action Program project summary—expense funding
- 5.7 Remedial Action Program funding summary

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: PRELIMINARY ASSESSMENT AND SITE INVESTIGATION

CONTACT: L. D. RATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: 5.01

STATUTORY REQ: RCRA, CERCLA (SARA), CWA

NEEDS ASSESSMENT CAT:

EMP NO: ERNG002, DPGF105

ENG PROJ NO:

EPMP NO: 2.5.01

SCOPE: This task will provide for preliminary assessment of all solid waste management units, including an historical review, on-site surveys, and initial pathways evaluation. As new sites are identified such assessments will be conducted at that time. A part of this program phase, a comprehensive groundwater monitoring network will be established for Waste Area Groupings and the remedial action component of the Biological Monitoring and Abatement Program (BMAP) will be conducted.

JUSTIFICATION: This program phase is required under the 3004(u) provisions of the 1984 RCRA Amendments and the ORNL NPDES permit and CERCLA (SARA) provisions. Specific schedules and requirements are contained in the RCRA permit for the ORNL Hazardous Waste Storage Facility, and will be contained in the CERCLA (SARA) interagency agreement. RCRA guidance is also being utilized for construction of the groundwater monitoring network. The BMAP outlines the regulatory-approved program for NPDES monitoring.

FACILITIES: Permanent groundwater monitoring wells are being installed under specific GPP projects (see Environmental Monitoring WBS). No other facilities are being developed.

STATUS/COMMENTS: Permit requirements are on schedule.

5-19

FUNDING YEARS: 85-?			TEC (\$M1000): 36437										
BSR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AR 05 10 05 K	BO	EXP	1414	1414	0	0	0	0	0	0	0	0	0
AR 05 10 10/D	BO	EXP	428	428	0	0	0	0	0	0	0	0	0
GF 01 02 06 0	BA	EXP	13985	0	0	0	635	2893	2280	2060	1975	1740	2400
GF 01 02 06 0	BO	EXP	1105	0	45	1060	0	0	0	0	0	0	0
KG 02/ERNG025	BA	EXP	19505	7680	3150	1925	2115	430	340	310	295	260	3000
TOTAL:			36437	9522	3195	2905	2750	3325	2620	2370	2270	2000	5400

1 Program Category

ORNL REMEDIAL ACTION

3 Project Title

PRELIMINARY ASSESSMENT/SITE INVESTIGATION

EWT NO. 1 KR0002

ACTIVITY NO. KR00200000

6 Project Number

001
001

7 Description of Work

ISSUE REVISED SUMMARY SHEETS FOR
GROUNDWATER MONITORING AND REMEDIATION
(K 5/14/89) (K 5/19/89)

SUBMIT STATUS REPORT ON FIELD SAMPLING
AT POTENTIAL NMMO SITES
(K 5/18/89) (K 5/19/89)

SUBMIT STATUS REPORT ON INSTALLATION OF
WALL PERIMETER GROUNDWATER MONITORING
WELLS (K 5/14/89) (K 5/19/89)

ISSUE SUMMARY REPORT ON GEOHYDROLOGIC
SUPPORT FOR GROUNDWATER MONITORING WELL
INSTALLATION (K 5/14/89) (K 5/19/89)

SUBMIT QUARTERLY REPORTS ON ANALYSES OF
SAMPLES FROM GROUNDWATER MONITORING
WELLS FOR EPA AND LOH (K 5/14/89) (K 5/19/89)
(K 5/18/89) (K 5/19/89)

SUBMIT ANNUAL REPORT ON GROUNDWATER
QUALITY INFORMATION
(K 5/20/89) (K 5/19/89)

COMPLETE GROUNDWATER QUALITY ASSESSMENT
PLAN FOR TMSA-6
(K 5/14/89) (K 5/19/89)

CONTINUED NEXT PAGE

2 Reporting Period

7/01/89 through 7/31/89

4 Program Representative

J. H. TRABALKA

5 Project Engineer

W. J. BOLCH

Funding Type

EXP

Funding Year

FY-1989

8 Fiscal Year and Months

FY-1989

FY-1990

O N D J F M A M J J A S O N D J F M A M J J A S

Y

Y

Y

Y

Y

Y

Y

Y

SHADING INDICATES STATUS
AND COMPLETION

ACTIVITY SCHEDULE

1
23
45
67
89
1011
1213
1415
1617
1819
2021
2223
2425
2627
2829
3031
3233
3435
3637
3839
4041
4243
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4647
4849
5051
5253
5455
5657
5859
6061
6263
6465
6667
6869
7071
7273
7475
7677
7879
8081
8283
8485
8687
8889
9091
9293
9495
9697
9899
100SYMBOL
MILESTONE LEVELV L I O N
0 1 2 3 4

Comments

a. A compilation of these 6 quarterly reports may become an award fee milestone
with a submittal date of 8/89 if selected by ORNL

referenced pending receipt of WBSA-4 data to be used to check out and validate the model
*** Question can be deferred until Sept. and material probably included in final report

1 Program Title
ORNL REMEDIAL ACTION

2 Reporting Period
7/01/89 through 7/31/89

3 Activity No. **1000-002**

4 Program Representative
J. R. INAHARA

5 Project Engineer
W. J. BOGLEY

6 Funding Type
1X1

7 Funding Year
FY 1989

8 Activity Name
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

9 Activity Subtitle
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

10 Activity Description
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

11 Activity Status
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

12 Activity Location
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

13 Activity Dates
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

14 Activity Objectives
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

15 Activity Results
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

16 Activity Comments
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

17 Activity Notes
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

18 Activity Attachments
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

19 Activity References
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

20 Activity Distribution
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

21 Activity Approval
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

22 Activity Revision
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

23 Activity Change
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

24 Activity Closure
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

25 Activity Archival
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

26 Activity Disposal
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

27 Activity Destruction
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

28 Activity Retention
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

29 Activity Access
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

30 Activity Release
PRELIMINARY ASSESSMENT/SITE INVESTIGATION

ISSUE GEOSTATISTICAL SYNTHESIS REPORT USING EXISTING DATA & LIMITED ADDITIONAL TESTING & GEOSTATISTICAL SCREENING DATA ON THREE WELLS (K-55A, RAFT 1 & 2)

SUBMIT THIRD ANNUAL REPORT OF THE BIOLOGICAL MONITORING AND ABATEMENT PROGRAM (K-54A DRAFT M-2 4/89)

PROVIDE SUMMARY OF ORNL GROUNDWATER FLOW SYSTEM CONCEPTUAL MODEL AND INTERFACE ACTIVITIES WITH ECLAM (K-55A EN-1 9/89)

COMPLETE REPORT ON EXAMPLE SIMULATIONS USING A GEOSTATISTICAL APPROACH TO CALIBRATION OF GROUNDWATER MODELS (K-56A 1-9/1/89)

ISSUE FINAL REPORT ON USE OF GEOSTATISTICAL APPROACH WITH ACCOMPANYING COMPUTER PROGRAM (K-56A 2 EN-1 7/89)

CONTINUED NEXT PAGE

8 Activity Year and Month
FY 1989

FY 1989

O N O J E M A M J J A S O N D J E M A M J J A S

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 MONTH

12 MONTH

SYMBOL

STONE LEVEL

0 1 2 3 4

Comments

A compilation of these 4 quarterly reports may become an award fee milestone with a submittal date of 9/89 if selected by DRO

Deferred pending receipt of SWSA-4 data to be used to check out and validate the model. Milestone will be deferred until Sept. and material probably included in final report

1. Program Category ORNL REMEDIAL ACTION		2. Reporting Period 7/01/89 through 7/31/89		Funding Type EXP
3. Project Title PRELIMINARY ASSESSMENT/SITE INVESTIGATION		4. Program Representative J. R. TRABALKA		Funding Year FY-1985
FWP NO ERK002 ACTIVITY NO KG 02 00 00 0		5. Project Engineer W. J. BOEGLY		
6. Project Number WBS 5.01	7. Subproject Title	8. Fiscal Year and Months FY-1989 | FY-1990		
		O N D J F M A M J J A S O N D J F M A M J J A S		
	SUBMIT ANNUAL REPORT ON DATA BASE MANAGEMENT SUPPORT FOR SITE CHARACTERIZATION ACTIVITIES (K 5.7 RAP 1.2 '89)			
	ISSUE REPORT ON MODEL SIMULATIONS OF THE EFFECTS OF THE SUBSURFACE PIPE TRENCH NETWORK ON HYDROLOGY IN THE MAIN PLANT AREA (WAG 1) (K 5.8 A LR 1.9/89)			
	PROVIDE PROGRESS REPORTS ON SURFACE WATER TRANSPORT MODELING TASKS (K 5.8 B 1 LR 1.4/89; K 5.8 B 2 LR 1.10/89)			
	ISSUE STATUS REPORT ON RAP INPUT TO ARAR DEVELOPMENT FOR RADIOACTIVE AND MIXED WASTES AT ENERGY SYSTEMS REMEDIAL ACTION SITES (K 5.8 C 1 LR 1.9/89)			
CONTINUED NEXT PAGE				

SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE	12 MONTH 	SYMBOL MILESTONE LEVEL 0 1 2 3 4 	Comments * A compilation of these 4 quarterly reports may become an award fee milestone with a submittal date of 9/89 if selected by ORG **Deferred pending receipt of SWSA-4 data to be used to check out and validate the model *** Mileston will be deferred until Sept. and material probably included in final report
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1. Program Category

ORNL REMEDIAL ACTION

3. Project Title

PRELIMINARY ASSESSMENT/SITE INVESTIGATION

1. W. NO. 100-500

ACTIVITY NO. K-584-20-00-00

6. Project Name

WUS
501

COMPLETE DOCUMENTATION OF PATHWAYS
ANALYSIS COMPUTER CODES (W. NO. 100-500)
MANUALS) FOR ESTABLISHING SOIL CLEAN
UP CRITERIA (K-584-20-00-00, 7/89)

ISSUE REPORT ON REVIEW OF METHODS FOR
IMPROVEMENT OF LEACHING MODEL FOR SOIL
PATHWAYS COMPUTER CODES
(K-584-20-00-00, 9/89)

2. Reporting Period

7/01/89 through 7/31/89

4. Program Representative

J. R. TRABALKA

5. Project Engineer

W. J. HOLLEY

Funding Type

EXP

Funding Year

FY 1989

8. Fiscal Year and Months
FY 1989

FY 1990

O N D J F M A M J J A S O N D J F M A M J J A S

THIS INDICATES STATUS
AND COMPLETION
ACTIVITY SCHEDULE

MONTH
WEEK

SYMBOL
MILESTONE LEVEL

0 1 2 3 4

Comments

* A compilation of these 4 quarterly reports may become an award fee milestone with a submittal date of 9/89 if selected by ORG

* Deferred pending receipt of SWSA-4 data to be used to check and validate the model
see Milestone will be deferred until Sept. and material probably included in final report

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: MAINTENANCE AND SURVEILLANCE

CONTACT: L. D. BATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: 5.02

STATUTORY REQ: RCRA, DOE, CERCLA (SARA)

NEEDS ASSESSMENT CAT:

EMP NO: MEAM200.201 DPGF105.701 ERKGD002

ENG. PROJ. NO:

EPMP NO: 2.5.02

SCOPE: This task provides for comprehensive management of surplus contaminated facilities from the end of their active life until final decommissioning is undertaken. Routine maintenance and surveillance is provided, along with special facilities upgrade tasks in order to maintain containment of residual hazardous materials. This task also supports collection and treatment of contaminated groundwater from the main plant area as an ongoing corrective action.

JUSTIFICATION: DOE orders and RCRA regulations require routine control of inactive sites until final closure can be performed. This maintenance and surveillance task is essential for providing needed repairs, improvements and monitoring of such facilities.

FACILITIES: NONE

STATUS/COMMENTS: Maintenance and surveillance costs in the outyears would be expected to decrease as decommissioning projects are undertaken.

FUNDING YEARS: 85-?				TEC (\$K1000): 112140											
B&R CODE		RA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95	
AM 10 20 00 0	BA	EXP	760	0	0	0	175	185	195	205	0	0	0		
AM 10 20 00 0	BO	EXP	525	0	355	170	0	0	0	0	0	0	0		
AM 10 20 00 0	BA	EXP	43360	0	0	0	110	0	0	0	0	0	43250		
AM 10 20 00 0	BO	EXP	312	0	267	45	0	0	0	0	0	0	0		
AM 10 20 00 0	BO	EXP	235	0	235	0	0	0	0	0	0	0	0		
AR 05 10 05 K	BO	EXP	1556	1556	0	0	0	0	0	0	0	0	0		
AR 05 10 10 8	BO	EXP	1117	1117	0	0	0	0	0	0	0	0	0		
GF 01 02 06 0	BA	EXP	42485	0	0	0	3995	3985	3945	3945	3845	3795	18975		
GF 01 02 06 0	BO	EXP	6757	0	3197	3560	0	0	0	0	0	0	0		
GF 11 03/DPGF	BA	EXP	5745	0	0	0	620	630	540	535	510	485	2425		
GF 11 03/DPGF	BO	EXP	645	0	0	645	0	0	0	0	0	0	0		
KG 02 01/ERKG	BA	EXP	3585	0	0	0	360	315	320	350	320	320	1600		
KG 02 01/ERKG	BO	EXP	2067	1336	331	400	0	0	0	0	0	0	0		
KG 02 01/ERKG	BA	EXP	2585	0	0	0	250	205	210	240	210	210	1260		
KG 02 01/ERKG	BO	EXP	406	71	0	335	0	0	0	0	0	0	0		
TOTAL:				112140	4080	4385	5155	5510	5320	5210	5275	4885	4810	67510	

1 Program Category ORNL REMEDIAL ACTION		2 Reporting Period 7/01/89 through 7/31/89		Funding Type EXP	
3 Project Title MAINTENANCE AND SURVEILLANCE (M&S)		4 Program Representative J R TRABALKA		Funding Year FY 1985	
FWP No. ER-00002		5 Project Engineer T W HURWINKLE			
ACTIVITY NO. AG 02 00 000					
6 Project Number WBS 502		7 Subproject Title			
		B Fiscal Year and Months			
		FY 1989 | FY 1990			
		O N D J F M A M J J A S O N D J F M A M J J A S			
ISSUE STATUS REPORT (K-5.10.A.1a LR-0 4/89) & YEAR-END SUMMARY REPORT ON M&S PLANNING FOR SCMP SITES (K-5.10.A.1b LR-2 9/89)					
ISSUE SUMMARY REPORT ON SCMP SITE-SPECIFIC SCOPING SURVEYS (MS K-5.10.A.2 LR-1 9/89)					
ISSUE STATUS REPORT (K-5.10.B.1a LR-0 4/89) & YEAR-END SUMMARY REPORT ON M&S PLANNING FOR SCMP SITES (K-5.10.B.1b LR-2 9/89)					
ISSUE STATUS REPORT (K-5.11.A.1 LR-0 4/89) & YEAR-END SUMMARY REPORT ON ROUTINE M&S FOR SCMP SITES (K-5.11.A.2 LR-2 9/89)					
CONTINUED NEXT PAGE					

SHADING INDICATES STATUS AND COMPLETION		12 MONTH		SYMBOL		MILESTONE LEVEL		0 1 2 3 4		Comments:	
ACTIVITY SCHEDULE

1 Program Category ORNL REMEDIAL ACTION		2 Reporting Period 7/01/89 through 7/31/89																									
3 Project Title MAINTENANCE AND SURVEILLANCE (M&S)		4 Program Representative J. R. TRABALKA																									
5 Activity NO. K-512 B 00 00 0		6 Project Engineer T. W. BURWINKLE																									
7 Subproject Title		Funding Type EXP																									
8 Fiscal Year and Months FY 1989		Funding Year FY-1985																									
9 Project Number 512		<table border="1"> <tr> <td>O</td><td>N</td><td>D</td><td>J</td><td>F</td><td>M</td><td>A</td><td>M</td><td>J</td><td>J</td><td>A</td><td>S</td> </tr> <tr> <td colspan="12"> <p>ISSUE YEAR-END PROGRESS REPORT ON SPECIAL MAINTENANCE ACTIVITIES AT THE 3019-B FACILITY (K-512 B 10 LR-2 9/89)</p> <p>DEVELOP REP FOR LARGE-EQUIPMENT REMOVAL AND INITIAL DECONTAMINATION OF 3019-B CELLS (K-512 B 10 CP-1 9/89)</p> <p>COMPLETE REPORT ON FURTHER REDUCTION OF RADIOLOGICAL HAZARDS AT THE DECONTAMINATION FACILITY (7819) (K-512 B 2 LR-0 4/89)</p> <p>ISSUE STATUS REPORT ON REPLACEMENT OF FILTERS IN BUILDING 3110 (K-512 B 30 LR-0 4/89)</p> <p>ISSUE YEAR-END PROGRESS REPORT ON FILTER REPLACEMENT PROJECT FOR BUILDING 3110 (K-512 B 30 LR-2 9/89)</p> </td> </tr> </table>		O	N	D	J	F	M	A	M	J	J	A	S	<p>ISSUE YEAR-END PROGRESS REPORT ON SPECIAL MAINTENANCE ACTIVITIES AT THE 3019-B FACILITY (K-512 B 10 LR-2 9/89)</p> <p>DEVELOP REP FOR LARGE-EQUIPMENT REMOVAL AND INITIAL DECONTAMINATION OF 3019-B CELLS (K-512 B 10 CP-1 9/89)</p> <p>COMPLETE REPORT ON FURTHER REDUCTION OF RADIOLOGICAL HAZARDS AT THE DECONTAMINATION FACILITY (7819) (K-512 B 2 LR-0 4/89)</p> <p>ISSUE STATUS REPORT ON REPLACEMENT OF FILTERS IN BUILDING 3110 (K-512 B 30 LR-0 4/89)</p> <p>ISSUE YEAR-END PROGRESS REPORT ON FILTER REPLACEMENT PROJECT FOR BUILDING 3110 (K-512 B 30 LR-2 9/89)</p>											
O	N	D	J	F	M	A	M	J	J	A	S																
<p>ISSUE YEAR-END PROGRESS REPORT ON SPECIAL MAINTENANCE ACTIVITIES AT THE 3019-B FACILITY (K-512 B 10 LR-2 9/89)</p> <p>DEVELOP REP FOR LARGE-EQUIPMENT REMOVAL AND INITIAL DECONTAMINATION OF 3019-B CELLS (K-512 B 10 CP-1 9/89)</p> <p>COMPLETE REPORT ON FURTHER REDUCTION OF RADIOLOGICAL HAZARDS AT THE DECONTAMINATION FACILITY (7819) (K-512 B 2 LR-0 4/89)</p> <p>ISSUE STATUS REPORT ON REPLACEMENT OF FILTERS IN BUILDING 3110 (K-512 B 30 LR-0 4/89)</p> <p>ISSUE YEAR-END PROGRESS REPORT ON FILTER REPLACEMENT PROJECT FOR BUILDING 3110 (K-512 B 30 LR-2 9/89)</p>																											

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SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE 	12 MONTH 1 MONTH 1 WEEK	SYMBOL MILESTONE LEVEL 0 1 2 3 4 	Comments:
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1. Program Category ORNL REMEDIAL ACTION		2. Reporting Period 7/01/89 through 7/31/89	
3. Project Title MAINTENANCE AND CURVEILLANCE (MBS)		4. Program Representative J. H. THABALKA	Funding Type EXP
FWP NO. ERRC000		5. Project Engineer T. W. BIRWINKLE	Funding Year FY 1989
6. Project Number 502	7. Subproject Title	8. Fiscal Year and Months FY: 1989 FY: 1990	
		O N D J F M A M J J A S O N D J F M A M J J A S	
ISSUE STATUS REPORT ON REMOVAL AND DISPOSAL OF LEAKING SODIUM CONTAINER AT THE TSE (K-5 12 B 4 G LR 0 4/89)		[Solid bar from O to J]	
ISSUE YEAR-END PROGRESS REPORT ON REMOVAL AND DISPOSAL OF LEAKING SODIUM CONTAINER AT THE TSE (K-5 12 B 4 G LR 2 8/89)		[Solid bar from M to J] [Symbol: circle with dot]	
SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE		Comments	
 12 MONTHS 12 MONTHS 12 MONTHS		SYMBOL MILESTONE LEVEL 0 1 2 3 4 V D O S	

8-18-1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY

CONTACT: J D RATES
PROGRAM CATEGORY: Remedial Action Program
PLANT: ORNL

PROJECT NO: 5-03
STATUTORY REQ: RCRA, CERCLA (SARA)
HAZARD ASSESSMENT CAT:

RUN NO: F0NG002. DPGF105. 800. MEAN203
 SMO_PROD_NO: 2.5.03
 SMP_NO: 2.5.03

SCOPE: This task will provide for the implementation of RCRA Remedial Investigations/Feasibility Studies designated RAP sites. The RI/FS effort will involve development and implementation of Remedial Investigation Plans performing risk assessments and the assessment of remedial action alternatives. The RI/FS evaluation will be performed by Waste Area Grouping, according to a regulatory agency approved schedules.

JUSTIFICATION: The PI/PS evaluation is required under the 1004 (u) provisions of the 1984 RCRA Amendments and by CERCLA (SARA) provisions. PI/PS activities will be subject to negotiations with the owner and The EPA-Region IV in developing an Interagency Agreement in '989.

FACULTIES: None.

STATUS/COMMENTS: Ten of the thirteen required RI plans have been submitted to the regulatory agencies for review, comment and approval. Implementation of the SMSA 6 (Wag 6) RI has been initiated.

FUNDING YEARS: 85-?			TEC (\$x1000): 232474										
FUNDING			PRIOR										BEYOND
ACR CODE	BA/BO	TOTAL	FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
	TYPE												
AR 10 20 00 0	BO	106	0	106	0	0	0	0	0	0	0	0	
AR 05 10 05 K	BO	2520	2520	0	0	0	0	0	0	0	0	0	
AR 05 10 10 0	BO	100	100	0	0	0	0	0	0	0	0	0	
GF 11 02-DPGF	BA	192885	0	0	0	21036	25849	22000	27000	28000	25000	44000	
GF 11 02-DPGF	BO	5629	0	5629	0	0	0	0	0	0	0	0	
GF(363)	BA	9029	0	0	0	8699	330	0	0	0	0	0	
GF(363)	BO	4640	0	0	4640	0	0	0	0	0	0	0	
KG 02-ERNG025	BA	13435	0	0	0	1075	2750	330	2000	2630	2330	2320	
KG 02-ERNG025	BO	3130	0	3130	0	0	0	0	0	0	0	0	
KG(364)	BO	1000	0	0	1000	0	0	0	0	0	0	0	
TOTAL:		232474	2620	8865	5640	30810	28929	22330	29000	30630	27330	46320	

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: REMEDIAL ACTION TECHNOLOGY DEMONSTRATIONS

CONTACT: L. D. BATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: 5.04

STATUTORY REQ: RCRA, CERCLA (SARA)

NEEDS ASSESSMENT CAT:

EMP NO: ERNG002, DPGF105, 402, 800

ENG. PROJ. NO:

EMP NO: 2.5.04

SCOPE: This task will provide for coordinated demonstrations and evaluations of remedial action technologies on a schedule compatible with regulatory requirements for implementation. The scope of the task includes evaluation of past corrective actions as well as demonstration of state-of-the-art technologies in the ORNL environment. Currently, major demonstrations are planned for in-situ vitrification, sediment stabilization and shallow-land burial closure.

JUSTIFICATION: Under the 3004 (u) provisions of RCRA and CERCLA (SARA) Requirements, corrective actions must be provided for sites exhibiting continuing releases of hazardous materials. Prior to implementation of such remedial actions, field demonstrations must be performed to verify the applicability and performance of candidate technologies in the ORNL environment.

FACILITIES: No permanent facilities will be provided.

STATUS/COMMENTS: A decision by the regulators will be forthcoming on the need for permitting some of the technology demonstrations.

FUNDING YEARS: 85-?			FEC (\$M1000): 17022										
REC CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AR 05 10 05 K	BO	EXP	2270	2270	0	0	0	0	0	0	0	0	0
AR TRU/DPGF40	BO	EXP	303	303	0	0	0	0	0	0	0	0	0
GF 01 02 06 0	BA	EXP	2400	0	0	0	500	500	500	500	250	150	0
GF 01 02 06 0	BO	EXP	350	0	0	350	0	0	0	0	0	0	0
GF 11 02/DPGF	BA	EXP	8068	0	0	0	4050	1250	700	300	300	300	1168
GF 11 02/DPGF	BO	EXP	825	0	0	825	0	0	0	0	0	0	0
NG 02/ERN025	BA	EXP	2150	0	0	0	0	0	1550	350	150	100	0
NG 02/ERN025	BO	EXP	656	327	329	0	0	0	0	0	0	0	0
TOTAL:			17022	2900	329	1175	4550	1750	2750	1150	700	550	1168

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: CORRECTIVE MEASURES

CONTACT: L. D. BATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: 5.05

STATUTORY REQ: RCRA, CERCLA (SARA)

NEEDS ASSESSMENT CAT:

FMP NO: ERKG002, DPGF105, 800

ENG. PROJ. NO:

EFMP NO: 2.5.05

SCOPE: Because of the probable need to assure functional equivalence of the RI/FS process with NEPA, most major actions will be carried out after completion of the entire RI/FS sequence. However, the need for interim decommissioning or closure actions has been identified at some sites; higher-priority sites will require near-term corrective action; lower-priority sites will continue to be maintained.

JUSTIFICATION: To meet requirements embodied in RCRA Section 3004 (u) Regulations and CERCLA (SARA).

FACILITIES: None.

STATUS/COMMENTS: Funding prior to FY 1988 was for Program Strategy Development. The scope of this task included (1) analysis of institutional, regulatory and technical issues, (2) development of closure criteria and site performance models, (3) documentation of program direction through long-range plans and strategy documents, and (4) establishment of a regulatory

FUNDING YEARS: 85-?					TEC (\$M1000): 980485									
B&R CODE		RA/RO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AR 05 10 05/D	BO		EXP	494	494	0	0	0	0	0	0	0	0	0
GF 01 02 06 0	BA		EXP	1100	0	0	0	100	100	100	100	100	100	500
GF 01 02 06 0	BO		EXP	100	0	0	100	0	0	0	0	0	0	0
GF 11 (331)/D	BA		EXP	157700	0	0	0	6700	11000	40000	50000	50000	0	0
GF 11 (331)/D	BO		EXP	1150	0	0	1150	0	0	0	0	0	0	0
GF 11 (332)/D	BA		EXP	55900	0	0	0	1275	4625	20000	30000	0	0	0
GF 11 (332)/D	BO		EXP	450	0	0	450	0	0	0	0	0	0	0
GF 11 (333)/D	BA		EXP	19000	0	0	0	0	3000	4000	4000	4000	4000	0
GF 11 02/DPGF	BA		EXP	484850	0	0	0	4125	4325	16800	10500	16000	26000	407100
GF 11 02/DPGF	BO		EXP	3435	0	0	3435	0	0	0	0	0	0	0
KG 02/ERKG025	BA		EXP	255400	0	0	0	0	0	1100	1400	1900	3400	247600
KG 02/ERKG025	BO		EXP	906	906	0	0	0	0	0	0	0	0	0
TOTAL:				980485	1400	0	5135	12200	23050	32000	96000	72000	33500	655200

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT FACILITY DECOMMISSIONING OR CLOSURE

CONTACT: L. D. BATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: S-06

STATUTORY REF: RCRA, CERCLA (SARA)

NEEDS ASSESSMENT CAT:

IMP NO: ERNG002, DPGF105,700,702,800, MEAM201,205,206

ENG. PROJ. NO:

EPHE NO: 3.5.06

SCOPE: This task provides for the final decommissioning and/or closure of all of the ORNL Remedial Action Program sites. The scope of the task includes final detailed site characterizations, development of engineering designs and project plans, and implementation of the necessary corrective actions. Priorities and schedules for closure projects will be developed through interaction with the DOE, TDNE and EPA.

JUSTIFICATION: RCRA, CERCLA regulations and DOE guidelines require corrective actions for sites that contain residual contamination, in order to control potential releases to the environment. Schedules for corrective actions will be established through the RCRA permit for the ORNL Hazardous Waste Storage Facility, after completion of the RI/FS evaluation.

FACILITIES: Temporary support facilities are being provided for project decommissioning activities. At the present time, no permanent facilities are planned.

STATUS/COMMENTS: Outyear estimates of decommissioning/closure costs are based on preliminary scoping studies and should be viewed as order of magnitude only. As closure criteria are defined and more detailed planning is completed, these resource requirements will be updated.

FUNDING YEARS: 85-?			FYC (2010001) 124331											BEYOND FY-93
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-80	FY-81	FY-82	FY-83	FY-84	FY-85	FY-86	FY-87	FY-88	FY-89	
AM 10 20 00 0	BA	EXP	9820	0	0	0	540	2000	250	2000	2710	2300	0	
AM 10 20 00 0	BO	EXP	105	0	0	105	0	0	0	0	0	0	0	
AM 10 20 00 0	BA	EXP	3570	0	0	0	270	285	300	315	330	345	1725	
AM 10 20 00 0	BO	EXP	255	0	0	255	0	0	0	0	0	0	0	
AR 05 10 05 K	BO	EXP	242	242	0	0	0	0	0	0	0	0	0	
AR 05 10 10 D	BO	EXP	2164	2164	0	0	0	0	0	0	0	0	0	
GF 01 02 06 0	BA	EXP	2680	0	0	0	1492	878	310	0	0	0	0	
GF 01 02 06 0	BO	EXP	70	0	0	70	0	0	0	0	0	0	0	
GF 01 02 06 0	BA	EXP	49046	0	0	0	0	710	700	3910	8055	4670	31001	
GF 01 02 06 0	BO	EXP	760	0	0	760	0	0	0	0	0	0	0	
GF 11 04 DPGF	BO	EXP	142	0	142	0	0	0	0	0	0	0	0	
GF 11 04 DPGF	BO	EXP	369	0	369	0	0	0	0	0	0	0	0	
GF 11 04 DPGF	BO	EXP	166	0	166	0	0	0	0	0	0	0	0	
AG 02 ERNG002	BA	EXP	54490	0	0	0	710	760	570	600	600	1950	49300	
AG 02 ERNG002	BO	EXP	452	0	52	400	0	0	0	0	0	0	0	
TOTAL			124331	2406	729	1590	3012	4633	2130	6825	11715	9265	82026	

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: REMEDIAL ACTION EQUIPMENT

CONTACT: L. D. BATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: 5.08

STATUTORY REQ: RCRA

NEEDS ASSESSMENT CAT:

EMP NO: ERNG002, DPGF105, MEAN200

EMP PROJ NO:

EPMP NO: 2.5.08

SCOPE: This task provides for necessary capital equipment in support of expense funded remedial action efforts. This equipment includes surveillance instrumentation, characterization equipment, analytical instruments, computer equipment, decommissioning tooling, support systems and containment structures. Some equipment will be utilized for specific projects while others will serve in general support to the entire program.

JUSTIFICATION: Capital equipment is required in support of many of the expense funded remedial action projects. Adequate GPE support is critical to the successful completion of these projects.

FACILITIES:

STATUS/COMMENTS: Specific equipment identification and justification is provided in the remedial action program data base.

5-33

FUNDING YEARS: 85-?			TEC (\$M1000): 3932										
		FUNDING	TOTAL	PRIOR									
B&R CODE	BA/BO	TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
AN 10 20 00 0	BA	CE	25	0	0	0	0	25	0	0	0	0	0
AN 10 20 00 0	BO	CE	120	45	75	0	0	0	0	0	0	0	0
AR 05 10 05 3	BO	CE	998	998	0	0	0	0	0	0	0	0	0
GF 11 04 00 0	BA	CE	50	0	0	0	0	0	0	50	0	0	0
KG 02/ERNG025	BO	CE	2739	2381	200	158	0	0	0	0	0	0	0
TOTAL:			3932	3424	275	158	0	25	0	50	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: ORAU FACILITIES

CONTACT: L. D. BATES

PROGRAM CATEGORY: Remedial Action Program

PLANT: ORNL

PROJECT NO: 5.09

STATUTORY REQ: RCRA/CERCLA

NEEDS ASSESSMENT CAT:

EMP NO: ERKG02590

EMP PROJ. NO:

EMP NO: 2.5.09

SCOPE: The Scarboro Facility currently operated by Oak Ridge Associated Universities, under contract to DOE, contains numerous facilities potentially containing radioactive and hazardous materials. Current information indicates that some releases of these materials may have occurred to the environment. ORNL has been asked by DOE to assume responsibility for conducting a RI/FS to determine the nature and extent of these releases.

JUSTIFICATION: This activity will be regulated under the ORO IAG currently under negotiation. Characterization and assessment of the nature and extent of the contamination from the Scarboro Facility is required under CERCLA/RCRA and will be negotiated in the ORO IAG.

FACILITIES:

STATUS/COMMENTS:

FUNDING YEARS: 90		TEC (\$M1000): 550											
R&R CODE	RA/RO	FUNDING TYPE	TOTAL	PRIOR									
				FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95	
KG 02/ERKG025	BA	EXP	550	0	0	50	100	400	0	0	0	0	0
TOTAL:			550	0	0	50	100	400	0	0	0	0	0

Table 5.5. Remedial Action Program project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$M1000)								BEYOND FY-95
		TYPE	SOURCE		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
S-08	REMEDIAL ACTION EQUIPMENT	CE	AM	100	75	0	0	25	0	0	0	0	0
S-08	REMEDIAL ACTION EQUIPMENT	CE	GF	50	0	0	0	0	0	50	0	0	0
S-08	REMEDIAL ACTION EQUIPMENT	CE	KG	358	200	158	0	0	0	0	0	0	0
FUNDING TOTALS:				508	275	158	0	25	0	50	0	0	0

Table 5.6. Remedial Action Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$M1000)								BEYOND FY-95
		TYPE	SOURCE		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
S-01	PRELIMINARY ASSESSMENT AND SITE INVESTIGATION	EXP	GF	15090	45	1060	635	2095	2280	2060	1975	1740	2400
S-01	PRELIMINARY ASSESSMENT AND SITE INVESTIGATION	EXP	KG	11825	3150	1925	2115	430	340	310	295	260	3000
S-02	MAINTENANCE AND SURVEILLANCE	EXP	AM	45192	857	215	285	185	195	205	0	0	43250
S-02	MAINTENANCE AND SURVEILLANCE	EXP	GF	55632	3197	4205	4615	4615	4485	4480	4355	4280	21400
S-02	MAINTENANCE AND SURVEILLANCE	EXP	KG	7236	331	735	610	520	530	590	530	530	2860
S-03	REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY	EXP	AM	106	106	0	0	0	0	0	0	0	0
S-03	REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY	EXP	GF	212183	5629	4640	29735	26179	22000	27000	28000	25000	44000
S-03	REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY	EXP	KG	17565	3130	1000	1075	2750	330	2000	2630	2330	2320
S-04	REMEDIAL ACTION TECHNOLOGY DEMONSTRATIONS	EXP	GF	11643	0	1175	4550	1750	1200	800	550	450	1168
S-04	REMEDIAL ACTION TECHNOLOGY DEMONSTRATIONS	EXP	KG	2479	329	0	0	0	1550	350	150	100	0
S-05	CORRECTIVE MEASURES	EXP	GF	723685	0	5135	12200	23050	80900	94600	70100	30100	407600
S-05	CORRECTIVE MEASURES	EXP	KG	255400	0	0	0	0	1100	1400	1900	3400	247600
S-06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	AM	13750	0	360	810	2285	550	2315	3060	2645	1725
S-06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	GF	53233	677	830	1492	1588	1010	3910	8055	4670	31001
S-06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	KG	54942	52	400	710	760	570	600	600	1950	49300
S-07	REMEDIAL ACTION PROGRAM SUPPORT	EXP	KG	935	935	0	0	0	0	0	0	0	0
S-09	ORAU FACILITIES	EXP	KG	550	0	50	100	400	0	0	0	0	0
FUNDING TOTALS:				1481446	18438	21730	58932	67407	117040	140620	122200	77455	857624

Table 5.7. Remedial Action Program funding summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)								BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
AM	Capital-CE	100	75	0	0	25	0	0	0	0	0
AM	Expense	59048	963	575	1095	2470	745	2520	3060	2645	44975
	Subtotal	59148	1038	575	1095	2495	745	2520	3060	2645	44975
GF	Capital-CE	50	0	0	0	0	0	50	0	0	0
GF	Expense	1071466	9548	17045	53227	60077	111875	132850	113035	66240	507569
	Subtotal	1071516	9548	17045	53227	60077	111875	132900	113035	66240	507569
NG	Capital-CE	358	200	158	0	0	0	0	0	0	0
NG	Expense	350932	7927	4110	4610	4860	4420	5250	6105	8570	305080
	Subtotal	351290	8127	4268	4610	4860	4420	5250	6105	8570	305080
Program Totals	Capital	508	275	158	0	25	0	50	0	0	0
	Expense	1481446	18438	21730	58932	67407	117040	140620	122200	77455	857624
	Grand Total	1481954	18713	21888	58932	67432	117040	140670	122200	77455	857624

6. ENVIRONMENTAL MONITORING PROGRAM

OVERVIEW

The environmental monitoring element of the Environmental Compliance program includes all environmental monitoring activities conducted for facilities operated by ORNL in Bethel Valley, Melton Valley, the K-25 Plant area, and the Y-12 Plant area. Central coordination of ORNL's Environmental Monitoring is the responsibility of the E&HP Division. Monitoring requirements specified in DOE orders, the CAA, Tennessee Air Pollution Control regulations, NESHAP, the CWA, and RCRA are of primary concern.

The objectives of the Environmental Monitoring Program are identified as follows:

1. *Environmental health and safety*—ensure that all environmental monitoring activities provide reliable information on the impact of operations to on-site personnel, the public, and the environment.
2. *Regulatory compliance*—ensure that all environmental monitoring of ORNL facilities is in compliance with applicable federal, state, and local regulations.
3. *Environmental monitoring capabilities upgrade and improvement*—ensure that all environmental monitoring equipment and stations provide current data on operating conditions.

Environmental monitoring at ORNL can be classified into five general categories as illustrated in Fig. 6.1. These categories are ambient air, stacks, water and biological, groundwater, and meteorological.

Ambient Air Monitoring

Currently, there are 23 local air monitor (LAM) stations, 19 of which were scheduled for upgrade as part of the Environmental Monitoring System Upgrade (EMSU). The remaining four LAM stations were retired from service in 1987. The LAM stations are located within the ORNL plant boundary and were designed to monitor ambient air for the worker population and to be a sensitive detector of any radioactive gaseous effluents from ORNL operations. The EMSU project was subdivided into two line-item projects—EMSU Phase I and EMSU Phase II. Five LAM stations received upgrade per the EMSU I project scope. The upgrade process provided enhanced station capability and the equipment to telemeter near-real-time data to the Environmental Monitoring System. EMSU Phase II was subdivided into five GPPs and initiated during FY 1988. EMSU Phase II is currently scheduled for completion in FY 1991.

The remaining 14 LAM stations will be upgraded by future GPPs and will be maintained only as sampling stations until they are upgraded. The unreliable operation of the monitoring equipment at these 14 stations (such as false alarms, frequent need of repair work, and lack of certifiable calibration) limits their usefulness for worker protection and detection of radioactive gaseous effluents. As sampling stations, they will be used to collect particulate and gaseous samples for

Fig. 6.1. Environmental monitoring at ORNL.

periodic removal and analysis with no capability for real-time assessment. Until future upgrades can be completed, existing building radiation alarms and stack monitoring equipment will serve as the alarm mechanism for worker protection in those areas where LAM stations perform only a sampling function.

The upgraded LAM stations will include capabilities for monitoring alpha particulate, beta-gamma particulate, iodine, noble gases, gross gamma, and total rainfall. The upgraded stations will telemeter their information via local data concentrators and dedicated telephone lines to the Environmental Monitoring System. They will also have sampling capability for particulates (alpha and beta-gamma), radioiodine in air (collected on charcoal cartridges), rainwater, and tritium.

The Perimeter Air Monitor (PAM) system, which consists of ten monitoring stations, was upgraded in 1985 and 1986 via EMSU I. These stations reside within the perimeter of the ORR and serve as monitoring and sampling stations for gaseous effluents from ORNL, the Y-12 Plant, and ORGDP. The upgraded PAM stations served as the model from which the upgrades for the LAM system were developed.

A Remote Air Monitor (RAM) system is also included in the ORNL air monitoring network. It is designed to provide background data to aid in the evaluation of local conditions. This system consists of seven stations encircling the Oak Ridge area at distances from 19 to 121 km. The existing RAM stations were recently upgraded. The upgraded RAM stations are not capable of real-time monitoring but will provide sampling of alpha and beta-gamma particulates, iodine, and rainwater that will be analyzed for radionuclide concentrations. Table 6.1 lists the monitoring and sampling capabilities for the LAM, PAM, and RAM environmental monitoring systems.

Stack Monitoring and Sampling

Stack monitoring, a gaseous effluent monitoring system, is provided for all stacks at ORNL. However, not all of the stacks require the same type of monitoring equipment. Table 6.2 identifies the radiation-monitoring equipment located at each stack.

As discussed in the section on ambient air, the EMSU project scope also provided improvement to ORNL's current stack monitoring and sampling program. The first phase of EMSU provided for the upgrade of stack monitoring and sampling capabilities at three stacks (3039, 7911, and 7025).

Monitoring and sampling is currently performed at the 50-ft level on the 3039 and 7911 stacks and at the 12-ft level for the 7025 stack. At the 3039 stack, the system was upgraded to add monitoring and sampling at the four input ducts. Isokinetic monitoring and sampling probes, located in each duct, will route a portion of the duct gas stream to monitors measuring alpha and beta-gamma particulates, iodine, noble gases, and tritium.

At the 7911 and 7025 stacks, the system was upgraded to add new monitoring and sampling probes designed for isokinetic measurements to replace the configuration. These isokinetic probes, similar to those already at the 3039 stack, will extract a sample from the stack at the 50-ft level and route it to the monitoring and sampling instrumentation located at ground level. This instrumentation will be like that described for the 3039 stack. Table 6.3 lists the new monitoring capabilities provided by the Phase I upgrade, which was completed October 31, 1987.

Water Monitoring

Three classifications are used to describe water monitoring at ORNL. These classifications are the NPDES program monitoring, surface water monitoring, and biological monitoring. These

Table 6.1. Radiation monitors and samplers used at ambient air stations

	LAMs		PAMs	RAMs
	5 Stations (Phase I)	14 Stations (prior to Phase II)	11 Stations	7 Stations
Monitoring				
Alpha particulate	X		X	
Beta-gamma particulate	X		X	
Iodine	X		X	
Noble gas	X		X	
Gross gamma	X		X	
Rainfall	X		X	
Sampling				
Alpha/beta particulate	X	X	X	X
Iodine	X	X	X	X
Tritium	X	X	X	
Rain	X	X	X	X

Table 6.2. Radiation monitors used at ORNL stacks

	Stack						
	3039	7911	7512	3020	2026	6010	7025
Stack monitors							
Alpha particulate	X	X	X	X			
Beta-gamma particulate	X	X	X	X	X	X	
Iodine	X	X	X	X			
In-line sampler	X	X	X	X	X		
Inert gas	X	X					
Tritium							X
Flow rate	X	X	X	X			

Table 6.3. Upgraded radiation monitors used at ORNL stacks

	Stack						
	3039	7911	7512	3020	2026	6010	7025
Monitoring							
Alpha particulate	X	X	X	X			
Beta-gamma particulate	X	X	X	X	X	X	
Iodine	X	X	X	X			
Inert gas	X	X					
Tritium	X	X					X
Flow rate	X	X					X
Sampling							
Alpha/beta particulate	X	X	X	X	X		
Iodine	X	X	X	X	X		
Tritium		X					X

classifications and their respective monitoring requirements are defined by the ORNL NPDES permit and by DOE guidelines for environmental monitoring and surveillance around nuclear facilities.

NPDES Program. ORNL received NPDES permit TN 00029451 on April 1, 1986. This permit reflected the federal and state intention of monitoring liquid effluents at their point of discharge into receiving waters. This position meant that the number of serial outfalls or point source discharges increased from 3 to 12, as well as created a system of over 150 outfalls that include storm, parking lot, and roof drains; cooling tower discharges; and other miscellaneous source outfalls. Also, the permit contains provisions for designing and implementing a number of special monitoring plans. These plans are the Mercury Assessment Plan, the Radiological Monitoring Plan, the Monitoring Plan for PCBs in the Aquatic Environment, the Toxicity Control and Monitoring Plan, and the ORNL Biological Monitoring and Abatement Plan (BMAP). Both the Mercury and PCB plans will require funding support after the EPA and state regulators approve the plan.

Before receipt of the new NPDES permit, only three stations were sampled for compliance with permit limits. These points were in the two major drainage areas and at the Sewage Treatment Plant (STP). The new permit requires sampling at more than 80 locations to monitor point sources at their discharge points to receiving streams. Automatic samplers were installed at eight of these locations before receipt of the permit. In addition, there are some sampling locations that are located in the streams as reference points for additional information. The NPDES permit specifies parameters, limits, and frequency for ORNL monitoring efforts.

Surface Water Monitoring. Surface water monitoring at ORNL is currently directed toward radiological monitoring and is designed to monitor the concentration of radionuclides in ORNL's surface streams and discharges to state waters. In response to DOE guidelines for environmental monitoring, flow and concentration data are collected to determine discharges of radiological constituents from ORNL processes. Water samples are collected regularly from the following stations: First Creek, Fifth Creek, 7500 Bridge, Melton Branch 1 (MB1), STP, WOC headwaters, WOD, 3518, 3544 PWTP, 2000 area, 1500 area, Northwest Tributary, WOC, Melton Branch 2, Melton Hill Dam, Raccoon Creek, Gallahar Kingston Water Intake, and 190 Pond. All samples are collected weekly but are analyzed for radionuclides at different periods. Samples from WOD are analyzed weekly, whereas samples collected at other stations are composited first and then analyzed monthly.

Biological Monitoring. The biological monitoring program consists of two major efforts; one is currently ongoing, and the other is planned as part of the NPDES permit requirements. The former is designed to meet the DOE guidelines for effluent monitoring (see *Guide for Environmental Radiological Measurements at DOE Installations* and *Guide for Effluent Radiological Measurements at DOE Installations*). It consists of fish sampling, collection of soil and grass in the vicinity of ORNL, PAM and RAM stations, and, annually, the collection of milk samples from local and more remotely located dairies. The second part of the program centers on the BMAP (mentioned earlier as one of the plans required by ORNL's new NPDES permit). The BMAP consists of seven tasks designed to provide adequate information on the toxic characteristics of the ORNL waste streams and to assess the impact of the waste streams on the biological components of the receiving waters. The full impact of these tasks on biological monitoring at ORNL has not been completely assessed. However, they are certain to increase the amount of funds required for assessments and investigations of waste streams at ORNL.

Groundwater Monitoring

Groundwater monitoring system improvements must address the regulatory requirements outlined as part of RCRA and CERCLA. When these requirements have been defined, a strategy for perimeter groundwater monitoring will be developed. Many, if not all, of the groundwater-quality wells that will be necessary for routine groundwater-quality monitoring will probably be installed as part of the site characterization activities within the RAP. A total of 332 piezometer wells have been completed by the RAP and are being utilized for data acquisition. About 100 groundwater-quality wells have been installed by the RAP, and it is anticipated that several hundred additional wells will be required at ORNL within the RAP to characterize and monitor facilities in accordance with environmental regulations. Although the current and future groundwater-quality wells are being implemented by the RAP as part of the site characterization activities, some of these wells will subsequently be used on a longer-term basis for routine compliance monitoring.

Meteorological Monitoring

Three towers at ORNL collect and send meteorological data to a computer, which in turn concentrates and processes the data before relaying them to a central data acquisition system (see Fig. 6.2). These data are used in conjunction with stack discharge data to determine radionuclide concentrations during emergency conditions, as well as on an annual average basis.

PLANS AND STRATEGY

Because of environmental insults that have occurred at ORNL and more stringent regulatory requirements, it is necessary to upgrade monitoring capabilities by adding stations and measuring additional parameters. Additions to the system are mainly the result of new regulatory requirements such as those stipulated by the NPDES permit. More accurate determinations of the overall discharges from ORNL are also required by DOE orders, which have undergone recent revision. These increased monitoring capabilities are related to an overall strategy for the ORR to cover releases from all facilities.

Much of the monitoring equipment currently used has reached its design-life limits. As a result, various instruments are experiencing excessive downtime caused by increased maintenance. In addition, the age of the equipment has caused problems in obtaining necessary spare parts. As a result, some of the monitoring stations have been placed on standby status or shut down to provide spare parts to keep other stations in operation. The technology for environmental monitoring instrumentation has advanced significantly. For example, the vacuum-tube-type electronics used in the current monitoring equipment is incompatible with and not as sensitive as the advanced solid-state equipment now available.

Projects planned for upgrading the Environmental Monitoring Program are discussed in the project data sheets and schedules attached at the end of this section. A number of environmental upgrade projects are in various stages of completion, and additional GPP projects are scheduled for FY 1989 through 1991. These system upgrades and/or modifications will be a boost to the overall plant-wide objective of attaining full compliance with all DOE and applicable regulatory requirements.

Fig. 6.2. Environmental Monitoring and Compliance Section data acquisition system.

ENVIRONMENTAL MONITORING SYSTEM UPGRADE

An FY 1985 EMSU I line-item project was implemented in order to upgrade the environmental monitoring system at ORNL and in surrounding areas with the highest-priority monitoring instrumentation. This project provided a Phase I system upgrade and addressed five LAM stations, ten PAM stations, and three stacks. The EMSU Phase I work was completed October 31, 1987. EMSU Phase II was designed to upgrade the balance of the monitoring stations; however, it was subsequently subdivided to form five GPP projects. These GPPs are currently scheduled for completion over the FY 1989 through FY 1991 budget years. The GPPs will provide upgrade funding for all monitoring stations and the four stacks excluded from the EMSU Phase I upgrade. The EMSU project design called for the upgrading of gaseous and liquid effluent monitors, the addition of new monitors where needed, and provision for new data-handling capabilities via a centralized data acquisition system (DAS). The DAS, provided as part of the EMSU project, is located in Building 2016 and affords improved environmental monitoring capabilities for both liquid and air monitoring stations. It will receive signals from three sources: ambient air monitoring stations, stack air monitoring stations, and surface water monitoring stations. The data collected from these types of atmospheric monitoring will be used in conjunction with the meteorological data collected from the three towers located at ORNL to provide near-real-time air modeling. Meteorological data will also be available to the DAS from the towers at the Y-12 Plant and at ORGDP and can be used as needed.

Real-time, representative gas monitoring systems will be provided for the stacks to enable analysis of radioactive particulates, iodine, noble gas, and tritium. Data will be telemetered to the DAS on command. Representative samples for laboratory analysis will also be collected for radioactive particulates, iodine, and tritium.

Stations designed to monitor and sample ambient air for radiological and nonradiological parameters (LAM and PAM) are being reinstrumented. The LAM and PAM stations are being instrumented for radioiodine, wet and dry fallout, alpha and beta-gamma particulate, noble gas activity, and gross gamma activity. Air sampling manifolds will be provided at each site for periodic sampling programs that are used to monitor ambient tritium and fluoride levels. Continuous radioisotopic analysis, tritium gas monitoring, and rain gages will be provided at specified stations. Existing thermoluminescent dosimeters and radioparticulate/radioiodine collectors will be retained. Data from the stations will be telemetered to the DAS.

Both on-site and off-site water monitoring stations will be provided by the upgrade project. The on-site stations will have a flow-measuring device as well as a flow-proportional sampling device for various radiological and nonradiological water quality parameters. The off-site stations will have the capability to perform flow-proportional sampling.

Other monitoring projects planned within the next 5 years are shown in Table 6.4 and include groundwater monitoring to comply with RCRA requirements and the addition of a wide range of small, portable monitoring and sampling instruments. These capital projects will be supported initially by expense funding through R&D, conceptual designs, and cost estimation phases.

Detailed project data and financial summaries for the Environmental Monitoring Program are provided in the remaining pages of this section. PDSs provide details for each project (Table 6.4), including scope, justification, facilities, and a detailed funding breakdown by fiscal years from 1989 through 1995, as well as funding beyond FY 1995. PSSs detail activities over the span of each project, enumerating the steps to complete the project, most of which are program milestones. Tables 6.5 and 6.6 summarize capital and expense funding, respectively, for all defined projects in the Environmental Monitoring Program. Table 6.7 is an overall funding summary by funding source.

6-9/10

Table 6.4. Environmental Monitoring Program detailed project data

Project number	Project	Funding year	Total estimated cost (\$ × 1000)
6.00	Environmental Monitoring Program	85	15,169
6.13	Regulatory Compliance Monitoring Wells, Phase II	87	1,000
6.24	Stack Monitoring Improvements	88	1,000
6.25	Regulatory Compliance Monitoring Wells, Phase III	88	1,000
6.26	Improvements to ORNL Plant Perimeter Air Monitors	90	700
6.28	Improvements to Local Air Monitors	92	500
6.29	Surface Water Monitoring Improvements	88	415
6.30	NHF & MVST Stack Monitoring Improvements	91	700
6.32	3020 Stack Monitoring Improvements	89	350
6.33	Groundwater Monitoring Wells, Phase III	89	735
6.34	Waste Operations Control Center Expansion	91	750
6.35	Meteorological Tower System Upgrade	91	200
6.36	Melton Valley Hydraulic Head Measuring Stations	89	1,100
6.37	ORNL Groundwater Characterization	91	1,450
6.38	IWMF Monitoring Station	91	250

ENVIRONMENTAL MONITORING PROGRAM

DETAILED INFORMATION

***PROJECT DATA SHEETS**

***PROJECT SCHEDULE SHEETS**
(AS SUMMARIZED IN TABLE 6.4)

***FINANCIAL SUMMARY TABLES**

- 6.5 Environmental Monitoring Program project summary—capital funding
- 6.6 Environmental Monitoring Program project summary—expense funding
- 6.7 Environmental Monitoring Program funding summary

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: ENVIRONMENTAL MONITORING PROGRAM

CONTACT: T. L. PAYNE

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.00

STATUTORY REQ: ALL

NEEDS ASSESSMENT CAT:

EMP NO: ERNG002, DPGF107, 108

ENG PROJ NO:

EMP NO: 2.6.00

SCOPE: This data sheet is not a summary of the Environmental Monitoring Program. It covers the expense and capital equipment funding necessary to support program activities, including strategy development, studies and assessments, capital project definition, and technical support. It includes the outyear GPP budgets which are not covered by specific data sheets. Line-Item and GPP funding which has been specifically defined is designated on the data sheet for each of those projects.

JUSTIFICATION: This activity provides the expense, operating, and miscellaneous capital support necessary to provide an integrated strategy for and implementation of environmental monitoring at ORNL. This includes monitoring of ground and surface waters, liquid effluents, gaseous effluents, and process control for environmental facilities. This activity will ensure compliance with the CWA, CAA, DOE Orders, RCRA, TSCA, NEPA, and other federal and state regulations.

FACILITIES: None

STATUS/COMMENTS: NONE

FUNDING YEARS: 85-93				TEC (\$M1000): 15169									BEYOND FY-95
B&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
AT	BA	CE	2283	2283	0	0	0	0	0	0	0	0	0
NG 02	BA	GPP	2000	0	0	0	0	0	0	500	500	500	500
NG 02 EP/ERNG	BA	EXP	4330	0	0	0	100	350	520	420	420	420	2100
NG 02 EP/ERNG	BO	EXP	2651	1457	932	262	0	0	0	0	0	0	0
NG 02 WMCO/ER	BA	EXP	3100	0	0	0	300	200	200	300	300	300	1500
NG 02 WMCO/ER	BO	EXP	300	0	0	300	0	0	0	0	0	0	0
NG 02/ERNG026	BA	CE	505	65	50	0	0	140	50	50	50	50	50
TOTAL:			15169	3805	982	562	400	690	770	1270	1270	1270	4150

1. Program Category ENVIRONMENTAL COMPLIANCE		2. Reporting Period 7/01/89 through 7/31/89		3. Project Title ENVIRONMENTAL MONITORING PROGRAM		4. Program Representative P. S. ROHWER		Funding Type ALL	
FWP NO. ERK0002		5. Project Engineer T. L. PAYNE		Funding Year FY-1985					
ACTIVITY NO. KG 02 60 0									
6. Project Number WBS 6 00		7. Subproject Title		8. Fiscal Year and Months FY-1989		FY-1990		FY-1991	
				1 2 3 4		1 2 3 4		1 2 3 4	
		PROVIDE RELIABILITY, AVAILABILITY AND MAINTAINABILITY (RAM) ENGINEERING VALUE ANALYSIS FOR ENVIRONMENTAL MONITORING SYSTEM (MS K-6 2.1 LR-1 9/89)							
		ISSUE ASSESSMENT PLAN ON GROUNDWATER MONITORING STUDY (MS K-6 2.2 LR-1 9/89)							
		ISSUE LETTER REPORT ON WEIR MODIFICATIONS FOR IMPROVING AMBIENT WATER MONITORING STATIONS (MS K-6 3.1 LR-1 8/89)							
		DEVELOP COMPUTER SOFTWARE FOR INTERFACE THE ENVIRONMENTAL MONITORING SYSTEM (MS K-6 3.2 LR-1 8/89)							

SHADING INDICATES STATUS AND COMPLETION		SYMBOL		Comments	
ACTIVITY SCHEDULE		MILESTONE LEVEL			
		0 1 2 3 4			

1 Program Category		3 Reporting Period		4 Program Representative		5 Project Engineer		6 Field Year and Months		7/01/89 through 7/31/89		Funding Type	
ENVIRONMENTAL COMPLIANCE		7/01/89 through 7/31/89		C E P H T H R		P P D K O Z H R		FY 1989		FY 1990		FY 1991	
3 Project Title		4 Project Title		5 Project Title		6 Project Title		7 Project Title		8 Project Title		9 Project Title	
ENVIRONMENTAL MONITORING PROGRAM		ENVIRONMENTAL MONITORING PROGRAM		ENVIRONMENTAL MONITORING PROGRAM		ENVIRONMENTAL MONITORING PROGRAM		ENVIRONMENTAL MONITORING PROGRAM		ENVIRONMENTAL MONITORING PROGRAM		ENVIRONMENTAL MONITORING PROGRAM	
FWP NO		FWP NO		FWP NO		FWP NO		FWP NO		FWP NO		FWP NO	
ACTIVITY NO		ACTIVITY NO		ACTIVITY NO		ACTIVITY NO		ACTIVITY NO		ACTIVITY NO		ACTIVITY NO	
8 Project Number		8 Project Number		8 Project Number		8 Project Number		8 Project Number		8 Project Number		8 Project Number	
9 Project Title		9 Project Title		9 Project Title		9 Project Title		9 Project Title		9 Project Title		9 Project Title	
SUBMIT PRELIMINARY PROPOSALS FOR ALL		SUBMIT PRELIMINARY PROPOSALS FOR ALL		SUBMIT PRELIMINARY PROPOSALS FOR ALL		SUBMIT PRELIMINARY PROPOSALS FOR ALL		SUBMIT PRELIMINARY PROPOSALS FOR ALL		SUBMIT PRELIMINARY PROPOSALS FOR ALL		SUBMIT PRELIMINARY PROPOSALS FOR ALL	
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APPROVAL (MSK 6410 LR 4 8/89)		APPROVAL (MSK 6410 LR 4 8/89)		APPROVAL (MSK 6410 LR 4 8/89)		APPROVAL (MSK 6410 LR 4 8/89)		APPROVAL (MSK 6410 LR 4 8/89)		APPROVAL (MSK 6410 LR 4 8/89)		APPROVAL (MSK 6410 LR 4 8/89)	
ISSUE INPUT FOR LONG RANGE PLAN		ISSUE INPUT FOR LONG RANGE PLAN		ISSUE INPUT FOR LONG RANGE PLAN		ISSUE INPUT FOR LONG RANGE PLAN		ISSUE INPUT FOR LONG RANGE PLAN		ISSUE INPUT FOR LONG RANGE PLAN		ISSUE INPUT FOR LONG RANGE PLAN	
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(MSK 6410 LR 1 2/89)		(MSK 6410 LR 1 2/89)		(MSK 6410 LR 1 2/89)		(MSK 6410 LR 1 2/89)		(MSK 6410 LR 1 2/89)		(MSK 6410 LR 1 2/89)		(MSK 6410 LR 1 2/89)	
ISSUE DRAFT CURRENT YEAR WORK PLAN		ISSUE DRAFT CURRENT YEAR WORK PLAN		ISSUE DRAFT CURRENT YEAR WORK PLAN		ISSUE DRAFT CURRENT YEAR WORK PLAN		ISSUE DRAFT CURRENT YEAR WORK PLAN		ISSUE DRAFT CURRENT YEAR WORK PLAN		ISSUE DRAFT CURRENT YEAR WORK PLAN	
(MSK 6410 LR 1 9/89)		(MSK 6410 LR 1 9/89)		(MSK 6410 LR 1 9/89)		(MSK 6410 LR 1 9/89)		(MSK 6410 LR 1 9/89)		(MSK 6410 LR 1 9/89)		(MSK 6410 LR 1 9/89)	
STACK MONITORING IMPROVEMENTS		STACK MONITORING IMPROVEMENTS		STACK MONITORING IMPROVEMENTS		STACK MONITORING IMPROVEMENTS		STACK MONITORING IMPROVEMENTS		STACK MONITORING IMPROVEMENTS		STACK MONITORING IMPROVEMENTS	
(MSK 641 624 LR 1 12/89)		(MSK 641 624 LR 1 12/89)		(MSK 641 624 LR 1 12/89)		(MSK 641 624 LR 1 12/89)		(MSK 641 624 LR 1 12/89)		(MSK 641 624 LR 1 12/89)		(MSK 641 624 LR 1 12/89)	
REGULATORY COMPLIANCE MONITORING WELLS,		REGULATORY COMPLIANCE MONITORING WELLS,		REGULATORY COMPLIANCE MONITORING WELLS,		REGULATORY COMPLIANCE MONITORING WELLS,		REGULATORY COMPLIANCE MONITORING WELLS,		REGULATORY COMPLIANCE MONITORING WELLS,		REGULATORY COMPLIANCE MONITORING WELLS,	
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IMPROVEMENTS TO ORNL PLANT BOUNDARY		IMPROVEMENTS TO ORNL PLANT BOUNDARY		IMPROVEMENTS TO ORNL PLANT BOUNDARY		IMPROVEMENTS TO ORNL PLANT BOUNDARY		IMPROVEMENTS TO ORNL PLANT BOUNDARY		IMPROVEMENTS TO ORNL PLANT BOUNDARY		IMPROVEMENTS TO ORNL PLANT BOUNDARY	
PERIPHERAL AIR MONITORS		PERIPHERAL AIR MONITORS		PERIPHERAL AIR MONITORS		PERIPHERAL AIR MONITORS		PERIPHERAL AIR MONITORS		PERIPHERAL AIR MONITORS		PERIPHERAL AIR MONITORS	
(MSK 641 626 LR 1 9/91)		(MSK 641 626 LR 1 9/91)		(MSK 641 626 LR 1 9/91)		(MSK 641 626 LR 1 9/91)		(MSK 641 626 LR 1 9/91)		(MSK 641 626 LR 1 9/91)		(MSK 641 626 LR 1 9/91)	
SURFACE WATER MONITORING IMPROVEMENTS		SURFACE WATER MONITORING IMPROVEMENTS		SURFACE WATER MONITORING IMPROVEMENTS		SURFACE WATER MONITORING IMPROVEMENTS		SURFACE WATER MONITORING IMPROVEMENTS		SURFACE WATER MONITORING IMPROVEMENTS		SURFACE WATER MONITORING IMPROVEMENTS	
(MSK 641 629 LR 2 12/90)		(MSK 641 629 LR 2 12/90)		(MSK 641 629 LR 2 12/90)		(MSK 641 629 LR 2 12/90)		(MSK 641 629 LR 2 12/90)		(MSK 641 629 LR 2 12/90)		(MSK 641 629 LR 2 12/90)	
CONTINUED NEXT PAGE													

Comments

April distribution delayed by ORN Proposal for 9/89 draft IIR submitted to ORN

1. Program Category ENVIRONMENTAL COMPLIANCE		2. Reporting Period 7/01/89 through 7/31/89				
3. Project Title ENVIRONMENTAL MONITORING PROGRAM		4. Program Representative C. E. PEPPER		Funding Type:		
FWP NO: ERK002 ACTIVITY NO: KG 02 06 0		5. Project Engineer F. P. DELOZIER		Funding Year:		
6. Project Number	7. Subproject Title	8. Fiscal Year and Months				
		FY-1989				
		FY-1990				
		FY-1991				
		1	2	3	4	
WBS 6.00						
6.32	3020 STACK MONITORING IMPROVEMENTS (MS A-6.4.1-6.32 LR-2 12/90)					12
	ISSUE FY 1990 KG02 GPP PLANNING BASE LETTER FOR DOE APPROVAL (MS K-6.4.2 LR-4 12/88)					

SHADING INDICATES STATUS AND COMPLETION		12 MONTH		SYMBOL		MILESTONE LEVEL		Comments	
ACTIVITY SCHEDULE		12 MONTH		SYMBOL		MILESTONE LEVEL		Comments	
								• April distribution delayed by ORO. Proposal for 9/89 draft LRP submitted to ORO.	

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: REGULATORY COMPLIANCE MONITORING WELLS, PHASE II

CONTACT: J. A. GREENE

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.13

STATUTORY REQ: CERCLA, SARA

NEEDS ASSESSMENT CAT:

FMP NO: ERKG002

ENG. PROJ. NO: 87-2

EPMP NO: 2.6.13

SCOPE: This project is Phase II of an overall groundwater monitoring network being installed at ORNL and surrounding areas to determine to what extent the groundwater is contaminated. This network consists of a large number of groundwater wells strategically located around specific impoundments, pits, and disposal areas.

JUSTIFICATION: Various ponds, impoundments, and other disposal/storage areas around the ORNL site have been determined to be RCRA sites. To meet the RCRA regulations, a groundwater monitoring system must be installed around each of these sites. The monitoring network is needed to determine if groundwater contamination is occurring and to determine containment of RCRA regulated waste-water ponds.

FACILITIES: Facilities will consist of appropriately installed permanent groundwater monitoring wells.

STATUS/COMMENTS: Preliminary Proposal approved by DOE 11/86.

<u>FUNDING YEARS:</u> 87				<u>TEC (\$x1000):</u> 1000									
<u>BA/BO</u>	<u>BA/BO</u>	<u>FUNDING TYPE</u>	<u>TOTAL</u>	<u>PRIOR</u>									
				<u>FY-88</u>	<u>FY-88</u>	<u>FY-89</u>	<u>FY-90</u>	<u>FY-91</u>	<u>FY-92</u>	<u>FY-93</u>	<u>FY-94</u>	<u>FY-95</u>	<u>BEYOND FY-95</u>
NG 02	BO	GPP	1000	1000	0	0	0	0	0	0	0	0	0
<u>TOTAL:</u>			1000	1000	0	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: STACK MONITORING IMPROVEMENTS

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.24

STATUTORY REQ: DOE, CAA

NEEDS ASSESSMENT CAT:

FMP NO:

EMG. PROJ. NO: 88-2

EPMP NO: 2.6.24

SCOPE: Exhaust systems from Buildings 2026, 6010, and 7503 (7512 Stack) will be modified to provide isokinetic sampling of the airstream. At each stack the sample will be piped to a nearby instrument enclosure for monitoring and sampling. Each stack will be instrumented for flow and velocity pressure monitoring. Each stack will be equipped to sample for particulates, and iodine. The 2026 and 7512 stacks will also be equipped to sample for tritium.

JUSTIFICATION: The present instrumentation is inadequate to predict with reasonable accuracy or adequate response time the consequences of an unplanned release from the Laboratory. The present configuration of real time stack monitoring does not comply with either the Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP) or DOE Order 5484.1 requirements for isokinetic monitoring of the effluent gas stream. Replacement of these systems is necessary to have both an accurate knowledge of source terms and environmental concentrations for routine and accidental releases and to provide a basis for controlling emissions to an ALARA level.

FACILITIES: Building 2026, 6010, and 7503 (7512 Stack). The 2026 and 7503 Stacks will be instrumented with monitoring carts for particulate alpha, particulate beta, iodine, and noble gases. The monitors will be interfaced with telemetry to the existing Data Collection and Analysis System. The 2026, 7512 and 6010 stacks will be provided with isokinetic sampling systems.

STATUS/COMMENTS: Ready for Bid and Award.

FUNDING YEARS: 88				TEC (\$MIG. 00): 1000									
FRR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR									
				FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND	
AT	BA	GPP	1000	0	1000	0	0	0	0	0	0	0	0
TOTAL:			1000	0	1000	0	0	0	0	0	0	0	0

LAST UPDATE: 8/09/89

PLANT: ORNL

NEEDS ASSESSMENT CAT:

LPMP NO: 2.6.25

JUSTIFICATION: State and federal environmental laws and regulations are imposing increasingly stringent standards for hazardous waste treatment storage and disposal facilities. DOE orders have, therefore, included provisions to identify and evaluate inactive waste sites and to effect remedial action where necessary to improve the control of hazardous substance migration from such sites.

STATUS/COMMENTS: Preliminary Proposal submitted to DOE 3/87.

[illegible]

1. Program Category ENVIRONMENTAL MONITORING PROGRAM		2. Reporting Period 7/01/89 through 7/31/89																																																	
3. Project Title REGULATORY COMPLIANCE MONITORING WELLS, PHASE III		4. Program Representative J. A. GREENE	Funding Type: GPP																																																
FWP NO. ACTIVITY NO		5. Project Engineer J. R. LAWSON	Funding Year FY-1988																																																
6. Project Number WBS 6.25	7. Subproject Title	8. Fiscal Year and Months																																																	
		<table border="1"> <thead> <tr> <th colspan="4">FY-1988</th> <th colspan="4">FY-1989</th> <th colspan="4">FY-1990</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th> <th>1</th><th>2</th><th>3</th><th>4</th> <th>1</th><th>2</th><th>3</th><th>4</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td> </td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td> <td></td><td></td><td> </td><td></td> <td></td><td></td><td></td><td></td> </tr> </tbody> </table>		FY-1988				FY-1989				FY-1990				1	2	3	4	1	2	3	4	1	2	3	4
FY-1988				FY-1989				FY-1990																																											
1	2	3	4	1	2	3	4	1	2	3	4

	WMS TITLE I & II ENGINEERING & DESIGN COMPLETE CONSTRUCTION OF REGULATORY COMPLIANCE MONITORING WELLS, PHASE III (2-64 (a))																																																		

SHADING INDICATES STATUS AND COMPLETION ACTIVITY SCHEDULE	MONTH	SYMBOL MILESTONE LEVEL 0 1 2 3 4	Comments Well drilling began in June, 1989 on Phase III Wells
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ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: IMPROVEMENTS TO ORNL PLANT PERIMETER AIR MONITORS

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.26

STATUTORY REQ: DOE

NEEDS ASSESSMENT CAT:

EMP NO:

ENG. PROJ. NO:

EMP NO: 2.6.26

SCOPE: Equipment at four sites will be installed to provide monitoring and sampling for emergency response. PIG carts, sampling stations, and gross gamma monitors will be installed in new instrument enclosures at Perimeter Air monitoring stations (9, 19, 21, 22).

JUSTIFICATION: Because of increased environmental concerns and more stringent regulatory requirements, it is necessary for ORNL to upgrade monitoring capabilities. The present instrumentation is inadequate to predict with reasonable accuracy or adequate response time the consequences of an unplanned release from the Laboratory. At present only a few gross parameters are measured at these sites. These measurements are made with instruments that are difficult to calibrate and have less than the increased sensitivity levels mandated by the ALARA program. These replacements will provide key data for emergency and risk management strategy.

FACILITIES: Plant Perimeter Air Monitors 9, 19, 21 and 22.

STATUS/COMMENTS: Preliminary Proposal is in preparation. Will be issued 8/89.

FUNDING YEARS: 90			TEC (\$M1000): 700										BEYOND
AGR CODE	BA/NO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
KG 02	BA	GPP	700	0	0	0	700	0	0	0	0	0	0
TOTAL:			700	0	0	0	700	0	0	0	0	0	0

1 Program Category ENVIRONMENTAL MONITORING PROGRAM		2 Reporting Period 7/01/89 through 7/31/89	
3 Project Title IMPROVEMENTS TO ORNL PLANT BOUNDARY PERIMETER AIR MONITORS		4 Program Representative S. T. RUDELL	
FWP NO. ERK0002		Funding Type GPP	
ACTIVITY NO.		5. Project Engineer F. P. DELOZER	
6 Fiscal Year and Months FY-1989		FY-1990	
7 Subproject Title		FY-1991	
8 Project Number 626			
FUNCTIONAL CRITERIA			
ASSESSMENTS (SAFETY, QA, ADM)			
PRELIMINARY PROPOSAL/STUDY & ESTIMATE			
DOE REVIEW			
TITLE & DESIGN BY MMS			
BID & AWARD			
COMPLETE CONSTRUCTION OF IMPROVEMENTS TO ORNL BOUNDARY PERIMETER AIR [2-64 (m)]			
MMS INSTALLATION			

SHADING INDICATES STATUS
AND COMPLETION
ACTIVITY SCHEDULE

12 MONTH
WEEKSTONE LEVEL
6.06E1457

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: IMPROVEMENTS TO LOCAL AIR MONITORS

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.28

STATUTORY REQ: DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.6.28

SCOPE: Equipment at four sites will be upgraded or installed to provide monitoring and sampling in compliance with DOE Orders 5480.1 and 5484.1. PIG carts will be installed in new instrument enclosures at Local Air Monitors 1, 19, New Hydrofracture, and 10. A gross gamma monitor, rain gauge, wet/dry precipitation collector, particulate sampler, and iodine sampler will be installed at the MNF LAM. Monitors will interface with the Data Collection and Analysis System.

JUSTIFICATION: Because of increased environmental concerns and more stringent regulatory requirements, it is necessary for ORNL to upgrade monitoring capabilities. The present instrumentation is inadequate to predict with reasonable accuracy or adequate response time the consequences of an unplanned release from the Laboratory. At present only a few gross parameters are measured at these sites. These measurements are made with instruments that are difficult to calibrate and have less than the increased sensitivity levels mandated by the ALARA program. These replacements will enable ORNL to comply with DOE Orders 5480.1 and 5484.1.1

FACILITIES: Local Air Monitors 1, 10, 19 and New Hydrofracture.

STATUS/COMMENTS: Pre-SRD studies/evaluations in progress.

6-24

FUNDING YEARS: 92				TEC (\$x1000): 500									
FGR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR									
				FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
NG 02	BA	GPP	500	0	0	0	0	0	500	0	0	0	0
TOTAL:			500	0	0	0	0	0	500	0	0	0	0

1. Program Category
ENVIRONMENTAL MONITORING PROGRAM
 3. Project Title
IMPROVEMENTS TO LOCAL AIR MONITORS
 FWP NO. ERAG002
 ACTIVITY NO.

2. Reporting Period
 7/01/89 through 7/31/89
 4. Program Representative
 S. T. RUDELL
 5. Project Engineer
 F. P. DELOZER

Funding Type
 QPP
 Funding Year
 FY-1991

6. Project Number
 WBS
 628

7. Subproject Title

8. Fiscal Year and Months
 FY-1990

FY-1991

FY-1992

FUNCTIONAL CRITERIA

ASSESSMENTS (SAFETY, QA, ADM)

PRELIMINARY PROPOSAL/STUDY & ESTIMATE

DOE REVIEW

TITLE II DESIGN BY MMES

BID & AWARD

FPSC CONSTRUCTION

MMES INSTALLATION

1

2

3

4

1

2

3

4

1

2

3

4

SHADING INDICATES STATUS
 AND COMPLETION
 ACTIVITY SCHEDULE

MONTH

MILESTONE LEVEL

SYMBOL
 MILESTONE LEVEL 0 1 2 3 4

Comments

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: SURFACE WATER MONITORING IMPROVEMENTS

CONTACT: L. R. SIMMONS

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.29

STATUTORY REQ: CWA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO: 88-2

EPMP NO: 2.6.29

SCOPE: Equipment at six sites will be upgraded or installed to provide monitoring and sampling in compliance with DOE Orders 5480.1 & 5484.1. Flow proportional samplers will be installed at the Homogeneous Reactor Test discharge, East and West Weirs. Flow monitors and weirs will also be replaced. Samplers will be installed at the K-25 and Kingston water intakes. Water quality monitoring equipment will be installed in a new instrument enclosure at the Northwest Tributary.

JUSTIFICATION: Because of increased environmental concerns and more stringent regulatory requirements, it is necessary for ORNL to upgrade monitoring capabilities. The present instrumentation is inadequate to predict with reasonable accuracy or adequate response time the consequences of an unplanned release from the Laboratory. At present only a few gross parameters are measured at these sites and none are measured at the Kingston water intake. Replacement of these systems is necessary for knowledge of source terms and concentrations and for controlling discharges to an AARA level.

FACILITIES: Six surface water monitoring sites.

STATUS/COMMENTS: Design activities by Engineering are currently on-going.

FUNDING YEARS: 88			TEC (\$M1000):										415	
R&R CODE	BA/BO	FUNDING	TOTAL	PRIOR										BEYOND
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
NG 02	BA	GPP	415	0	415	0	0	0	0	0	0	0	0	0
		TOTAL:	415	0	415	0	0	0	0	0	0	0	0	0

1. Program Category ENVIRONMENTAL MONITORING PROGRAM		2. Reporting Period 7/01/89 through 7/31/89	
3. Project Title SURFACE WATER MONITORING IMPROVEMENTS FWP NO: ERK0002 ACTIVITY NO:		4. Program Representative L. R. SIMMONS 5. Project Engineer D. A. CONATSER	
		Funding Type GPP Funding Year: FY-1988	

6. Project Number WBS 6.29	7. Subproject Title	8. Fiscal Year and Months																			
		FY-1987				FY-1988				FY-1989				FY-1990				FY-1991			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	FUNCTIONAL CRITERIA																				
	ASSESSMENTS (SAFETY, QA, ADM)																				
	PRELIMINARY PROPOSAL/ STUDY & ESTIMATE																				
	DOE REVIEW																				
	TITLE II DESIGN																				
	BID & AWARD																				
	COMPLETE CONSTRUCTION OF SURFACE WATER MONITORING IMPROVEMENTS [2-64 (d)]																				
	NME'S INSTALLATION																				
	CONTINUED NEXT PAGE																				

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 MONTH

12 FORECAST

SYMBOL

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MYSTONE LEVEL

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1

2

3

4

Comments

Design is on-going.

1. Program Category: ENVIRONMENT : MONITORING PROGRAM		2. Reporting Period 7/01/89 through 7/31/89	
3. Project Title SURFACE WATER MONITORING IMPROVEMENTS		4. Program Representative L. R. SIMMONS	Funding Type: OPP
FWP NO : ERK0002		5. Project Engineer D. A. CONATSER	Funding Year: FY-1989
ACTIVITY NO :			

6. Project Number	7. Subproject Title	8. Fiscal Year and Months																							
		FY-1987				FY-1988				FY-1989				FY-1990				FY-1991							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
WBS 6.29	CONSTRUCTION MANAGEMENT TEST 3RD CHECKOUT																								

SHADING INDICATES STATUS AND COMPLETION

ACTIVITY SCHEDULE

12 MONTH

6 MONTH

SYMBOL

MILESTONE LEVEL 0 1 2 3 4

Comments:

Design is on-going.

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: MNF & MVST STACK MONITORING IMPROVEMENTS

CONTACT: S. T. RUDRELL

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.30

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

FNP NO:

ENG. PROJ. NO: 90-2

EPNP NO: 2.6.30

SCOPE: Equipment at four stacks will be installed to provide monitoring and isokinetic sampling in compliance with DOE Orders 5480.1 and 5484.1. Exhaust systems from Building 7860 (New Hydrofracture) and 7830 (Melton Valley Storage Tanks) will be modified. Each stack will be instrumented for flow and velocity pressure monitoring. Each stack will be equipped to sample for particulates, iodine, and tritium.

JUSTIFICATION: Because of increased environmental concerns and more stringent regulatory requirements, it is necessary for ORNL to upgrade monitoring capabilities. The present lack of real time stack monitoring does not comply with either the Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP) or DOE Order 5484.1 for isokinetic monitoring of the effluent gas stream. Installation of these systems is necessary to have both an accurate knowledge of source terms and environmental concentrations for routine and accidental releases and to provide a basis for controlling emissions to an ALARA level.

FACILITIES: Exhaust systems from Buildings 7830 (New Hydrofracture) and 7860 (Melton Valley Storage Tanks) will be modified to provide isokinetic sampling of the airstream.

STATUS/COMMENTS: Functional Requirements Document in preparation.

FUNDING YEARS: 91				FEC (\$M1000):										BEYOND	
BAR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR										FY-95	
				FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	FY-97	FY-98	FY-99
KG	BA	GPP	700	0	0	0	0	700	0	0	0	0	0	0	0
TOTAL:			700	0	0	0	0	700	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: 3020 STACK MONITORING IMPROVEMENTS

CONTACT: S. T. RUDILL

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.32

STATUTORY REQ: CAA

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.4.32

SCOPE: The exhaust systems from Building 3019 (3020 Stack) will be modified to provide isokinetic sampling of the airstream. From the stack the sample will be piped to a nearby instrument enclosure for monitoring and sampling. The stack will be instrumented for flow and velocity pressure monitoring. The stack will also be equipped to sample for particulates, iodine, and tritium.

JUSTIFICATION: The present instrumentation is inadequate to predict with reasonable accuracy or adequate response time the consequences of an unplanned release from the Laboratory. The present configuration of real time stack monitoring does not comply with either the Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP) or DOE Order 5484, 1 requirements for isokinetic monitoring of the effluent gas stream. Replacement of these systems is necessary to have both an accurate knowledge of source terms and environmental concentrations for routine and accidental releases and to provide a basis for controlling emissions to an ALARA level.

FACILITIES: The 3020 Stack will be instrumented with a monitoring cart for particulate alpha, particulate beta, iodine, and noble gases. The monitors will be interfaced with telemetry to the existing Data Collection and Analysis System.

STATUS/COMMENTS: Preliminary Proposal is in draft form. Will be issued 8/89.

FUNDING YEARS: 89		FEC (\$x1000): 350											
R&R CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95
KG 02	BA	GPP	350	0	0	350	0	0	0	0	0	0	0
TOTAL:			350	0	0	350	0	0	0	0	0	0	0

1. Program Category ENVIRONMENTAL MONITORING PROGRAM					2. Reporting Period 7/01/89 through 7/31/89																				
3. Project Title 3030 STACK MONITORING IMPROVEMENTS					4. Program Representative S. T. RUDELL					Funding Type GPP															
FWP NO: ERKQ002					5. Project Engineer D. A. CONATSER					Funding Year FY-1989															
ACTIVITY NO:																									
6. Project Number WBS 6.32		7. Subproject Title		8. Fiscal Year and Months																					
				FY-1987				FY-1988				FY-1989				FY-1990				FY-1991					
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
		FUNCTIONAL CRITERIA																							
		ASSESSMENTS (SAFETY, QA, ADM)																							
		PRELIMINARY PROPOSAL/STUDY & ESTIMATE																							
		DOE REVIEW																							
		TITLE II DESIGN BY MMES																							
		BID & AWARD																							
		COMPLETE CONSTRUCTION OF STACK MONITORING IMPROVEMENTS [2-64.1(1)]																							
		MMES INSTALLATION																							

SHADING INDICATES STATUS AND COMPLETION		12 ← MONTH		SYMBOL		MILESTONE LEVEL 0 1 2 3 4		Comments:	
ACTIVITY SCHEDULE		← FORECAST							

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: GROUNDWATER MONITORING WELLS, PHASE III

CONTACT: J. A. GRIENE

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.33

STATUTORY REQ: CERCLA, SARA

NEEDS ASSESSMENT CAT:

FMP NO:

EMG PROJ. NO:

EPMP NO: 2.6.33

SCOPE: These projects will provide installation of groundwater quality monitoring wells, well development, and pump procurement/installation. Will cover cost for wells on perimeters of lower Waste Area Grouping 2 and Waste Area Grouping 17.

JUSTIFICATION: Various ponds, impoundments, underground tanks, and spill sites around the ORNL site have been determined to be RCRA sites. To meet the RCRA regulations, a groundwater monitoring system must be installed around each of these sites. The Monitoring Network is needed to determine if groundwater contamination is occurring and to determine containment of RCRA regulated wastewater ponds.

FACILITIES:

STATUS/COMMENTS: Preliminary Proposal has been approved and signed by ORNL. It has been sent to DOE-CRO for approval.

633

FUNDING YEARS: 89			TEC (\$x1000):										735	
R&R CODE	BA/BO	FUNDING	TOTAL	PRIOR									BEYOND	
		TYPE		FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
KG 02	BA	EXP	735	0	0	735	0	0	0	0	0	0	0	0
TOTAL:			735	0	0	735	0	0	0	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: WASTE OPERATIONS CONTROL CENTER EXPANSION

CONTACT: M. L. WILLOUGHBY

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.34

STATUTORY REQ: DOE, ALL

NEEDS ASSESSMENT CAT:

ENP NO:

ENG. PROJ. NO:

EPMP NO: 2.6.34

SCOPE: The Waste Operations Control Center (WOCC) does not have sufficient personnel support capabilities including offices, lunch room, change house, and training space to properly support the mission and responsibilities of the WOCC and the Waste Management Operations organization. This facility would physically comprise a two or three story structure occupying about 3,000 sq. ft. in the space immediately east of the WOCC, Building 3130.

JUSTIFICATION: Failure to provide the proposed facilities could prove very disruptive to ongoing operations if current facilities are deemed unsatisfactory in a Technical Safety Appraisal (TSA) or other facilities audit. Inadequate office space and other facilities require very inefficient usage of available space throughout ORNL which compounds the problems associated with the coordination of the understaffed Waste Management Operations.

FACILITIES: This facility will comprise a two or three story structure providing approximately 3,000 square feet of space.

STATUS/COMMENTS: Functional Requirements need to be developed.

FUNDING YEARS: 91			TEC (\$x1000): 750										BEYOND
BAR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
KG 02	BA	GPP	750	0	0	0	0	750	0	0	0	0	0
TOTAL:			750	0	0	0	0	750	0	0	0	0	0

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/18/1989

LAST UPDATE: 8/17/89

ACTIVITY/PROJECT: METEOROLOGICAL TOWER SYSTEM UPGRADE

CONTACT: S. T. RUDELL

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.35

STATUTORY REQ: CAA, DOE

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.6.35

SCOPE: The meteorological tower system would be upgraded to provide data to the ESS VAX. This upgrade would allow anyone who has access to the monitoring system at ORNL to obtain near real-time meteorological data. Organizations with upgraded access to data would include LSS which currently reviews the monitoring system.

JUSTIFICATION: Due to the method currently used to interface with meteorological tower, data is often lost because of the interruption of communication. The upgrade would provide a dependable backup to current system as well as a method to better store and allow a wide use of data. Without this data, ORNL response and environmental personnel will continue to be without data during certain periods.

6-35

FACILITIES: Meteorological towers (3).

STATUS/COMMENTS: No work has been accomplished on this project to date. Project manager to contact Environmental Monitoring Section for information necessary to begin preparation of functional requirements document.

FUNDING YEARS: 91				TEC (\$x1000): 200										BEYOND
BGR CODE	BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
KG 02	BA	GPP	200	0	0	0	0	200	0	0	0	0	0	
TOTAL:			200	0	0	0	0	200	0	0	0	0	0	

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: MELTON VALLEY HYDRAULIC HEAD MEASURING STATIONS

CONTACT: J. A. GREENE

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.36

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.6.36

SCOPE: Wells will be drilled at 3 or more locations in Melton Valley to monitor vertical and lateral changes in the hydraulic head in order to characterize the regional hydrology of Melton Valley. Each station will consist of one 400-foot, 4-inch diameter borehole drilled to retrieve 3.5-inch core.

JUSTIFICATION: Information will be used in the RI/FS activities.

FACILITIES: Each borehole will be instrumented to monitor hydraulic head data and sample groundwater at multiple levels. Construction of each station will consist of obtaining a suite of geophysical logs, core, hydraulic conductivity, and hydraulic head data.

STATUS/COMMENTS: Environmental document 13 in preparation.

6-36

FUNDING YEARS: 89		TEC (\$M1000): 1100												
		FUNDING		PRIOR										BEYOND
BSR CODE	BA/BO	TYPE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95		
GF 01 02 06 0	BA	EXP	1100	0	0	300	0	0	200	200	200	200	0	
TOTAL:			1100	0	0	300	0	0	200	200	200	200	0	

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: ORNL GROUNDWATER CHARACTERIZATION

CONTACT: S. P. du MONT

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.37

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.6.37

SCOPE:

JUSTIFICATION: These well systems will permit measurements of vertically distributed properties of the water-bearing zones in the complex geology at ORNL. These installations will minimize the use of grout and allow more rapid water level recovery in the low permeability formations known to be present. This will provide needed information on movement of groundwater contaminants to support planned corrective actions. Without this information, it is likely that regulatory mandates will force extensive drilling and sampling programs that will have to be exploratory, and hence more expensive than a planned approach.

FACILITIES:

STATUS/COMMENTS:

FUNDING YEARS: 91							TEC (\$M1000):				1450							
BGR CODE		BA/BO	FUNDING TYPE	TOTAL	PRIOR FY-88	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND FY-95				
GF	01	02	06	0	BA	GPP	1000	0	0	0	1000	0	0	0	0			
GF	01	02	06	0	BA	EXP	450	0	0	0	0	450	0	0	0			
TOTAL:				1450	0	0	0	1000	450	0	0	0	0	0				

ORNL ENVIRONMENTAL PROGRAM DATA SHEET
8/14/1989

LAST UPDATE: 8/09/89

ACTIVITY/PROJECT: SMSA 6 MONITORING STATION

CONTACT: M. C. YEE

PROGRAM CATEGORY: Environmental Monitoring Program

PLANT: ORNL

PROJECT NO: 6.38

STATUTORY REQ:

NEEDS ASSESSMENT CAT:

FMP NO:

ENG. PROJ. NO:

EPMP NO: 2.6.38

SCOPE: Provide capability to monitor water runoff from the southwest portion of SMSA 6 including the planned Interim Corrective Measures and IWMF. Monitoring capabilities to include flow measurement and proportional sampling capability. Instrumentation is required to monitor the discharges from previous SMSA 6 disposal operations, previous TUNULUS disposal operations, and the IWMF operations. This project will also enhance surface water drainage from the site.

JUSTIFICATION: The current system does not provide adequate measurement of runoff and releases from the facilities.

6-38

FACILITIES:

STATUS/COMMENTS:

FUNDING YEARS: 91										TEC (\$x1000):						BEYOND	
												PRIOR					
BSR CODE	BA/BO	FUNDING TYPE	TOTAL		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96				
GF 01 02 06 0	BA	GPP	250		0	0	0	0	250	0	0	0	0	0			0
TOTAL:			<u>250</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>250</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>			<u>0</u>	

Table 6.5. Environmental Monitoring Program project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE	AMOUNT	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND
6.00	ENVIRONMENTAL MONITORING PROGRAM	CE	3000	3000	0	0	0	0	0	500	500	500	500
6.00	ENVIRONMENTAL MONITORING PROGRAM	CE	440	440	0	0	0	0	0	50	50	50	50
6.22	GROUNDWATER MONITORING NETWORK, PHASE II	GF	500	500	0	0	0	0	0	0	0	0	0
6.24	STACK MONITORING IMPROVEMENTS	GF	1000	1000	0	0	0	0	0	0	0	0	0
6.25	REGULATORY COMPLIANCE MONITORING	GF	1000	1000	0	0	0	0	0	0	0	0	0
6.26	IMPROVEMENTS TO O&M PLANT	GF	700	700	0	0	0	0	0	0	0	0	0
6.26	PERIMETER AIR MONITORING	GF	500	500	0	0	0	0	0	500	0	0	0
6.26	IMPROVEMENTS TO LOCAL AIR MONITORING	GF	415	415	0	0	0	0	0	0	0	0	0
6.29	SURFACE WATER MONITORING	GF	350	350	0	0	0	0	0	0	0	0	0
6.30	WET & WAST STACK MONITORING IMPROVEMENTS	GF	700	700	0	0	0	0	0	0	0	0	0
6.32	3020 STACK MONITORING IMPROVEMENTS	GF	750	750	0	0	0	0	0	0	0	0	0
6.34	WASTE OPERATIONS CONTROL CENTER EXPANSION	GF	200	200	0	0	0	0	0	0	0	0	0
6.35	METEOROLOGICAL TOWER SYSTEM UPGRADE	GF	1000	1000	0	0	0	0	0	0	0	0	0
6.37	O&M GROUNDWATER CHARACTERIZATION	GF	250	250	0	0	0	0	0	0	0	0	0
6.38	SNVA 6 MONITORING STATION	GF	1000	1000	0	0	0	0	0	0	0	0	0
FUNDING TOTALS:			9805	9805	2865	350	1700	2040	550	550	550	550	550

Table 6.6. Environmental Monitoring Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE	AMOUNT	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND
6.00	ENVIRONMENTAL MONITORING PROGRAM	EXP	8924	8924	562	400	350	730	720	720	720	720	3600
6.33	GROUNDWATER MONITORING WELLS, PHASE III	EXP	735	735	0	0	0	0	0	0	0	0	0
6.36	MELTON VALLEY HYDRAULIC HEAD MEASURING STATIONS	EXP	1100	1100	0	0	0	0	0	0	0	0	0
6.37	O&M GROUNDWATER CHARACTERIZATION	EXP	450	450	0	0	450	0	0	0	0	0	0
FUNDING TOTALS:			11209	11209	562	400	1000	730	720	720	720	720	3600

Table 6.7. Environmental Monitoring Program funding summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$M1000)					FY-93	FY-94	FY-95	BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92				
AT	Capital-GPP	2000	2000	0	0	0	0	0	0	0	0
	Subtotal	2000	2000	0	0	0	0	0	0	0	0
GF	Capital-GPP	1750	500	0	1000	250	0	0	0	0	0
	Expense	1550	0	300	0	450	200	200	200	200	0
	Subtotal	3300	500	300	1000	700	200	200	200	200	0
KG	Capital-CF	440	50	0	0	140	50	50	50	50	50
	Capital-GPP	5615	415	350	700	1650	500	500	500	500	500
KG	Expense	9659	932	1297	400	550	720	720	720	720	3600
	Subtotal	15714	1397	1647	1100	2340	1270	1270	1270	1270	4150
Program Totals	Capital	9805	2965	350	1700	2040	550	550	550	550	550
	Expense	11209	932	1597	400	1000	920	920	920	920	3600
Grand Total		21014	3897	1947	2100	3040	1470	1470	1470	1470	4150

7. ENVIRONMENTAL AND WASTE MANAGEMENT PROGRAM SUMMARY

ORNL ENVIRONMENTAL PROGRAM SUMMARY

Tables 7.1 through 7.17 provide information on annual costs and projected funding beyond FY 1988, as well as TECs, for each of the six WBS elements around which the ORNL environmental and waste management activities are organized. Within a given WBS element, the initial table (e.g., Table 7.1 for WBS 1.0, Comprehensive Environmental Management Program) summarizes total annual costs or projected funding and indicates the type of funds (expense or capital) as well as the known or proposed funding source. The ORNL environmentally associated general plant projects funded prior to FY 1988 are shown in Table 7.18, and the line-item projects are listed by funding source in Table 7.19. Tables 7.20 through 7.27 separate the projects by Multi-Program Environmental (KG), Waste Management (GF), Magnetic Fusion (AT), and Remedial Action (AH) funding sources. Table 7.28 shows the Environmental and Waste Management Program by funding type, with accumulative totals. Total program budget summary by WBS category is provided in Table 7.29, and Environmental Program summaries are provided in Tables 7.30 through 7.32.

Budget categories have been addressed for support from the DOE Office of Energy Research (KG or AT funds), the Office of Defense Waste and By-products Management (GF funds), and the Office of Nuclear Energy (AH funds). The current split of anticipated funding by program category is given in Fig. 7.1 for the total program commitments. The current split of anticipated funding by program category is given in Figs. 7.2 and 7.3 for the total capital and expense program commitments. Figure 7.4 shows annual capital funding for the period FY 1988 through FY 1995 for the funding categories KG, AT, and GF as well as total capital funding. Total capital funding increases from \$20 million in FY 1988 to \$92 million in FY 1994.

Figure 7.5 shows annual expense funding for the period FY 1988 through FY 1995 for the funding categories KG, GF, and AH as well as total expense funding in each year. Total expense funding increases from \$34.5 million in FY 1988 to \$163.7 million in FY 1993.

Figure 7.6 highlights the total program funding for the period FY 1988 through FY 1995. Total funding increases from \$54.5 million in FY 1988 to \$232.7 million in FY 1994.

Table 7.1. Environmental management systems project summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)								BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
GF	Expense	4951	0	300	600	551	300	400	400	400	2000
	Subtotal	4951	0	300	600	551	300	400	400	400	2000
KG	Expense	4726	907	269	250	330	330	330	330	330	1650
	Subtotal	4726	907	269	250	330	330	330	330	330	1650
Program Totals	Capital	0	0	0	0	0	0	0	0	0	0
	Expense	9677	907	569	850	881	630	730	730	730	3650
Grand Total		9677	907	569	850	881	630	730	730	730	3650

Table 7.2. Environmental management systems project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FUNDING (\$x1000)								BEYOND FY-95
		TYPE	SOURCE		FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
1.00	ORNL COMPREHENSIVE ENVIRONMENTAL MANAGEMENT	EXP	GF	4951	0	300	600	551	300	400	400	400	2000
1.00	ORNL COMPREHENSIVE ENVIRONMENTAL MANAGEMENT	EXP	KG	4726	907	269	250	330	330	330	330	330	1650
FUNDING TOTALS:				9677	907	569	850	881	630	730	730	730	3650

Table 7.3. Air Pollution Control Program project summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)							BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95
GF	Capital-GPP	3868	630	0	0	538	1400	1300	0	0
	Expense	73	73	0	0	0	0	0	0	0
	Subtotal	3941	703	0	0	538	1400	1300	0	0
KG	Capital-CX	468	30	63	225	0	30	30	30	30
	Capital-GPP	3000	450	0	550	0	0	500	500	500
KG	Expense	4228	378	250	410	340	400	350	300	1500
	Subtotal	7696	858	313	1185	340	430	880	830	2030
Program Totals	Capital	7336	1110	63	775	538	1430	1830	530	530
	Expense	4301	451	250	410	340	400	350	300	1500
	Grand Total	11637	1561	313	1185	878	1830	2180	830	2030

Table 7.4. Air Pollution Control Program project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$M1000)										BEYOND	
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	FY-97	FY-98
2.00	AIR POLLUTION CONTROL PROGRAM	GPP	KG	2000	0	0	0	0	0	500	500	500	500	500	500
2.00	AIR POLLUTION CONTROL PROGRAM	CE	KG	468	30	63	225	0	30	30	30	30	30	30	30
2.05	VENTILATION SYSTEM UPGRADE	GPP	GF	1300	0	0	0	0	0	1300	0	0	0	0	0
2.07	UPGRADE 3047 FILTER HOUSE	GPP	GF	1400	0	0	0	0	1400	0	0	0	0	0	0
2.08	UPGRADE CALL FILTRATION. 3517	GPP	GF	630	630	0	0	0	0	0	0	0	0	0	0
2.09	UPGRADE 7913 FILTER PITS	GPP	KG	450	450	0	0	0	0	0	0	0	0	0	0
2.12	UPGRADE STACK FANS 3039	GPP	KG	550	0	0	550	0	0	0	0	0	0	0	0
2.26	GASEOUS/LIQUID WASTE SUPPORT FACILITY	GPP	GF	538	0	0	0	538	0	0	0	0	0	0	0
FUNDING TOTALS:				7336	1110	63	775	538	1430	1830	530	530	530	530	530

Table 7.5. Air Pollution Control Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$M1000)										BEYOND	
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	FY-97	FY-98
2.00	AIR POLLUTION CONTROL	EXP	GF	73	73	0	0	0	0	0	0	0	0	0	0
2.00	AIR POLLUTION CONTROL	EXP	KG	4228	378	250	410	340	400	350	300	300	300	1500	1500
FUNDING TOTALS:				4301	451	250	410	340	400	350	300	300	300	1500	1500

Table 7.6. Water Pollution Control Program project summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)					FY-93	FY-94	FY-95	BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92				
AF	Capital-LIP	31000	0	0	0	6500	12800	8400	3300	0	0
	Expense	7000	0	0	0	0	3500	3500	0	0	0
	Subtotal	38000	0	0	0	6500	16300	11900	3300	0	0
AT	Capital-GPP	3075	450	0	0	0	625	500	500	500	500
	Subtotal	3075	450	0	0	0	625	500	500	500	500
GF	Capital-CE	3334	589	270	500	500	400	450	450	275	0
	Capital-GPP	3993	1593	1302	1100	0	0	0	0	0	0
	Expense	80861	6789	3092	5880	6700	6700	6700	6600	6600	31800
	Subtotal	88188	8971	4662	7480	7200	7100	7150	6950	6875	31800
KG	Capital-LIP	98313	11800	12900	10500	7913	6000	17000	22100	10100	0
	Capital-CE	720	80	50	30	160	80	80	80	80	80
	Capital-GPP	18850	300	1550	800	500	4700	3500	3500	2500	1500
KG	Expense	52586	3078	2473	4175	5860	6000	4000	4000	4000	19000
	Subtotal	170469	15358	16973	15505	14433	16780	24380	29680	16680	20380
Program Totals	Capital	159285	14818	16070	12930	13573	24603	29930	29930	13435	3080
	Expense	140447	9867	5565	10055	12560	16200	14200	10600	10600	50800
	Grand Total	299732	24679	21635	22985	28133	40805	44130	40430	24055	52880

Table 7.7. Water Pollution Control Program Project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE SOURCE	FUNDING (\$1000)										BEYOND FY-95
			TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
3.00	WATER POLLUTION CONTROL PROGRAM	GPP AT	2000	0	0	0	0	0	500	500	500	500	0
3.00	WATER POLLUTION CONTROL PROGRAM	CE GF	3334	509	270	500	500	400	450	350	275	0	0
3.00	WATER POLLUTION CONTROL PROGRAM	GPP KG	6500	0	0	0	0	500	1500	1500	1500	1800	0
3.00	WATER POLLUTION CONTROL PROGRAM	CE KG	720	80	50	30	160	80	80	80	80	80	0
3.08	VOLUME REDUCTION PIPING	GPP GF	1000	1200	0	0	0	0	0	0	0	0	0
3.21	MODIFICATIONS, ORNL	LIP KG	8113	7000	1113	0	0	0	0	0	0	0	0
3.30	WASTEWATER PIPING REPLACEMENT	GPP KG	300	300	0	0	0	0	0	0	0	0	0
3.32	WASTEWATER/STORM DRAIN ISOLATION	GPP AT	450	450	0	0	0	0	0	0	0	0	0
3.37	SEWER VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	LIP KG	35000	4800	11787	10500	7513	0	0	0	0	0	0
3.38	PROCESS WASTE TREATMENT PLANT (PHTP) PROCESS IMPROVEMENTS	GPP GF	1100	0	0	1100	0	0	0	0	0	0	0
3.41	GROUNDWATER TREATMENT FACILITY	GPP KG	1000	0	0	0	0	1000	0	0	0	0	0
3.44	ISOTOPES AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	LIP AT	31000	0	0	0	6500	12800	8400	3300	0	0	0
3.45	MILTON VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	LIP KG	35000	0	0	0	0	6000	12000	12000	5000	0	0
3.50	MANHOLE MONITORS - PROCESS WASTE	GPP GF	300	0	300	0	0	0	0	0	0	0	0
3.59	WEST ADDITION TO BUILDING 3544	GPP GF	593	593	0	0	0	0	0	0	0	0	0
3.76	ORNL PLANT DECONTAMINATION FACILITY	LIP KG	20200	0	0	0	0	0	5000	10100	5100	0	0
3.77	EQUIPMENT DECONTAMINATION FACILITY	GPP KG	1000	0	0	0	0	1000	0	0	0	0	0
3.78	BUILDING 3544 ION EXCHANGE/EVAPORATOR ROOM UPGRADE	GPP GF	1000	0	1000	0	0	0	0	0	0	0	0
3.79	BSR/ORR LLW UPGRADE	GPP KG	1000	0	1000	0	0	0	0	0	0	0	0
3.80	CLEAN WATER ACT COMPLIANCE PROJECT	GPP KG	550	0	550	0	0	0	0	0	0	0	0
3.81	GRAPHITE REACTOR CANAL LLW STORAGE AND TRANSFER	GPP KG	500	0	0	0	500	0	0	0	0	0	0
3.82	COAL YARD RUNOFF IMPROVEMENTS. BUILDING 3545 AND 3644	GPP AT	500	0	0	0	0	500	0	0	0	0	0
3.85	NEW LINERS IN THE SECONDARY SEWAGE TREATMENT PONDS	GPP KG	800	0	0	800	0	0	0	0	0	0	0
3.86	REPLACE 25,000 GALLON FUEL OIL TANK AT 7600 AREA	GPP AT	125	0	0	0	0	125	0	0	0	0	0
3.91	UNDERGROUND STORAGE TANKS (UST) INSTALLED AFTER 1965	GPP KG	7200	0	0	0	0	2200	2000	2000	1000	0	0
FUNDING TOTALS:			159285	14812	16070	12930	15373	24605	39930	29830	13455	2080	0

Table 7.2. Water Pollution Control Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE SOURCE	TOTAL	FUNDING (\$1000)										BEYOND FY-95
				FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	FY-97	
3.00	WATER POLLUTION CONTROL PROGRAM	EXP GF	80861	6789	3092	5880	6700	6700	6700	6600	6600	6600	6600	31800
3.00	WATER POLLUTION CONTROL PROGRAM	EXP KG	45266	3058	1973	2973	3210	3650	3800	3800	3800	3800	3800	19000
3.37	BETHEL VALLEY LIQUID LLN COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP KG	300	0	100	100	100	0	0	0	0	0	0	0
3.44	ISOTOPE AREA LIQUID LLN COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP AF	7000	0	0	0	0	3500	3500	0	0	0	0	0
3.44	ISOTOPE AREA LIQUID LLN COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP KG	600	0	0	600	0	0	0	0	0	0	0	0
3.45	WELTON VALLEY LIQUID LLN COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP KG	1300	0	300	300	300	100	100	100	100	100	100	0
3.54	ENGINEERING EVALUATION OF COAL YARD REMOVAL TREATMENT FACILITY	EXP KG	20	20	0	0	0	0	0	0	0	0	0	0
3.76	ORNL PLANT DECONTAMINATION FACILITY	EXP KG	1100	0	100	200	230	230	100	100	100	100	100	0
3.91	UNDERGROUND STORAGE TANKS (UST) INSTALLED AFTER 1965	EXP KG	4000	0	0	0	2000	2000	0	0	0	0	0	0
FUNDING TOTALS:			140447	9867	5563	10035	12360	14300	14200	10600	10600	10600	10600	50800

Table 7.10. Solid Waste Management Program Project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE SOURCE	TOTAL	FUNDING (\$M1000)										BEYOND FY-95
				FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95			
4.00	SOLID WASTE MANAGEMENT PROGRAM	GPP AT	5200	0	0	0	0	1000	1000	1000	1000	1200		
4.00	SOLID WASTE MANAGEMENT PROGRAM	GPP OF	13100	0	0	0	0	400	2200	3500	3500	3500		
4.00	SOLID WASTE MANAGEMENT PROGRAM	CE OF	7705	0	498	507	900	725	725	725	725	2903		
4.00	SOLID WASTE MANAGEMENT PROGRAM	GPP KG	4600	0	0	0	0	600	1000	1000	1000	1000		
4.00	SOLID WASTE MANAGEMENT PROGRAM	CE KG	519	40	34	145	106	40	40	40	40	40		
4.01	GAS CYLINDER RECONTAINERIZATION FACILITY	GPP KG	750	0	0	0	0	750	0	0	0	0		
4.12	REMOTE-HANDLED TRANSURANIC (RM TRU) WASTE STORAGE BUNKER	GPP OF	1100	0	0	1100	0	0	0	0	0	0		
4.13	WASTE HANDLING AND PACKAGING PLANT (WHPP)	LIP OF	130000	0	0	0	0	30000	28000	50000	25000	10000		
4.13	WASTE HANDLING AND PACKAGING PLANT (WHPP)	CE OF	1650	693	215	150	250	250	163	0	0	0		
4.21	EXPAND MIXED WASTE STORAGE CAPACITY	GPP KG	450	0	450	0	0	0	0	0	0	0		
4.29	SWSA 6 IMPROVEMENTS	GPP OF	300	0	250	120	0	0	0	0	0	0		
4.30	UPGRADE BUILDING 7507 MIXED WASTE	GPP KG	150	0	0	150	0	0	0	0	0	0		
4.31	BULK MIXED WASTE STORAGE FACILITY	GPP KG	900	0	0	0	900	0	0	0	0	0		
4.33	INTERIM WASTE MANAGEMENT FACILITIES (IWMF), ORNL	GPP OF	1100	0	1100	0	0	0	0	0	0	0		
4.37	CLASS III & IV RETRIEVABLE STORAGE FACILITIES	GPP KG	1000	0	0	150	250	0	0	0	0	0		
4.38	CERTIFICATION AND SEGREGATION FOR (IWMF) INTERIM WASTE MANAGEMENT FACILITY	GPP KG	1000	0	0	0	0	1000	0	0	0	0		
4.39	CONTACT-HANDLED TRANSURANIC (CH-TRU) REPACKAGING FACILITY	GPP OF	1000	0	0	0	1000	0	0	0	0	0		
4.40	SWSA 6 STAGING AREA UPGRADE	GPP OF	900	0	0	900	0	0	0	0	0	0		
4.42	EVAPORATOR COOLING TOWER CHEMICAL ADDITION SHED	GPP OF	50	50	0	0	0	0	0	0	0	0		
4.43	PCB-HAZARDOUS WASTE STORAGE, BUILDING 7652	GPP KG	100	0	100	0	0	0	0	0	0	0		
4.44	UNDERGROUND STORAGE BUILDING UPGRADE	GPP OF	150	0	0	0	150	0	0	0	0	0		
4.47	SLUDGE VOLUME REDUCTION FACILITY	GPP KG	900	0	0	0	0	900	0	0	0	0		
4.48	WASTE CHARACTERIZATION AND CERTIFICATION FACILITY	LIP KG	8000	0	0	0	0	0	3000	5000	0	0		
4.50	UNDERGROUND STORAGE TANKS OLDER THAN 25 YEARS	GPP KG	2300	0	0	0	1450	850	0	0	0	0		
FUNDING TOTALS:			183020	783	2647	3240	5600	35315	33065	61265	31265	18640		

Table 7.11. Solid Waste Management Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND FY-95
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
4 00	SOLID WASTE MANAGEMENT PROGRAM	EXP	GF	33093	1693	2470	2700	3740	4065	4310	3520	3720	6875	
4 00	SOLID WASTE MANAGEMENT PROGRAM	EXP	KG	16762	421	856	1045	1270	1500	1500	1450	1450	7250	
4 13	WASTE HANDLING AND PACKAGING PLANT (WHP)	EXP	GF	11110	1027	2824	1534	1300	1125	1100	800	600	0	
4 48	WASTE CHARACTERIZATION AND CERTIFICATION FACILITY	EXP	KG	300	0	0	75	125	100	0	0	0	0	
4 50	UNDERGROUND STORAGE TANKS OLDER THAN 25 YEARS	EXP	KG	1660	0	0	660	750	250	0	0	0	0	
FUNDING TOTALS:				62925	3941	4150	6034	7185	7040	6910	5770	5770	14125	

Table 7.12. Remedial Action Program project summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$x1000)								BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
AK	Capital-CR	100	75	0	0	25	0	0	0	0	0
AK	Expense	59048	963	575	1095	2470	745	2520	3060	2645	44975
	Subtotal	59148	1038	575	1095	2495	745	2520	3060	2645	44975
GF	Capital-CR	50	0	0	0	0	0	50	0	0	0
GF	Expense	1071466	9548	17045	53227	60077	111875	132850	113035	66240	507569
	Subtotal	1071516	9548	17045	53227	60077	111875	132900	113035	66240	507569
KG	Capital-CR	358	200	158	0	0	0	0	0	0	0
KG	Expense	350932	7927	4110	4610	4860	4420	5250	6105	8570	305080
	Subtotal	351290	8127	4268	4610	4860	4420	5250	6105	8570	305080
Program Totals	Capital	508	275	158	0	25	0	50	0	0	0
	Expense	1481446	18438	21730	58932	67407	117040	140620	122200	77455	857624
	Grand Total	1481954	18713	21888	58932	67432	117040	140670	122200	77455	857624

Table 7.13. Remedial Action Program project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FY-88	FY-89	FUNDING (\$M1000)						BEYOND FY-95
		TYPE	SOURCE				FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
S 08	REMEDIAL ACTION EQUIPMENT	CE	AM	100	75	0	0	25	0	0	0	0	0
S 08	REMEDIAL ACTION EQUIPMENT	CE	GF	50	0	0	0	0	0	50	0	0	0
S 08	REMEDIAL ACTION EQUIPMENT	CE	KG	358	200	158	0	0	0	0	0	0	0
FUNDING TOTALS:				508	275	158	0	25	0	50	0	0	0

Table 7.14. Remedial Action Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		TOTAL	FY-88	FY-89	FUNDING (\$M1000)						BEYOND FY-95
		TYPE	SOURCE				FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
S 01	PRELIMINARY ASSESSMENT AND SITE INVESTIGATION	EXP	GF	15090	45	1060	638	2895	2280	2060	1975	1740	2400
S 01	PRELIMINARY ASSESSMENT AND SITE INVESTIGATION	EXP	KG	11825	3150	1925	2115	430	340	310	295	260	3000
S 02	MAINTENANCE AND SURVEILLANCE	EXP	AM	45192	857	215	285	185	195	205	0	0	43250
S 02	MAINTENANCE AND SURVEILLANCE	EXP	GF	55632	3197	4205	4615	4615	4485	4480	4355	4280	21400
S 02	MAINTENANCE AND SURVEILLANCE	EXP	KG	7236	331	735	610	530	530	590	530	530	2860
S 03	REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY	EXP	AM	106	106	0	0	0	0	0	0	0	0
S 03	REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY	EXP	GF	212183	5629	4640	29735	26179	22000	27000	28000	25000	44000
S 03	REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDY	EXP	KG	17565	3130	1000	1075	2750	320	2000	2630	2330	2320
S 04	REMEDIAL ACTION TECHNOLOGY DEMONSTRATIONS	EXP	GF	11643	0	1175	4550	1750	1200	800	550	450	1168
S 04	REMEDIAL ACTION TECHNOLOGY DEMONSTRATIONS	EXP	KG	2479	329	0	0	0	1550	350	150	100	0
S 05	CORRECTIVE MEASURES	EXP	GF	723685	0	5135	12200	23050	80900	94600	70100	20100	407600
S 05	CORRECTIVE MEASURES	EXP	KG	255400	0	0	0	0	1100	1400	1900	3400	247600
S 06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	AM	13750	0	360	810	2285	550	2315	3060	2645	1725
S 06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	GF	53233	677	830	1492	1588	1010	3910	8055	4670	31001
S 06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	KG	54942	52	400	710	760	570	600	600	1950	49300
S 07	REMEDIAL ACTION PROGRAM SUPPORT	EXP	KG	925	935	0	0	0	0	0	0	0	0
S 09	ORAW FACILITIES	EXP	KG	550	0	50	100	400	0	0	0	0	0
FUNDING TOTALS:				1481446	18438	21730	58922	67407	117040	140620	122200	77455	857624

Table 7.15. Environmental Monitoring Program project summary

FUNDING SOURCE	TYPE FUNDING	TOTAL	FUNDING (\$M1000)								BEYOND FY-95
			FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	
AT	Capital-GPP	2000	2000	0	0	0	0	0	0	0	0
	Subtotal	2000	2000	0	0	0	0	0	0	0	0
GF	Capital-GPP	1750	500	0	1000	250	0	0	0	0	0
GF	Expense	1550	0	300	0	450	200	200	200	200	0
	Subtotal	3300	500	300	1000	700	200	200	200	200	0
KG	Capital-CR	440	30	0	0	140	50	50	50	50	50
KG	Capital-GPP	5615	415	350	700	1650	500	500	500	500	500
KG	Expense	9659	932	1297	400	550	720	720	720	720	3600
	Subtotal	15714	1397	1647	1100	2340	1270	1270	1270	1270	4150
Program Totals	Capital	9805	2965	350	1700	2040	550	550	550	550	550
	Expense	11209	932	1597	400	1000	920	920	920	920	3600
	Grand Total	21014	3897	1947	2100	3040	1470	1470	1470	1470	4150

Table 7.16. Environmental Monitoring Program project summary—capital funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE SOURCE	FUNDING (\$M1000)						BEYOND FY-95
			TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	
6.00	ENVIRONMENTAL MONITORING PROGRAM	GPP KG	2000	0	0	0	0	500	500
6.00	ENVIRONMENTAL MONITORING PROGRAM	CE KG	440	50	0	0	140	50	50
6.22	GROUNDWATER MONITORING NETWORK. PHASE II	GPP GF	500	500	0	0	0	0	0
6.24	STACK MONITORING IMPROVEMENTS	GPP AT	1000	1000	0	0	0	0	0
6.25	REGULATORY COMPLIANCE MONITORING WELLS. PHASE III	GPP AT	1000	1000	0	0	0	0	0
6.26	IMPROVEMENTS TO ORNL PLANT	GPP KG	700	0	0	700	0	0	0
6.28	PERIMETER AIR MONITORS IMPROVEMENTS TO LOCAL AIR MONITORS	GPP KG	500	0	0	0	500	0	0
6.29	SURFACE WATER MONITORING IMPROVEMENTS	GPP KG	415	415	0	0	0	0	0
6.30	WVF & WUST STACK MONITORING IMPROVEMENTS	GPP KG	700	0	0	0	700	0	0
6.32	3020 STACK MONITORING IMPROVEMENTS	GPP KG	350	0	350	0	0	0	0
6.34	WASTE OPERATIONS CONTROL CENTER EXPANSION	GPP KG	750	0	0	0	750	0	0
6.35	METEOROLOGICAL TOWER SYSTEM UPGRADE	GPP KG	200	0	0	0	200	0	0
6.37	ORNL GROUNDWATER CHARACTERIZATION	GPP GF	1000	0	0	1000	0	0	0
6.38	SN5A 6 MONITORING STATION	GPP GF	250	0	0	0	250	0	0
FUNDING TOTALS:			9805	3965	350	1700	2040	550	550

Table 7.17. Environmental Monitoring Program project summary—expense funding

PROJECT NUMBER	PROJECT TITLE	FUNDING TYPE SOURCE	FUNDING (\$M1000)						BEYOND FY-95
			TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	
6.00	ENVIRONMENTAL MONITORING PROGRAM	EXP KG	8924	932	562	400	550	720	720
6.33	GROUNDWATER MONITORING WELLS. PHASE III	EXP KG	735	0	735	0	0	0	0
6.36	MELTON VALLEY HYDRAULIC HEAD MEASURING STATIONS	EXP GF	1100	0	300	0	0	200	200
6.37	ORNL GROUNDWATER CHARACTERIZATION	EXP GF	450	0	0	0	450	0	0
FUNDING TOTALS:			11209	932	1597	400	1000	920	920

Table 7.18. Prior-year general plant projects

Project title	Funding source	Funding year	Total estimated cost (\$ × 1000)
Core Storage Shed	AR	FY 82	57 ^a
Containment Tower Panels at New Hydrofracture Facility (NHF)	AR	FY 82	73 ^a
Shielding at Melton Valley Storage	AR	FY 82	26 ^a
NHF Ventilation Mods	AR	FY 82	62 ^a
Volume Reduction Facility, B-7934	AR	FY 82	488 ^a
Hazardous Waste Storage Facility	AT	FY 82	391 ^a
NHF Bedrock Elevator Indicator System	AR	FY 83	69 ^a
Process Waste Treatment Plant (PWTP)	AR	FY 83	46 ^a
High Flux Isotope Reactor Pond			
Sparging System	AR	FY 83	1 ^b
Upgrade Electrical System for NHF Area	AR	FY 83	0 ^b
Ish Creek Monitoring Station	AR	FY 83	84 ^a
Corrective Action, Solid Waste Storage Area (SWSA) 4	AR	FY 83	229 ^a
Deep Monitoring Wells	AR	FY 83	239 ^a
Building Equipment Storage SW of SWSA 4	AR	FY 83	0 ^b
Melton Valley Piping Mods	AR	FY 83	300 ^a
Central Intermediate-Level Waste (ILW)			
Collection	AR	FY 83	1070
Concrete Storage Pad	AR	FY 84	14 ^a
PWTP Improvements	AR	FY 84	34 ^a
Drainage Control, SWSA 4	AR	FY 84	0 ^b
Fence Enclosure, White Oak Creek	AT	FY 84	57 ^a
Polychlorinated Biphenyl (PCB) Storage Facility, 2018	AT	FY 84	27 ^a
Sewer System Inflow/Infiltration Reduction	AT	FY 84	236 ^a
Cell Ventilation Improvements, 3517	AR	FY 84	1081 ^a
Coal Yard Runoff Treatment System, 2536	AT	FY 84	605 ^a
Isotope Separation Facility Wastewater			
Collection System, 9204-3	AT	FY 84	153 ^a
Low Level Waste Collection, 3517	AR	FY 84	535 ^a
Liquid Low Level Waste Collection System, 3017	AR	FY 84	82 ^a
Specimen Preparation and Test Laboratory, 3013	AR	FY 84	72 ^a
NPDES Monitors at Y-12	AT	FY 84	113 ^a
Hydrostatic Head Measuring Stations, Trench Areas	AR	FY 84	215 ^a
Biology Area Wastewater Isolations	AT	FY 84	750 ^a
Chemical Waste Storage Facility, 7653	AT	FY 84	360 ^a
Water Quality Monitors	AT	FY 84	225 ^b
Secondary Containment and Contamination Control, 3019	AT	FY 85	75 ^a
Cask Tool Storage	AT	FY 85	100 ^a
1505 Area Transfer Piping	AT	FY 85	97 ^b
Sewer System Inflow and Infiltration, Phase II	AT	FY 85	593 ^a

Table 7.18 (continued)

Project title	Funding source	Funding year	Total estimated cost (\$ × 1000)
Replacement of PCB Transformers, Phase I	AT	FY 85	148 ^a
Hydrostatic Head Measuring Station, SWSA 6	AR	FY 85	263 ^a
New NPDES Monitors, Design	AT	FY 85	24 ^a
Groundwater Monitoring Network, Phase I	AT	FY 85	167 ^a
Prefilter and Drain System, Bldg. 3517	AR	FY 85	420 ^a
2000 Area Transfer Piping	AT	FY 85	200 ^a
Liquid Waste System, West End Area 3019	AT	FY 85	750 ^a
Biology Area Wastewater Collection System	AT	FY 85	500 ^a
Long-Term Hazardous Waste Storage Facility, 7654	AT	FY 85	361 ^a
Environmental Monitoring Systems Upgrade, Phase I	KG	FY 85	3406 ^a
Sump Oil Separation Facility, Y-12	AT	FY 86	100 ^a
Clarifier Installation, PWTP	AR	FY 86	24 ^a
Explosive & Shock Sensitive Waste Detonation Facility	AT	FY 86	100 ^a
Replacement of PCB Transformers, Phase II	KG	FY 86	659 ^a
Monitoring Equipment Storage Shed	KG	FY 86	87 ^a
Process Waste System Inflow/Infiltration	AT	FY 86	750 ^a
Process Waste Monitoring System	AR	FY 86	500 ^a
Biology Area Process Waste Volume Reduction	KG	FY 86	270 ^a
Liquid Waste Metals Monitoring System	KG	FY 86	350 ^a
Process Waste Collection System 3000 Area	KG	FY 86	700 ^a
Storm Drain Rehabilitation	AR	FY 86	119 ^a
LLW Solidification Facility	AR	FY 86	830 ^a
Shielded TRU Waste Storage Facility (WELLS)	AR	FY 86	4 ^b
Equipment Cleaning Facility	KG	FY 86	350 ^a
Environmental Emergency Response Facility	KG	FY 86	350 ^a
SWSA 6 Staging Area	AR	FY 86	145 ^a
Hydrostatic Head Measuring Station, SWSA 4	AR	FY 86	438 ^a
Regulatory Compliance Monitoring Wells, Phase I	KG	FY 86	849 ^a
Tritium Removal Cost-Benefit Study	KG	FY 87	90 ^a
Methods of Repair of 3039 Ventilation Ducts	KG	FY 87	100 ^a
Stack and Vent Survey	KG	FY 87	135 ^a
Stack Flow Profile Measurements	KG	FY 87	25 ^a
WC-10 Pump Pit Replacement	KG	FY 87	575 ^a
Waste Operations Control Center Data Acquisition Upgrade	KG	FY 87	130 ^a
LLLW MVST Decant System	AR	FY 87	510 ^a
Replacement of PCB Capacitors	KG	FY 87	33 ^a
Upgrade 7500 Bridge Monitoring Station	KG	FY 87	245 ^a
Install Emergency Generator, 7025	AR	FY 87	27 ^a
Engineering Evaluation of Coal Yard Runoff Treatment Facility	KG	FY 88	20 ^a
Evaporator Cooling Tower Chemical Addition Shed	GF	FY 88	50 ^a

^aCompleted.^bCancelled.

Table 7.19. ORNL environmental line item projects

Project	Funding source	Cost (\$ × 1000)									
		Before FY 88	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	Beyond FY 95
Environmental Monitoring System Upgrade, Phase I	KG	3,406									
Nonradiological Wastewater Treatment Project	KG	9,887	7,000	1,113							
Bothel Valley Liquid Low-Level Waste (LLLW) Collection and Transfer System Upgrade	KG		4,800	11,787	10,500	7,913					
Isotopes Area LLLW Collection and Transfer System Upgrade	AF					6,500	12,800	8,400	3,300		
Waste Handling and Packaging Plant (WHPP)	GF						20,000	25,000	50,000	25,000	10,000
Melton Valley LLLW Collection and Transfer System Upgrade	KG						6,000	12,000	12,000	5,000	
ORNL Decontamination Facility	KG							5,000	10,100	5,100	
Waste Characterization and Certification Facility	KG							3,000	5,000		
Radioactive Waste Facilities Improvements	AR	22,236									
Total		35,529	11,800	12,900	10,500	14,413	38,800	53,400	80,400	35,100	10,000

Table 7.28. Multiprogram environmental (KG) estimated cost summary
(thousands of dollars)

Funding type	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
1.0 Comprehensive Environmental Management	907	269	250	330	330	330
2.0 Air Pollution Control	378	250	410	340	400	350
3.0 Water Pollution Control	3,378	2,473	4,175	5,860	6,000	4,000
4.0 Solid Waste Management	421	856	1,800	2,145	1,850	1,500
5.0 Remedial Action	7,927	4,110	4,610	4,860	4,420	5,250
6.0 Environmental Monitoring	932	1,297	400	550	720	720
Total KG expenses	13,643	9,255	11,645	14,085	13,720	12,150
GPP	1,165	2,450	2,350	5,350	9,300	5,500
CE	400	305	400	400	200	200
Line items						
Nonradiological waste-water treatment project	7,000	1,113				
Bethel Valley LLLW collection and transfer system upgrade, ORNL	4,800	11,787	10,500	7,913		
Melton Valley LLLW collection and transfer system upgrade, ORNL					6,000	12,000
ORNL Decontamination Facility						5,000
Waste Characterization and Certification Facility						3,000
Line items total	11,800	12,900	10,500	7,913	6,000	20,000
KG total	27,008	24,910	24,895	27,748	29,220	37,850

Table 7.21. Interim waste operations program
(thousands of dollars)

Funding type	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
Expense	11,796	9,052	13,042	16,758	15,535	18,120
GPP	2,773	2,650	3,138	1,400	1,800	3,500
CE	1,033	720	1,107	1,600	1,350	1,250
Line items						
Waste Handling and Packaging Plant (WHPP)					20,000	25,000
Total	15,602	12,422	17,287	19,758	38,685	47,870

Table 7.22. Waste management (GF) estimated cost summary
(thousands of dollars)

Funding type	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
Expense	19,930	26,031	63,941	72,818	124,265	145,560
GPP	2,773	2,650	4,238	1,938	1,800	3,500
CE	1,282	983	1,157	1,650	1,375	1,325
Line items					20,000	25,000
Total	23,985	29,664	69,336	76,406	147,440	175,385

Table 7.23. Magnetic fusion (AT) and remedial action (AR) estimated cost summary
(thousands of dollars)

Funding type	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
Magnetic fusion						
GPP	2450				1625	1500
Total	2450				1625	1500
Remedial action						
Expense	963	575	1095	2470	745	2520
CE	75			25		
Total	1038	575	1095	2495	745	2520

Table 7.24. Multiprogram environmental (KG) funding by work-breakdown structure

Air Pollution Control Program Project Summary - Capital Funding													
PROJECT		FUNDING		FUNDING (\$x1000)									
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	BEYOND
2.00	AIR POLLUTION CONTROL PROGRAM	GPP	FG	2000	0	0	0	0	0	500	500	500	500
2.00	AIR POLLUTION CONTROL PROGRAM	CE	FG	468	30	63	225	0	30	30	30	30	50
2.09	UPGRADE 7913 FILTER PITS	GPP	FG	450	450	0	0	0	0	0	0	0	0
2.12	UPGRADE STACK FANS 3039	GPP	FG	550	0	0	550	0	0	0	0	0	0
FUNDING TOTALS:				3468	480	63	775	0	30	530	530	530	530

Table 7.24 (continued)

Water Pollution Control Program Project Summary - Capital Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$:1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
3.00	WATER POLLUTION CONTROL PROGRAM	GPP	KG	6500	0	0	0	0	500	1500	1500	1500	1500	
3.00	WATER POLLUTION CONTROL PROGRAM	CE	KG	720	80	50	30	160	80	80	80	80	80	
3.21	NON-RADIOLOGICAL WASTEWATER TREATMENT PROJECT	LIP	KG	8113	7000	1113	0	0	0	0	0	0	0	
3.30	WASTEWATER PIPING REPLACEMENT	GPP	KG	300	300	0	0	0	0	0	0	0	0	
3.37	BETHEL VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	LIP	KG	35000	4800	11787	10500	7913	0	0	0	0	0	
3.41	GROUNDWATER TREATMENT FACILITY	GPP	KG	1000	0	0	0	0	1000	0	0	0	0	
3.45	MELTON VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	LIP	KG	35000	0	0	0	0	6000	12000	12000	5000	0	
3.76	ORNL PLANT DECONTAMINATION FACILITY	LIP	KG	20200	0	0	0	0	0	5000	10100	5100	0	
3.77	EQUIPMENT DECONTAMINATION	GPP	KG	1000	0	0	0	0	1000	0	0	0	0	
3.79	BSR/URR LLW UPGRADE	GPP	KG	1000	0	1000	0	0	0	0	0	0	0	
3.80	CLEAN WATER ACT COMPLIANCE	GPP	KG	550	0	550	0	0	0	0	0	0	0	
3.81	PROJECT GRAPHITE REACTOR CANAL LLW	GPP	KG	500	0	0	0	500	0	0	0	0	0	
3.85	STORAGE AND TRANSFER NEW LINERS IN THE SECONDARY	GPP	KG	800	0	0	800	0	0	0	0	0	0	
3.91	SEWAGE TREATMENT PONDS UNDERGROUND STORAGE TANKS (UST) INSTALLED AFTER 1965	GPP	KG	7200	0	0	0	0	2200	2000	2000	1000	0	
FUNDING TOTALS:				117883	12180	14500	11330	8573	10780	20580	25680	12680	1580	

Table 7.24 (continued)

Solid Waste Management Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$1,000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
4.00	SOLID WASTE MANAGEMENT PROGRAM	GPP	FG	4600	0	0	0	0	600	1000	1000	1000	1000	
4.00	SOLID WASTE MANAGEMENT PROGRAM	CE	FG	519	40	34	145	100	40	40	40	40	40	
4.01	GAS CYLINDER RECONTAINERIZATION	GPP	FG	750	0	0	0	0	750	0	0	0	0	
4.21	FACILITY EXPAND MIXED WASTE STORAGE	GPP	FG	450	0	450	0	0	0	0	0	0	0	
4.30	CAPACITY UPGRADE BUILDING 7507 MIXED WASTE	GPP	FG	150	0	0	150	0	0	0	0	0	0	
4.31	BULK MIXED WASTE STORAGE FACILITY	UPP	FG	900	0	0	0	900	0	0	0	0	0	
4.37	CLASS III & IV RETREIVABLE	GPP	FG	1000	0	0	150	850	0	0	0	0	0	
4.38	STORAGE FACILITIES CERTIFICATION AND SEGREGATION FOR	GPP	KG	1000	0	0	0	0	1000	0	0	0	0	
4.43	(IWMF) INTERIM WASTE MANAGEMENT FACILITY PCB/HAZARDOUS WASTE STORAGE,	UPP	KG	100	0	100	0	0	0	0	0	0	0	
4.47	BUILDING 7452 SLUDGE VOLUME REDUCTION FACILITY	GPP	KG	900	0	0	0	0	900	0	0	0	0	
4.48	WASTE CHARACTERIZATION AND	LIP	FG	8000	0	0	0	0	0	3000	5000	0	0	
4.50	CERTIFICATION FACILITY UNDERGROUND STORAGE TANKS OLDER	GPP	KG	2300	0	0	0	1450	850	0	0	0	0	
	THAN 25 YEARS													
FUNDING TOTALS:				20669	40	584	445	3300	4140	4040	6040	1040	1040	

Table 7.24 (continued)

Remedial Action Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
5.08	REMEDIAL ACTION EQUIPMENT	CE	IG	358	200	158	0	0	0	0	0	0	0	
FUNDING TOTALS:				358	200	158	0	0	0	0	0	0	0	

Environmental Monitoring Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
6.00	ENVIRONMENTAL MONITORING PROGRAM	GPP	KG	2000	0	0	0	0	0	500	500	500	500	
6.00	ENVIRONMENTAL MONITORING PROGRAM	CE	KG	440	50	0	0	140	50	50	50	50	50	
6.26	IMPROVEMENTS TO ORNL PLANT	GPP	KG	700	0	0	700	0	0	0	0	0	0	
6.28	PERIMETER AIR MONITORS IMPROVEMENTS TO LOCAL AIR	GPP	KG	500	0	0	0	0	500	0	0	0	0	
6.29	MONITORS SURFACE WATER MONITORING	GPP	KG	415	415	0	0	0	0	0	0	0	0	
6.30	IMPROVEMENTS NHF & MVST STACK MONITORING	GPP	KG	700	0	0	0	700	0	0	0	0	0	
6.32	IMPROVEMENTS 3020 STACK MONITORING	GPP	KG	350	0	350	0	0	0	0	0	0	0	
6.34	IMPROVEMENTS WASTE OPERATIONS CONTROL CENTER	GPP	KG	750	0	0	0	750	0	0	0	0	0	
6.35	EXPANSION METEOROLOGICAL TOWER SYSTEM UPGRADE	GPP	KG	200	0	0	0	200	0	0	0	0	0	
FUNDING TOTALS:				6055	465	350	700	1790	550	550	550	550	550	

Table 7.24 (continued)

Comprehensive Environmental Management Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
1.00	UNCL. COMPREHENSIVE ENVIRONMENTAL MANAGEMENT	EXP	LG	4726	907	269	250	330	330	330	330	330	330	1650
FUNDING TOTALS:				4726	907	269	250	330	330	330	330	330	330	1650

Air Pollution Control Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
2.00	AIR POLLUTION CONTROL PROGRAM	EXP	KG	4228	378	250	410	340	400	350	300	300	300	1500
FUNDING TOTALS:				4228	378	250	410	340	400	350	300	300	300	1500

Table 7.24 (continued)

Water Pollution Control Program Project Summary - Expense Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
3.00	WATER POLLUTION CONTRL. PROGRAM	EXP	KG	45266	3058	1973	2975	3210	3650	3800	3800	3800	19000	
3.37	METHEL VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	KG	300	0	100	100	100	0	0	0	0	0	
3.44	ISOTOPES AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	KG	600	0	0	600	0	0	0	0	0	0	
3.45	MELTON VALLEY LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	KG	1300	0	300	300	300	100	100	100	100	0	
3.54	ENGINEERING EVALUATION OF COAL	EXP	KG	20	20	0	0	0	0	0	0	0	0	
3.76	YAND RUNOFF TREATMENT FACILITY URNL PLANT DECONTAMINATION	EXP	KG	1100	0	100	200	250	250	100	100	100	0	
3.91	FACILITY UNDERGROUND STORAGE TANKS (UST) INSTALLED AFTER 1965	EXP	KG	4000	0	0	0	2000	2000	0	0	0	0	
FUNDING TOTALS:				52586	3078	2473	4175	5860	6000	4000	4000	4000	19000	

Solid Waste Management Program Project Summary - Expense Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
4.00	SOLID WASTE MANAGEMENT PROGRAM	EXP	KG	16762	421	856	1065	1270	1500	1500	1450	1450	7250	
4.48	WASTE CHARACTERIZATION AND CERTIFICATION FACILITY	EXP	KG	300	0	0	75	125	100	0	0	0	0	
4.50	UNDERGROUND STORAGE TANKS OLDER THAN 25 YEARS	EXP	KG	1660	0	0	660	750	250	0	0	0	0	
FUNDING TOTALS:				18722	421	856	1800	2145	1850	1500	1450	1450	7250	

Table 7.24 (continued)

Remedial Action Program Project Summary - Expense Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
5.01	PRELIMINARY ASSESSMENT AND SITE	EXP	FG	11025	3150	1925	2115	430	340	310	295	260	3000	
5.02	INVESTIGATION MAINTENANCE AND SURVEILLANCE	EXP	FG	7236	331	732	610	520	510	590	530	530	2860	
5.03	REMEDIAL INVESTIGATIONS AND	EXP	FG	17565	3130	1000	1075	2750	330	2090	2630	2330	2320	
5.04	FEASIBILITY STUDY REMEDIAL ACTION TECHNOLOGY	EXP	FG	2479	329	0	0	0	1500	350	150	100	0	
5.05	DEMONSTRATIONS CORRECTIVE MEASURES	EXP	KG	255400	0	0	0	0	1100	1400	1900	3400	247600	
5.06	FACILITY DECOMMISSIONING OR	EXP	KG	54942	52	400	710	760	570	600	600	1950	49300	
5.07	CLOSURE REMEDIAL ACTION PROGRAM SUPPORT	EXP	KG	935	935	0	0	0	0	0	0	0	0	
5.09	ORAU FACILITIES	EXP	KG	550	0	50	100	100	0	0	0	0	0	
FUNDING TOTALS:				350932	7927	4110	4610	4860	4420	5280	6105	6570	305000	

Environmental Monitoring Program Project Summary - Expense Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
6.00	ENVIRONMENTAL MONITORING PROGRAM	EXP	KG	8924	932	562	400	500	720	720	720	720	3600	
6.33	GROUNDWATER MONITORING WELLS, PHASE III	EXP	KG	735	0	735	0	0	0	0	0	0	0	
FUNDING TOTALS:				9659	932	1297	400	500	720	720	720	720	3600	

Table 7.25. Waste management (GP) funding by work-breakdown structure

Water Pollution Control Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
2.05	VENTILATION SYSTEM UPGRADE	GPP	GF	1300	0	0	0	0	0	1300	0	0	0	
2.07	UPGRADE 3047 FILTER HOUSE	GPP	GF	1400	0	0	0	0	1400	0	0	0	0	
2.08	UPGRADE CELL FILTRATION, 3017	GPP	GF	630	630	0	0	0	0	0	0	0	0	
2.26	GASEOUS/LIQUID WASTE SUPPORT FACILITY	GPP	GF	538	0	0	0	538	0	0	0	0	0	
FUNDING TOTALS:				3868	630	0	0	538	1400	1300	0	0	0	

Water Pollution Control Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
3.00	WATER POLLUTION CONTROL PROGRAM	CE	GF	3334	589	270	500	500	400	450	350	275	0	
3.08	VOLUME REDUCTION PIPING	GPP	GF	1000	1000	0	0	0	0	0	0	0	0	
3.38	MODIFICATIONS, ORNL PROCESS WASTE TREATMENT PLANT	GPP	GF	1100	0	0	1100	0	0	0	0	0	0	
3.50	(PWTP) PROCESS IMPROVEMENTS	GPP	GF	300	0	300	0	0	0	0	0	0	0	
3.59	WAST ADDITION TO BUILDING 3544	GPP	GF	593	593	0	0	0	0	0	0	0	0	
3.78	BUILDING 3544 ION EXCHANGE/EVAPORATOR ROOM UPGRADE	GPP	GF	1000	0	1000	0	0	0	0	0	0	0	
FUNDING TOTALS:				7327	2182	1570	1600	500	400	450	350	275	0	

Table 7.25 (continued)

Solid Waste Management Program Project Summary - Capital Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
4.00	SOLID WASTE MANAGEMENT PROGRAM	GF	GF	13100	0	0	0	0	400	2200	3500	3500	3500	
4.00	SOLID WASTE MANAGEMENT PROGRAM	CE	GF	7705	0	498	507	900	725	725	725	725	2900	
4.12	REMOTE HANDLED TRANSURANIC (RH)	GPP	GF	1100	0	0	1100	0	0	0	0	0	0	
4.13	TRU WASTE STORAGE BUNKER WASTE HANDLING AND PACKAGING	LIP	GF	130000	0	0	0	0	20000	25000	50000	25000	10000	
4.13	PLANT (NHPP) WASTE HANDLING AND PACKAGING	CE	GF	1458	693	215	150	250	250	100	0	0	0	
4.29	PLANT (NHPP) SMSA & IMPROVEMENTS	GPP	GF	388	0	250	138	0	0	0	0	0	0	
4.33	INTERIM WASTE MANAGEMENT	GPP	GF	1100	0	1100	0	0	0	0	0	0	0	
4.39	FACILITIES (IMF), ORNL CONTACT HANDLED TRANSURANIC	GPP	GF	1000	0	0	0	1000	0	0	0	0	0	
4.40	(CH-TRU) REPACKAGING FACILITY SMSA & STAGING AREA UPGRADE	GPP	GF	900	0	0	900	0	0	0	0	0	0	
4.42	EVAPORATOR COOLING TOWER CHEMICAL	GPP	GF	50	50	0	0	0	0	0	0	0	0	
4.44	ADDITION SHED UNDERGROUND STORAGE BUILDING UPGRADE	GPP	GF	150	0	0	0	150	0	0	0	0	0	
FUNDING TOTALS:				157151	743	2063	2795	2300	21375	28025	54225	29225	16400	

Remedial Action Program Project Summary - Capital Funding

PROJECT NUMBER	PROJECT TITLE	FUNDING		FUNDING (\$x1000)										BEYOND
		TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
5.08	REMEDIATION ACTION EQUIPMENT	CL	GF	50	0	0	0	0	0	50	0	0	0	
FUNDING TOTALS:				50	0	0	0	0	0	50	0	0	0	

Table 7.25 (continued)

Environmental Monitoring Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
6.22	GROUNDWATER MONITORING NETWORK,	GPP	GF	500	500	0	0	0	0	0	0	0	0	0
6.37	PHASE II ORNL GROUNDWATER CHARACTERIZATION	GPP	GF	1000	0	0	1000	0	0	0	0	0	0	0
6.38	SWBA & MONITORING STATION	GPP	GF	250	0	0	0	250	0	0	0	0	0	0
FUNDING TOTALS:				1750	500	0	1000	250	0	0	0	0	0	0

Air Pollution Control Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
2.00	AIR POLLUTION CONTROL PROGRAM	EXP	GF	73	73	0	0	0	0	0	0	0	0	0
FUNDING TOTALS:				73	73	0	0	0	0	0	0	0	0	0

Water Pollution Control Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
3.00	WATER POLLUTION CONTROL PROGRAM	EXP	GF	80861	6789	3092	5880	6700	6700	6700	6600	6600	31800	
FUNDING TOTALS:				80861	6789	3092	5880	6700	6700	6700	6600	6600	31800	

Table 7.25 (continued)

Solid Waste Management Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
4.00	SOLID WASTE MANAGEMENT PROGRAM	EXP	GF	33093	1693	2470	2700	3740	4065	4510	3520	3720	6875	
4.13	WASTE HANDLING AND PACKAGING PLANT (WHPP)	EXP	GF	11115	1827	2824	1534	1300	1125	1100	800	600	0	
FUNDING TOTALS:				44208	3520	5294	4234	5040	5190	5610	4320	4320	6875	

Remedial Action Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
5.01	PRELIMINARY ASSESSMENT AND SITE INVESTIGATION	EXP	GF	15090	45	1060	635	2895	2280	2060	1975	1740	2400	
5.02	MAINTENANCE AND SURVEILLANCE	EXP	GF	55632	3197	4205	4615	4615	4485	4480	4355	4280	21400	
5.03	REMEDIATION INVESTIGATIONS AND FEASIBILITY STUDY	EXP	GF	212183	5629	4640	29735	26179	22000	27000	28000	25000	44000	
5.04	REMEDIATION ACTION TECHNOLOGY DEMONSTRATIONS	EXP	GF	11643	0	1175	4550	1750	1200	800	550	450	1160	
5.05	CORRECTIVE MEASURES	EXP	GF	723685	0	5135	12200	23050	50900	94600	70100	30100	407000	
5.06	FACILITY DECOMMISSIONING OR CLOSURE	EXP	GF	53233	677	830	1492	1588	1010	3910	8055	4470	31000	
FUNDING TOTALS:				1071466	9548	17045	53227	60077	111875	132850	113035	66240	507569	

Table 7.25 (continued)

Environmental Monitoring Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
6.36	MELTON VALLEY HYDRAULIC HEAD	EXP	GF	1100	0	300	0	0	200	200	200	200	0	
6.37	MEASURING STATIONS ORNL GROUNDWATER CHARACTERIZATION	EXP	GF	450	0	0	0	450	0	0	0	0	0	
FUNDING TOTALS:				1550	0	300	0	450	200	200	200	200	0	

Comprehensive Environmental Management Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95	
1.00	ORNL COMPREHENSIVE ENVIRONMENTAL MANAGEMENT	EXP	GF	4951	0	300	600	551	300	400	400	400	2000	
FUNDING TOTALS:				4951	0	300	600	551	300	400	400	400	2000	

Table 7.26. Nuclear energy research and development (AF) funding by work-breakdown structure

Water Pollution Control Program Project Summary - Capital Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
3.44	ISOTOPE AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	CIP	AF	31000	0	0	0	6500	12800	8400	3300	0	0	
FUNDING TOTALS:				31000	0	0	0	6500	12800	8400	3300	0	0	

Water Pollution Control Program Project Summary - Expense Funding

PROJECT		FUNDING		FUNDING (\$x1000)										BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-96	
3.44	ISOTOPE AREA LIQUID LLW COLLECTION AND TRANSFER SYSTEM UPGRADE	EXP	AF	7000	0	0	0	0	3500	3500	0	0	0	
FUNDING TOTALS:				7000	0	0	0	0	3500	3500	0	0	0	

Table 7.27. Remedial action (AH) funding by work-breakdown structure

Remedial Action Program Project Summary - Capital Funding													
PROJECT	FUNDING			FUNDING (\$x1000)									BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
5.08	REMEDIATION ACTION EQUIPMENT	CE	AH	100	75	0	0	25	0	0	0	0	0
FUNDING TOTALS:				100	75	0	0	25	0	0	0	0	0

Remedial Action Program Project Summary - Expense Funding													
PROJECT	FUNDING			FUNDING (\$x1000)									BEYOND
NUMBER	PROJECT TITLE	TYPE	SOURCE	TOTAL	FY-88	FY-89	FY-90	FY-91	FY-92	FY-93	FY-94	FY-95	FY-95
5.02	MAINTENANCE AND SURVEILLANCE	EXP	AH	45192	857	215	285	185	195	205	0	0	43250
5.03	REMEDIATION INVESTIGATIONS AND	EXP	AH	106	106	0	0	0	0	0	0	0	0
5.06	FEASIBILITY STUDY FACILITY DECOMMISSIONING OR CLOSURE	EXP	AH	13750	0	360	810	2285	650	2315	3060	2645	1725
FUNDING TOTALS:				59048	963	575	1095	2470	745	2520	3060	2645	44975

Table 7.28. ORNL Environmental Program by funding type
(thousands of dollars)

Funding type	Fiscal year								Total FY 1988-95	Total estimated cost
	1988	1989	1990	1991	1992	1993	1994	1995		
GPP	6,388	5,100	6,588	7,288	12,725	10,500	10,500	9,500	68,589	98,406
LIP	11,800	12,900	10,500	14,413	38,800	53,400	80,400	35,100	257,313	302,742
CE	1,927	1,288	1,557	2,075	1,575	1,525	1,275	1,200	12,422	22,769
EXP	<u>34,536</u>	<u>35,861</u>	<u>76,681</u>	<u>89,373</u>	<u>142,230</u>	<u>163,730</u>	<u>140,520</u>	<u>95,775</u>	<u>778,706</u>	<u>1,750,312</u>
Total	54,651	55,149	95,326	113,149	195,330	229,155	232,695	141,575	1,117,030	2,174,329
Accumulative total	54,651	109,800	205,126	318,275	513,605	742,760	975,455	1,117,030		

Table 7.29. Environmental and waste management budget summary^{a,b}
(millions of dollars)

Program category	Fiscal year								Total estimated cost ^c
	1988	1989	1990	1991	1992	1993	1994	1995	
1.0 Comprehensive Environmental Management	0.9	0.6	0.8	0.9	0.6	0.7	0.7	0.7	12.3
2.0 Air Pollution Control	1.6	0.3	1.2	0.9	1.8	2.2	0.8	0.8	15.7
3.0 Water Pollution Control	24.7	21.3	22.7	27.8	34.7	32.0	28.4	19.0	351.8
4.0 Solid Waste Management	4.7	9.1	9.6	13.1	39.7	52.1	79.1	42.1	254.5
5.0 Remedial Action	18.7	21.9	58.9	67.4	117.0	140.7	122.2	77.5	1508.3
6.0 Environmental Monitoring	<u>3.9</u>	<u>1.9</u>	<u>2.1</u>	<u>3.0</u>	<u>1.5</u>	<u>1.5</u>	<u>1.5</u>	<u>1.5</u>	<u>31.8</u>
Total	54.5	55.1	95.3	113.1	195.3	229.2	232.7	141.6	2174.3

^aFigures rounded off to nearest \$0.1 million.

^bFunds for routine operations on waste management conducted by WMO and routine compliance monitoring conducted by EMC are not included in this table. These figures are summarized in Tables ES.2 and ES.3.

^cIncludes funding for years preceding 1988 and beyond 1995. The total for FY 1988-95 is \$1116.8 million.

Table 7.30. ORNL Environmental Program summary--all funding

FUNDING SOURCE	FUNDING TYPE	ZY-88	ZY-89	ZY-90	ZY-91	ZY-92	ZY-93	ZY-94	ZY-95	Total ZY-88-95	ZEG
AF	Capital-LIP	0	0	0	6500	12800	8400	3300	0	31000	31000
	Expense	0	0	0	0	3800	3800	0	0	7000	7000
	Subtotal	0	0	0	6500	16600	11900	3300	0	38000	38000
AR	Capital-CR	75	0	0	35	0	0	0	0	100	145
	Expense	965	575	1095	2470	745	3520	3000	3645	14075	59040
	Subtotal	1040	575	1095	2495	745	3520	3000	3645	14175	59193
AR	Capital-LIP	0	0	0	0	0	0	0	0	0	32236
	Capital-CR	0	0	0	0	0	0	0	0	0	5105
AR	Capital-OPP	0	0	0	0	0	0	0	0	0	7206
	Expense	0	0	0	0	0	0	0	0	0	17005
AR	Expense-TTU	0	0	0	0	0	0	0	0	0	775
	Subtotal	0	0	0	0	0	0	0	0	0	49407
AT	Capital-CR	0	0	0	0	0	0	0	0	0	3203
	Capital-OPP	2450	0	0	0	1625	1500	1500	1500	8575	17273
	Subtotal	2450	0	0	0	1625	1500	1500	1500	8575	19556
OF	Capital-LIP	0	0	0	0	20000	25000	50000	35000	120000	120000
	Capital-CR	1203	925	1127	1650	1375	1225	1075	1000	9047	12747
OF	Capital-OPP	2773	2650	4230	1930	1800	3500	3500	3500	23099	27399
	Expense	19200	36031	63941	72010	124265	143560	124555	77700	654060	1203104
	Subtotal	23903	39604	69326	76406	127440	173503	179120	107200	608606	1272550
RG	Capital-LIP	11000	12000	10500	7913	6000	20000	37100	10100	106313	119606
	Capital-CR	400	205	400	400	300	300	300	200	2319	5319
RG	Capital-OPP	1163	2420	2350	2350	9200	2500	2500	4500	26115	46440
	Expense	13643	9255	11645	14005	13720	12150	12005	15370	102773	462470
	Subtotal	27006	24910	24095	27748	29220	37850	45705	20170	247506	634043
Program Totals	Capital	19945	19200	10645	23776	32100	63425	92175	45000	320154	422047
	Expense	34326	35061	76601	89373	142330	163730	140230	95775	770706	1730403
	Grand Total	34071	55159	95226	113149	192320	227155	230505	141575	1116060	3174329

Table 7.31. ORNL Environmental Program summary—capital projects
(thousands of dollars)

Funding source	Funding type	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	Total 88-95	TBC
AF	LIP	0	0	0	6,500	12,800	8,400	3,300	0	31,000	31,000
Subtotal		0	0	0	6,500	12,800	8,400	3,300	0	31,000	31,000
AH	CE	75	0	0	25	0	0	0	0	100	145
Subtotal		75	0	0	25	0	0	0	0	100	145
AR	GPP	0	0	0	0	0	0	0	0	0	7,286
AR	LIP	0	0	0	0	0	0	0	0	0	22,236
AR	CE	0	0	0	0	0	0	0	0	0	2,105
Subtotal		0	0	0	0	0	0	0	0	0	31,627
AT	GPP	2,450	0	0	0	1,625	1,500	1,500	1,500	8,575	17,273
AT	CE	0	0	0	0	0	0	0	0	0	2,283
Subtotal		2,450	0	0	0	1,625	1,500	1,500	1,500	8,575	19,556
GF	GPP	2,773	2,650	4,238	1,928	1,800	3,500	3,500	3,500	23,899	27,399
GF	LIP	0	0	0	0	20,000	25,000	50,000	25,000	120,000	130,000
GF	CE	1,282	983	1,157	1,650	1,375	1,325	1,075	1,000	9,847	12,747
Subtotal		4,055	3,633	5,395	3,588	23,175	29,825	54,575	29,500	153,746	170,146
KG	GPP	1,165	2,450	2,350	3,350	9,300	5,500	5,500	4,500	36,115	46,448
KG	LIP	11,800	12,900	10,500	7,913	6,000	20,000	27,100	10,100	106,313	119,606
KG	CE	400	305	400	400	200	200	200	200	2,305	5,312
Subtotal		13,365	15,655	13,250	13,663	15,500	25,700	32,800	14,800	144,733	171,373
Program totals											
GPP		6,388	5,100	6,588	7,288	12,725	10,500	10,500	9,500	68,589	98,406
LIP		11,800	12,900	10,500	14,413	38,800	53,400	80,400	35,100	257,313	302,842
CE		1,757	1,288	1,557	2,075	1,575	1,525	1,275	1,200	12,252	22,592
Grand total		19,945	19,288	18,645	23,776	53,100	65,425	92,175	45,800	338,154	423,847

Fig. 7.1. Proposed ORNL environmental funding source summary. The amounts include anticipated costs for FY 1988 and beyond. Costs for active projects that were funded prior to FY 1988 are not included.

Fig. 7.2. ORNL environmental capital projects funding by DOE program. Estimated funding requirements are given in millions of dollars; the total estimated cost for capital projects is \$423 million.

Fig. 7.3. ORNL environmental expense projects funding by DOE program. Estimated funding requirements are given in millions of dollars; the total estimated cost of expense projects is \$1.738 billion.

Fig. 7A. ORNL environmental capital projects funding.

Fig. 7.5. ORNL environmental expense projects funding.

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Fig. 7.6. ORNL environmental and waste management funding.

DOE ENVIRONMENTAL AND WASTE MANAGEMENT FIVE-YEAR PLAN

DOE is developing a Five-Year Environmental Waste Management Plan covering the years 1989 through 1995. The plan is currently at a Predecisional Draft II stage and covers Environmental Program activities, placing them in three categories: Corrective Activities (CA), Environmental Restoration (ER), and Waste Management Operations (WMO). Consistent with these three categories, the new Budget and Reporting numbers listed in Table 7.33 are expected to become effective October 1, 1989.

Table 7.33 provides a crosscut between the work breakdown structure used in this ORNL Long-Range Plan and the ORNL funding identified in the DOE Five-Year Environmental and Waste Management Plan. The funding for FY 1989 is the amount authorized (BA) and received by ORNL. The target funding for FY 1990 and FY 1991 is that amount expected to be in the President's budget. The requirements (REQ) funding reflects the amount requested by ORNL to meet the needs of emerging DOE orders and federal and state regulations, current technical standards, and general program support. The FY 1992 through FY 1995 funding listed in Table 7.33 is also for the requirements level.

Table 7.33. Funding crosscut
 Draft II DOE Five-Year
 ORNL Long-Range

ADS #	FUNDING	PRIOR CAT	FUP NO.	MBS	TITLES
301	1-OP EX	1 CA	LIP		
301	2-CE	1 CA	LIP		
301	3-GPP	1 CA	LIP		
301	4-LIP	1 CA	LIP	3.21	NON-RAD WASTE/WATER TREATMENT PROJECT
302	1-OP EX	1 CA	KG-MBS 3	3.37	BETHEL VALLEY LLLW COLLECTION & TRANS
302	2-CE	1 CA	KG-MBS 3		
302	3-GPP	1 CA	KG-MBS 3		
302	4-LIP	1 CA	KG-MBS 3		
303	1-OP EX	2 CA	KG-MBS 4	3.44	ISOTOPES AREA LLLW COLLECTION & TRANS
303	1-OP EX	2 CA	AF/IP		
303	2-CE	2 CA	AF/IP		
303	3-GPP	2 CA	AF/IP		
303	4-LIP	2 CA	AF/IP		
304	1-OP EX	2 CA	KG-MBS 4	4.51	MELTON VALLEY LLLW COLLECTION & TRANS
304	2-CE	2 CA	KG-MBS 4		
304	3-GPP	2 CA	KG-MBS 4		
304	4-LIP	2 CA	KG-MBS 4		
305	1-OP EX	3 CA	KG-MBS 6		
305	2-CE	3 CA	KG-MBS 6		
305	3-GPP	3 CA	KG-MBS 6	6.30	MWF & RWST STACK MONITORING IMPROVEME
305	4-LIP	3 CA	KG-MBS 6		
307	1-OP EX	2 ER	DPGF 107	6.36	METEOROLOGICAL TOWER SYSTEM UPGRADE
307	2-CE	2 ER	DPGF 107	6.37	ORNL GROUNDWATER CHARACTERIZATION
307	3-GPP	2 ER	DPGF 107		
307	4-LIP	2 ER	DPGF 107		
308	1-OP EX	1 CA	KG-MBS 3		
308	2-CE	1 CA	KG-MBS 3		
308	3-GPP	1 CA	KG-MBS 3	3.79	BSR PROCESS DRAIN SEGREGATION
308	4-LIP	1 CA	KG-MBS 3	3.80	CLEAN WATER ACT COMPLIANCE SEGREGATION
309	1-OP EX	3 WM	KG-MBS 4		
309	2-CE	3 WM	KG-MBS 4		
309	3-GPP	3 WM	KG-MBS 4	4.01	GAS CYLINDER RECONTAINERIZATION FACIL
309	4-LIP	3 WM	KG-MBS 4		
310	1-OP EX	3 CA	OVERHEAD	4.50	UNDERGROUND STORAGE TANKS OLDER THAN
310	2-CE	3 CA	OVERHEAD		
310	3-GPP	3 CA	OVERHEAD		
310	4-LIP	3 CA	OVERHEAD		
311	1-OP EX	1 ER	DPGF 105	5.02	MAINTENANCE & SURVEILLANCE
311	2-CE	1 ER	DPGF 105		
311	3-GPP	1 ER	DPGF 105		
311	4-LIP	1 ER	DPGF 105		
312	1-OP EX	1 ER	KG-MBS 5	5.02	MAINTENANCE & SURVEILLANCE
312	2-CE	1 ER	KG-MBS 5		
312	3-GPP	1 ER	KG-MBS 5		
312	4-LIP	1 ER	KG-MBS 5		
313	1-OP EX	1 ER	NEAM200	5.06	FACILITY DECOMMISSIONING OR CLOSURE
313	1-OP EX	1 ER	NEAM201		
313	1-OP EX	1 ER	NEAM202		
313	2-CE	1 ER	NEAM201		
313	2-CE	1 ER	NEAM200	5.08	REMEDIATION ACTION EQUIPMENT
313	2-CE	1 ER	NEAM202		
313	3-GPP	1 ER	NEAM200/201/202		
313	4-LIP	1 ER	NEAM200/201/202		
314	1-OP EX	1 ER	DPGF 701	5.06	FACILITY DECOMMISSIONING OR CLOSURE
314	2-CE	1 ER	DPGF 701	5.08	REMEDIATION ACTION EQUIPMENT
314	3-GPP	1 ER	DPGF 701		
314	4-LIP	1 ER	DPGF 701		
315	1-OP EX	1 ER	KG-MBS 5	5.06	FACILITY DECOMMISSIONING OR CLOSURE
315	2-CE	1 ER	KG-MBS 5		
315	3-GPP	1 ER	KG-MBS 5		
315	4-LIP	1 ER	KG-MBS 5		
316	1-OP EX	1 ER			NOT INCLUDED IN ORNL LRP
316	2-CE	1 ER			NOT INCLUDED IN ORNL LRP
316	3-GPP	1 ER			NOT INCLUDED IN ORNL LRP
316	4-LIP	1 ER			NOT INCLUDED IN ORNL LRP
317	1-OP EX	1 ER			NOT INCLUDED IN ORNL LRP
317	2-CE	1 ER			NOT INCLUDED IN ORNL LRP
317	3-GPP	1 ER			NOT INCLUDED IN ORNL LRP

		OLD BAR		NEW BAR		FY 90		FY 91		FY-92	FY-93	FY-94	FY-95	
						FY-89	TARGET	REQ.	TARGET					REQ.
						BA	BA	BA	BA					BA
ECT	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0	0		
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 3	1113	0	0	0	0	0	0	0	0			
TRANSFER	KG 02 00 00 0	KG 71 86 4	100	100	100	100	100	0	0	0	0			
	KG 02 00 00 0	KG 71 86 4	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 4	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 4	11767	10500	10500	7913	7913	0	0	0	0			
TRANSFER	AF	AF 71 80 86 4	0	600	600	0	0	0	0	0	0			
	AF	AF 71 80 86 4	0	0	0	0	0	3500	3500	0	0			
	AF	AF 71 80 86 4	0	0	0	0	0	0	0	0	0			
	AF	39 AF 71 80 U	0	0	0	0	0	0	0	0	0			
	AF	39 AF 71 80 U	0	0	0	6500	6500	12800	8400	3300	0			
TRANSFER	KG 02 00 00 0	KG 71 86 04	300	300	300	300	300	100	100	100	100			
	KG 02 00 00 0	KG 71 86 04	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 4	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 4	0	0	0	0	0	6000	12000	12000	5000			
INVESTMENTS	KG 02 00 00 0	39 KG 71 86 2	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 2	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 2	0	0	0	700	700	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 2	0	0	0	0	0	0	0	0	0			
IDE	GF 01 02 06 0	GF 72 91 01	300	0	0	0	450	200	200	200	200			
	GF 01 02 06 0	GF 72 91 01	0	0	0	0	0	0	0	0	0			
	GF 01 02 06 0	GF 72 91 01	0	0	0	0	0	0	0	0	0			
ATION	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 3	1000	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 3	550	0	0	0	0	0	0	0	0			
FACILITY	KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	750	0	0	0			
	KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0			
THAN 25	KG 02 00 00 0	KG 71 86 04	0	660	660	750	750	250	0	0	0			
	KG 02 00 00 0	KG 71 86 04	0	0	0	0	0	0	0	0	0			
	KG 02 00 00 0	39 KG 71 86 4	0	0	0	1450	1450	850	0	0	0			
	KG 02 00 00 0	39 KG 71												

Table 7.33 (continued)

NOS	FUNDING	PRIOR	CAT	FMP NO.	MBS	TITLES	OLD BAR					NEW
317	4-LIP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	05	00	0	AM 10
313	1-OP EX	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
318	2-CE	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
318	3-GPP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
318	4-LIP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
319	1-OP EX	3	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
319	2-CE	3	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
319	3-GPP	3	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
319	4-LIP	3	ER			NOT INCLUDED IN ORNL LAP	AM	10	15	01	0	AM 10
320	1-OP EX	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
320	2-CE	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
320	3-GPP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
320	4-LIP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
321	1-OP EX	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
321	2-CE	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
321	3-GPP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
321	4-LIP	1	ER			NOT INCLUDED IN ORNL LAP	AM	10	20	00	0	AM 10
322	1-OP EX	2	ER	DPGF105	5.01	PRELIMINARY ASSESSMENT & SITE INVESTIGATION	GF	01	02	06	0	GF 72
322	2-CE	2	ER	DPGF105			GF	01	02	06	0	GF 72
322	3-GPP	2	ER	DPGF105			GF	01	02	06	0	GF 72
322	4-LIP	2	ER	DPGF105			GF	01	02	06	0	GF 72
323	1-OP EX	2	ER	KG-MBS 5	5.01	PRELIMINARY ASSESSMENT & SITE INVESTIGATION	KG	02	00	00	0	KG 72
323	2-CE	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
323	3-GPP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
323	4-LIP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
324	1-OP EX	2	ER	DPGF800	5.03	REMEDIATION INVESTIGATIONS & FEASIBILITY STUDY	GF	11				GF 72
324	2-CE	2	ER	DPGF800			GF	11				GF 72
324	3-GPP	2	ER	DPGF800			GF	11				GF 72
324	4-LIP	2	ER	DPGF800			GF	11				GF 72
325	1-OP EX	2	ER	KG-MBS 5	5.03	REMEDIATION INVESTIGATIONS & FEASIBILITY STUDY	KG	02	00	00	0	KG 72
325	2-CE	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
325	3-GPP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
325	4-LIP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
326	1-OP EX	2	ER	KG-MBS 5	5.09	ORAU FACILITIES	KG	02	00	00	0	KG 72
326	2-CE	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
326	3-GPP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
326	4-LIP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
327	1-OP EX	2	ER	DPGF800	5.04	REMEDIATION ACTION TECHNOLOGY DEMONSTRATIONS	GF	11				GF 72
327	1-OP EX	2	ER	DPGF105			GF	01	02	06	0	GF 72
327	2-CE	2	ER	DPGF105			GF	01	02	06	0	GF 72
327	3-GPP	2	ER	DPGF105/800			GF	01	02	06	0	GF 72
327	4-LIP	2	ER	DPGF105/800			GF	01	02	06	0	GF 72
328	1-OP EX	3	ER	KG-MBS 5	5.04	REMEDIATION ACTION TECHNOLOGY DEMONSTRATIONS	KG	02	00	00	0	KG 72
328	2-CE	3	ER	KG-MBS 5			KG	02	00	00	0	KG 72
328	3-GPP	3	ER	KG-MBS 5			KG	02	00	00	0	KG 72
328	4-LIP	3	ER	KG-MBS 5			KG	02	00	00	0	KG 72
329	1-OP EX	2	ER	DPGF800	5.05	CORRECTIVE MEASURES	GF	11				GF 72
329	1-OP EX	2	ER	DPGF105			GF01/GF11					GF 72
329	2-CE	2	ER	DPGF105			GF	01	02	06	0	GF 72
329	3-GPP	2	ER	DPGF105/800			GF01/GF11					GF 72
329	4-LIP	2	ER	DPGF105/800			GF01/GF11					GF 72
330	1-OP EX	2	ER	KG-MBS 5	5.05	CORRECTIVE MEASURES	KG	02	00	00	0	KG 72
330	2-CE	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
330	3-GPP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
330	4-LIP	2	ER	KG-MBS 5			KG	02	00	00	0	KG 72
331	1-OP EX	2	ER	DPGF800	5.11	UNDERGROUND STORAGE TANKS	GF	11				GF 72
331	2-CE	2	ER	DPGF800			GF	11				GF 72
331	3-GPP	2	ER	DPGF800			GF	11				GF 72
331	4-LIP	2	ER	DPGF800			GF	11				GF 72
332	1-OP EX	2	ER	DPGF800	5.12	GENERAL SITE CLOSURE	GF	11				GF 72
332	2-CE	2	ER	DPGF800			GF	11				GF 72
332	3-GPP	2	ER	DPGF800			GF	11				GF 72
332	4-LIP	2	ER	DPGF800			GF	11				GF 72
333	1-OP EX	3	ER	DPGF800	5.13	HYDROFRACTURE	GF	11				GF 72
333	2-CE	3	ER	DPGF800			GF	11				GF 72
333	3-GPP	3	ER	DPGF800			GF	11				GF 72
333	4-LIP	3	ER	DPGF800			GF	11				GF 72
334	1-OP EX	1	ER			NOT INCLUDED IN ORNL LAP	356P 73010					GF 72
334	2-CE	1	ER			NOT INCLUDED IN ORNL LAP	GF	02	00	00	0	GF 72

[illegible]

ADS #	FUNDING	PRIOR CAT	FJP NO.	MBS	TITLES
334	3-GPP	3 ER			NOT INCLUDED IN ORNL LRP
334	4-LIP	3 ER			NOT INCLUDED IN ORNL LRP
336	1-OP EX	1 UN			NOT INCLUDED IN ORNL LRP
336	2-CE	1 UN			NOT INCLUDED IN ORNL LRP
336	3-GPP	1 UN			NOT INCLUDED IN ORNL LRP
336	4-LIP	1 UN			NOT INCLUDED IN ORNL LRP
337	1-OP EX	3 ER			NOT INCLUDED IN ORNL LRP
337	2-CE	3 ER			NOT INCLUDED IN ORNL LRP
337	3-GPP	3 ER			NOT INCLUDED IN ORNL LRP
337	4-LIP	3 ER			NOT INCLUDED IN ORNL LRP
338	1-OP EX	4 ER	NEAM205	5.06	FACILITY DECOMMISSIONING OR CLOSURE
338	1-OP EX	4 ER	NEAM206		
338	1-OP EX	4 ER	NEAM207		
338	2-CE	4 ER	NEAM205/206/207		
338	3-GPP	4 ER	NEAM205/206/207		
338	4-LIP	4 ER	NEAM205/206/207		
339	1-OP EX	4 ER	DPGF700	5.06	FACILITY DECOMMISSIONING OR CLOSURE
339	1-OP EX	4 ER	DPGF701		
339	1-OP EX	4 ER	DPGF702		
339	2-CE	4 ER	DPGF700/701/702		
339	3-GPP	4 ER	DPGF700/701/702		
339	4-LIP	4 ER	DPGF700/701/702		
340	1-OP EX	4 ER	KG-MBS 5	5.06	FACILITY DECOMMISSIONING OR CLOSURE
340	2-CE	4 ER	KG-MBS 5		
340	3-GPP	4 ER	KG-MBS 5		
340	4-LIP	4 ER	KG-MBS 5		
341	1-OP EX	1 UN	Chrgbk-Air		NOT INCLUDED IN ORNL LRP
341	1-OP EX	1 UN	Chrgbk-Water		NOT INCLUDED IN ORNL LRP
341	2-CE	1 UN	Chrgbk		NOT INCLUDED IN ORNL LRP
341	3-GPP	1 UN	Chrgbk		NOT INCLUDED IN ORNL LRP
341	4-LIP	1 UN	Chrgbk		NOT INCLUDED IN ORNL LRP
342	1-OP EX	1 UN	DPGF402		
342	1-OP EX	1 UN	DPGF410	4.13	WAPP
342	1-OP EX	1 UN	DPGF108		
342	1-OP EX	1 UN	Chrgbk-Air		
342	1-OP EX	1 UN	DPGF106	3.00	WATER POLLUTION CONTROL PROGRAM
342	1-OP EX	1 UN	Chrgbk-Water		
342	2-CE	1 UN	DPGF402	4.13	WAPP
342	2-CE	1 UN	DPGF106	3.00	WATER POLLUTION CONTROL PROGRAM
342	2-CE	1 UN	DPGF410		
342	3-GPP	1 UN	DPGF410	3.38	PWTP PROCESS IMPROVEMENTS
342	4-LIP	1 UN	CMG/402/410/106/107		
343	1-OP EX	1 UN	Chrgbk/MBS 3		
343	1-OP EX	1 UN	Chrgbk-MBS 2		
343	2-CE	1 UN	Chrgbk/MBS 3		
343	3-GPP	1 UN	KG-MBS 3	4.47	SLUDGE VOLUME REDUCTION FACILITY
343	4-LIP	1 UN	Chrgbk/MBS 3	3.82	COAL YARD RUNOFF IMPROVEMENTS, BLDG.
344	1-OP EX	1 UN	DPGF108	4.00	SOLID WASTE MANAGEMENT PROGRAM
344	2-CE	1 UN	DPGF107		
344	3-GPP	1 UN	DPGF107	4.12	AN-TAU WASTE STORAGE BUNKER
				4.39	CH-TAU REPACKAGING FACILITY
				4.44	UNDERGROUND STORAGE BLDG. UPGRADE
344	4-LIP	1 UN	DPGF107/108		
345	1-OP EX	1 UN	KG-MBS 4		
345	2-CE	1 UN	KG-MBS 4		
345	3-GPP	1 UN	KG-MBS 4		
				4.21	EXPAND MIXED WASTE STORAGE CAPACITY
				4.43	PCB/HAZARDOUS WASTE STORAGE, BLDG. 7
				4.30	UPGRADE BLDG. 7502 MIXED WASTE
				4.37	CLASS III & IV RETRIEVABLE STORAGE
				4.31	BULK MIXED WASTE STORAGE FACILITY
346	4-LIP	1 UN	KG-MBS 4		
346	1-OP EX	1 UN	Chrgbk-Solid		NOT INCLUDED IN ORNL LRP
346	2-CE	1 UN	Chrgbk-Solid		NOT INCLUDED IN ORNL LRP
346	3-GPP	1 UN	Chrgbk-Solid		NOT INCLUDED IN ORNL LRP
346	4-LIP	1 UN	Chrgbk-Solid		NOT INCLUDED IN ORNL LRP
347	1-OP EX	1 UN	DPGF108	4.00	SOLID WASTE MANAGEMENT PROGRAM
347	1-OP EX	1 UN	Chrgbk-Solid		
347	2-CE	1 UN	CMG/DPGF107/1		
347	3-GPP	1 UN	DPGF107	4.43	PCB/HAZARDOUS WASTE STORAGE, BLDG. 7
				4.40	SWSA 6 STAGING AREA UPGRADE
347	4-LIP	1 UN	CMG/DPGF107/108		

Table 7.33 (continued)

		FY 90		FY 91		FY 92		FY 93		FY 94		FY 95	
		FY-89	TARGET	REQ.	TARGET	REQ.	FY-92	FY-93	FY-94	FY-95			
		BA	BA	BA	BA	BA	BA/DO	BA/DO	BA/DO	BA/DO			
OLD DAR													
NEW DAR													
GF 02 06 00 0	GF 72 91 51	0	0	0	0	0	0	0	0	0	0	0	
GF 02 06 00 0	GF 72 91 51	0	0	0	0	0	0	0	0	0	0	0	
GF	GF 72 91 51	117	2779	2779	1469	1469	530	50	0	0	0	0	
GF	35 GF 73 01 B	0	400	400	50	50	0	0	0	0	0	0	
GF	GF 72 91 51	0	0	0	0	0	0	0	0	0	0	0	
GF	GF 72 91 51	0	0	0	0	0	0	0	0	0	0	0	
GF	GF 72 91 01	818	2631	2631	2217	2217	920	230	0	0	0	0	
GF	GF 72 91 01	0	34	34	14	14	0	0	0	0	0	0	
GF	GF 72 91 01	0	0	0	0	0	0	0	0	0	0	0	
GF	GF 72 91 01	0	0	0	0	0	0	0	0	0	0	0	
AM 10 20 00 0	AM 10 20 92 2	55	100	100	0	0	0	0	0	0	0	0	
AM 10 20 00 0	AM 10 20 92 2	50	190	190	1600	1600	0	0	0	0	0	0	
AM 10 20 00 0	AM 10 20 92 2	0	250	250	400	400	250	2000	2730	2300	0	0	
AM 10 20 00 0	AM 10 20 92 2	0	0	0	0	0	0	0	0	0	0	0	
AM 10 20 00 0	AM 10 20 92 2	0	0	0	0	0	0	0	0	0	0	0	
AM 10 20 00 0	AM 10 20 92 2	0	0	0	0	0	0	0	0	0	0	0	
GF 11 04 00 0	GF 72 92 02	70	542	542	878	878	310	0	0	0	0	0	
GF 11 04 00 0	GF 72 92 02	0	0	0	0	0	700	3910	8055	4670	0	0	
GF 11 04 00 0	GF 72 92 02	760	950	950	710	710	0	0	0	0	0	0	
GF 11 04 00 0	GF 72 92 02	0	0	0	0	0	0	0	0	0	0	0	
GF 11 04 00 0	GF 72 92 02	0	0	0	0	0	0	0	0	0	0	0	
GF 11 04 00 0	GF 72 92 02	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	KG 72 92 02	400	710	710	760	760	570	600	600	1950	0	0	
KG 02 00 00 0	KG 72 92 02	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	KG 72 92 02	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	KG 72 92 02	0	0	0	0	0	0	0	0	0	0	0	
AF 20	AF 73 70 96	248	274	274	274	274	274	274	274	274	274	274	
AF 20	AF 73 70 96	1409	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	
AF 20	AF 73 70 96	0	0	0	0	0	0	0	0	0	0	0	
AF 20	AF 73 70 96	0	0	0	0	0	0	0	0	0	0	0	
AF 20	AF 73 70 96	0	0	0	0	0	0	0	0	0	0	0	
GF 01	GF 73 01 96	1484	0	0	0	0	0	0	0	0	0	0	
GF 01	GF 73 01 96	940	1534	1534	1300	1300	1125	1100	800	600	0	0	
GF 01 02 06 0	GF 73 01 96	0	20	50	20	50	50	300	50	50	50	50	
GF 01	GF 73 01 96	298	327	327	327	327	327	327	327	327	327	327	
GF 01	GF 73 01 96	1864	2560	3050	2780	3250	3100	3225	3200	3175	0	0	
GF 01	GF 73 01 96	1690	2035	2035	2035	2035	2035	2035	2035	2035	2035	2035	
GF 01	35 GF 73 01 0	215	0	0	0	0	0	0	0	0	0	0	
GF 01	35 GF 73 01 0	0	350	500	350	500	400	450	350	275	0	0	
GF 01	35 GF 73 01 0	0	0	150	0	250	250	100	0	0	0	0	
GF 01	39 GF 73 01 0	0	1100	1100	0	0	0	0	0	0	0	0	
GF 01	39 GF 73 01 0	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	KG 73 96	2536	3053	3053	3053	3053	3053	3053	3053	3053	3053	3053	
KG 02 00 00 0	KG 73 96	448	491	491	491	491	491	491	491	491	491	491	
KG 02 00 00 0	KG 73 96	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	39 KG 73 96	0	0	0	0	0	900	0	0	0	0	0	
KG 02 00 00 0	39 KG 73 96	0	0	0	0	0	500	0	0	0	0	0	
GF 01 02 06 0	GF 73 01 97	75	30	30	50	50	200	30	0	0	0	0	
GF 01 02 06 0	GF 73 01 97	0	0	0	0	0	0	0	0	0	0	0	
GF 01 02 06 0	39 GF 73 01 E	0	1100	1100	1150	1000	0	0	0	0	0	0	
GF 01 02 06 0	39 GF 73 01 E	0	0	0	0	150	0	0	0	0	0	0	
KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0	0	0	
KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0	0	0	
7652		450											
100			150	150	850	850							
FACILITIES			150	150	900	900							
KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0	0	0	
AF 20	AF 73 70 98	1383	1510	1510	1510	1510	1510	1510	1510	1510	1510	1510	
AF 20	AF 73 70 98	0	0	0	0	0	0	0	0	0	0	0	
AF 20	AF 73 70 98	0	0	0	0	0	0	0	0	0	0	0	
AF 20	AF 73 70 98	0	0	0	0	0	0	0	0	0	0	0	
GF 01 02 06 0	GF 73 01 98	690	470	470	750	750	890	1060	400	600	0	0	
GF 01 02 06 0	GF 73 01 98	1660	1814	1814	1814	1814	1814	1814	1814	1814	1814	1814	
GF 01 02 06 0	GF 73 01 98	0	0	0	0	0	0	0	0	0	0	0	
GF 01 02 06 0	39 GF 73 01 F	1100	0	0	0	0	0	0	0	0	0	0	
GF 01 02 06 0	39 GF 73 01 F	0	900	900	0	0	0	0	0	0	0	0	

Table 7.33 (continued)

POS #	FUNDING	PRIOR CAT	FUP NO.	UBS	TITLES	OLD B&R	NEW
348	1-OP EX	1	UN	Chngbld/UBS 4		KG 02 00 00 0	39 KG
348	2-CE	1	UN	Chngbld/UBS 4		KG 02 00 00 0	39 KG
348	3-GPP	1	UN	KG-UBS 4	4.38	KG 02 00 00 0	39 KG
348	4-LIP	1	UN	Chngbld/UBS 4		KG 02 00 00 0	39 KG
349	1-OP EX	1	UN	DPGF-401	4.00	GF 01/02	GF 73
349	1-OP EX	1	UN	DPGF 106		GF 01/02 06 0	GF 73
349	1-OP EX	1	UN	DPGF 101		GF 01/02	GF 73
349	1-OP EX	1	UN	DPGF 106	3.00	GF 01/02	GF 73
349	1-OP EX	1	UN	Croff		GF	GF 73
349	1-OP EX	1	UN	DPGF 107		GF 01/02	GF 73
349	1-OP EX	1	UN	DPGF-405	4.13	GF 01/02	GF 73
349	2-CE	1	UN	DPGF 106	3.00	GF 01/02	35 GF
349	2-CE	1	UN	DPGF 101	4.00	GF 01/02	35 GF
349	2-CE	1	UN	DPGF 106		GF 01 02 06 0	35 GF
349	2-CE	1	UN	DPGF 107	4.00	GF 01/02	35 GF
349	3-GPP	1	UN	DPGF 107		GF 01/02	39 GF
				3.50	MANHOLE MONITORS - PROCESS WASTE		
				3.78	BLDG. 3544 ION-EXCHANGE/EVAPORATOR ROOM UPG		
				4.29	SUSA 6 IMPROVEMENTS		
				6.37	ORNL GROUNDWATER CHARACTERIZATION		
				6.38	IMW MONITORING STATION		
				2.26	BIOLOGY AREA WASTEWATER TREATMENT FACILITY		
				2.05	VENTILATION SYSTEM UPGRADE		
				2.07	UPGRADE 3047 FILTER HOUSE		
				CONT			
349	4-LIP	1	UN	DPGF-401/405/101-06		GF 01/02	39 GF
350	1-OP EX	1	UN	KG-UBS 6	6.00	KG 02 00 00 0	KG 73
350	1-OP EX	1	UN	KG-UBS 4	4.00	KG 02 00 00 0	KG 73
350	1-OP EX	1	UN	KG-UBS 3	3.00	KG 02 00 00 0	KG 73
350	1-OP EX	1	UN	KG-UBS 1	1.00	KG 02 00 00 0	KG 73
350	1-OP EX	1	UN	KG-UBS 2	2.00	KG 02 00 00 0	KG 73
350	2-CE	1	UN	KG-UBS 2	2.00	KG 02 00 00 0	35 KG
350	2-CE	1	UN	KG-UBS 6	6.00	KG 02 00 00 0	35 KG
350	2-CE	1	UN	KG-UBS 4	4.00	KG 02 00 00 0	35 KG
350	2-CE	1	UN	KG-UBS 5	5.08	KG 02 00 00 0	35 KG
350	2-CE	1	UN	KG-UBS 3	3.00	KG 02 00 00 0	35 KG
350	3-GPP	1	UN	KG-UBS 6	6.32	KG 02 00 00 0	39 KG
				6.26	IMPROVEMENTS TO ORNL PLANT PERIMETER AIR MONITORS		
				6.34	WASTE OPERATIONS CONTROL CENTER EXPANSION		
				6.35	METEOROLOGICAL TOWER SYSTEM UPGRADE		
				6.28	IMPROVEMENTS TO LOCAL AIR MONITORS		
350	3-GPP	1	UN	KG Contingency		KG 02 00 00 0	39 KG
				3.00	WATER POLLUTION CONTROL		
				4.00	SOLID WASTE MANAGEMENT PROGRAM		
				6.00	ENVIRONMENTAL MONITORING PROGRAM		
				2.00	AIR POLLUTION CONTROL PROGRAM		
				4.00	SOLID WASTE MANAGEMENT PROGRAM		
				3.00	WATER POLLUTION CONTROL		
350	3-GPP	1	UN	KG-UBS 2	2.12	KG 02 00 00 0	39 KG
350	3-GPP	1	UN	AT Contingency		KG 02 00 00 0	39 KG
				4.00	SOLID WASTE MANAGEMENT PROGRAM		
				3.00	WATER POLLUTION CONTROL		
350	3-GPP	1	UN	KG-UBS 3	3.77	KG 02 00 00 0	39 KG
350	4-LIP	1	UN	KG-UBS 1-4/6	3.85	KG 02 00 00 0	39 KG
351	1-OP EX	1	UN	TSCA		KG 03	KG 73
351	2-CE	1	UN	TSCA		KG 03	KG 73
351	3-GPP	1	UN	TSCA		KG 03	KG 73
351	4-LIP	1	UN	TSCA		KG 03	KG 73
352	1-OP EX	2	UN	LIP		GF 01 02 06 0	39 GF
352	2-CE	2	UN	LIP		GF 01 02 06 0	39 GF
352	3-GPP	2	UN	LIP		GF 01 02 06 0	39 GF
352	4-LIP	2	UN	LIP	4.13	GF 01 02 06 0	39 GF
				UNPP			
353	1-OP EX	3	UN	KG-UBS 4	4.48	KG 02 00 00 0	KG 73
353	2-CE	3	UN	KG-UBS 4		KG 02 00 00 0	KG 73
353	3-GPP	3	UN	KG-UBS 4		KG 02 00 00 0	39 KG
353	4-LIP	3	UN	KG-UBS 4		KG 02 00 00 0	39 KG
354	1-OP EX	2	UN	PROGSUP	1.00	GF 01 02 06 0	GF 73
354	2-CE	2	UN	PROGSUP		GF 01 02 06 0	GF 73
354	3-GPP	2	UN	PROGSUP		GF 01 02 06 0	GF 73
354	4-LIP	2	UN	PROGSUP		GF 01 02 06 0	GF 73
355	1-OP EX	3	UN	DPGF 101	4.00	GF 01 02 06 0	GF 73
355	2-CE	3	UN	DPGF 101		GF 01 02 06 0	GF 73
355	3-GPP	3	UN	DPGF 101		GF 01 02 06 0	GF 73
355	4-LIP	3	UN	DPGF 101		GF 01 02 06 0	GF 73
356	1-OP EX	1	UN	KG-UBS 4	4.00	KG 02 00 00 0	KG 73

NEW BAR	FY 90		FY 91		FY-92	FY-93	FY-94	FY-95
	FY-89	TARGET	REQ.	TARGET				
	BA	BA	BA	BA				
06 73 96	2488	2720	2720	2720	2720	2720	2720	2720
06 73 96	0	0	0	0	0	0	0	0
06 73 96	0	0	0	0	1000	0	0	0
06 73 96	0	0	0	0	0	0	0	0
73 01 01	350	0	0	0	0	0	0	0
73 01 01	1075	348	960	1200	1500	1375	1520	1520
73 01 01	550	1020	1090	940	1240	1350	1350	1350
73 01 01	865	550	680	750	750	775	800	825
73 01 01	175	129	129	138	100	100	100	100
73 01 01	363	1500	2100	2650	2650	2400	2550	2550
73 01 01	50	0	0	0	0	0	0	0
07 73 01 A	270	0	0	0	0	0	0	0
07 73 01 A	48	50	50	50	25	25	25	25
07 73 01 A	350	357	357	357	650	500	500	500
07 73 01 A	100	100	100	100	200	200	200	200
07 73 01 A	300	138		788				
	1000							
	250		138		250			
			1000		538			
						1300		
					1400		0	0
					400	2200	3500	3500
07 73 01 A	0	0	0	0	0	0	0	0
73 01	562	400	400	400	550	720	720	720
73 01	756	865	865	1020	1020	1250	1250	1200
73 01	1973	2975	2975	2620	3210	3650	3600	3600
73 01	269	250	250	250	330	330	330	330
73 01	250	410	410	310	340	400	350	300
08 73 01	63	225	225	0	30	30	30	30
08 73 01	0	0	0	140	140	50	50	50
08 73 01	34	145	145	100	100	40	40	40
08 73 01	158	0	0	0	0	0	0	0
08 73 01	50	30	30	160	160	80	80	80
08 73 01	350	0	0	0	0	0	0	0
			700		750			
					200			
					500			
06 73 01	0	0	0	0	0	0	0	0
					500			
					600	500	500	500
					0	500	500	500
					0	1000	1000	1000
					0	1500	1500	1500
					0	0	0	0
06 73 01	0	550	550	0	0	0	0	0
06 73 01	0	0	0	0	0	0	0	0
					1000	1000	1000	1000
06 73 01	0	500	0	0	0	500	500	500
06 73 01	0	0	900	0	0	0	0	0
			0	0	0	0	0	0
73 96	1141	1198	1198	1258	1258	1315	1374	1500
73 96	0	0	0	0	0	0	0	0
73 96	0	0	0	0	0	0	0	0
73 96	0	0	0	0	0	0	0	0
07 73 01 0	0	0	0	0	0	0	0	0
07 73 01 0	0	0	0	0	0	0	0	0
07 73 01 0	0	0	0	0	0	0	0	0
07 73 01 0	0	0	0	0	20000	25000	50000	25000
73 01	0	75	75	125	125	100	0	0
73 01	0	0	0	0	0	0	0	0
06 73 01	0	0	0	0	0	0	0	0
06 73 01	0	0	0	0	0	3000	5000	0
73 01 99	300	600	600	551	551	300	400	400
73 01 99	0	0	0	0	0	0	0	0
73 01 99	0	0	0	0	0	0	0	0
73 01 99	0	0	0	0	0	0	0	0
73 01 52	80	150	150	200	200	250	250	250
73 01 52	0	0	0	0	0	0	0	0
73 01 52	0	0	0	0	0	0	0	0
73 01 52	0	0	0	0	0	0	0	0
73 52	100	200	200	250	250	250	250	250

ADS #	FUNDING	PRIOR	CAT	FMP NO.	UBS	TITLES
356	2-CE	3	WH	KG-UBS 4		
356	3-GPP	3	WH	KG-UBS 4		
356	4-LIP	3	WH	KG-UBS 4		
357	1-OP EX	3	WH	KG-UBS 3	3.76	RAO PROCESS WASTE TREATMENT PLANT/DEC
357	2-CE	3	WH	KG-UBS 3		
357	3-GPP	3	WH	KG-UBS 3		
357	4-LIP	3	WH	KG-UBS 3		
358	1-OP EX	3	WH			NOT INCLUDED IN ORNL LRP
358	2-CE	3	WH			
358	3-GPP	3	WH			
358	4-LIP	3	WH			
359	1-OP EX	3	WH			
359	2-CE	3	WH			
359	3-GPP	3	WH			
359	4-LIP	3	WH			
360	1-OP EX	3	WH	USTS	3.91	UST INSTALLED AFTER 1965
360	2-CE	3	WH	USTS		
360	3-GPP	3	WH	USTS		
360	4-LIP	3	WH	USTS		
361	1-OP EX	3	CA	GPP		
361	2-CE	3	CA	GPP	3.81	GRAPHITE REACTOR CANAL LLU STORAGE &
361	3-GPP	3	CA	GPP	3.41	GROUNDWATER TREATMENT FACILITY
361	4-LIP	3	CA	GPP	3.86	REPLACE 25,000 GAL. FUEL OIL TANK AT
362	1-OP EX	1	ER	GPP/OE	6.33	GROUNDWATER MONITORING WELLS, PHASE I
362	2-CE	1	ER	GPP/OE		
362	3-GPP	1	ER	GPP/OE		
362	4-LIP	1	ER	GPP/OE		
363	1-OP EX	1	ER	DPGF800	5.03	REMEDIATION INVESTIGATIONS & FEASIBILITY
363	2-CE	1	ER	DPGF800		
363	3-GPP	1	ER	DPGF800		
363	4-LIP	1	ER	DPGF800		
364	1-OP EX	1	ER	KG-UBS 5	5.03	REMEDIATION INVESTIGATIONS & FEASIBILITY
364	2-CE	1	ER	KG-UBS 5		
364	3-GPP	1	ER	KG-UBS 5		
364	4-LIP	1	ER	KG-UBS 5		

Table 7.24 (continued)

			FY 90		FY 91											
			FY-89	TARGET	REQ.	TARGET	REQ.	FY-92	FY-93	FY-94	FY-95					
			BA	BA	BA	BA	BA	BA/BO	BA/BO	BA/BO	BA/BO					
OLD BAR			NEW BAR													
	KG 02 00 00 0	KG 73 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 73 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 73 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DECON.	KG 02 00 00 0	KG 73 96	100	200	200	250	250	250	100	100	100	100	100	100	100	100
	KG 02 00 00 0	KG 73 96	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	39 KG 73 96	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	39 KG 73 96	0	0	0	0	0	0	5000	10100	5100	5100	5100	5100	5100	5100
	GF 01 02 06 0	GF 73 01 01	350	400	400	400	400	400	400	400	400	400	400	400	400	400
	GF 01 02 06 0	GF 73 01 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GF 01 02 06 0	GF 73 01 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GF 01 02 06 0	GF 73 01 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GF 02 05 00 0	GF 73 01 51	350	670	670	650	650	300	300	300	300	300	300	300	300	300
	GF 02 05 00 0	35 GF 73 01 51 B	0	200	200	250	250	0	0	0	0	0	0	0	0	0
	GF 02 05 00 0	GF 73 01 51	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GF 02 05 00 0	GF 73 01 51	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 73 97	0	0	0	2000	2000	2000	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 73 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	2200	2000	2000	1000	1000	1000	1000	1000	1000
	KG 02 00 00 0	39 KG 73 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	500	500	0	0	0	0	0	0	0	0	0
								1000								
AT 7600 AREA								125								
	KG 02 00 00 0	39 KG 71 86 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RE III	KG 02 00 00 0	KG 72 91 01	735	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LITY STUDY	GF 11	GF 72 91 01	4640	8699	8699	330	330	0	0	0	0	0	0	0	0	0
	GF 11	GF 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GF 11	GF 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GF 11	GF 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LITY STUDY	KG 02 00 00 0	KG 72 91 01	1000	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KG 02 00 00 0	KG 72 91 01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GRAND TOTAL	75127	97683	120040	102286	135858	215545	246819	249066	157888					