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ORNL-6741

OAK RIDGE NATIONAL LABORATORY

MARTIN MARIETTA

Chemical Technology Division Progress Report for the Period July 1, 1991, to December 31, 1992

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

ORNL-6741

Chemical Technology Division Progress Report for the Period July 1, 1991, to December 31, 1992

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CHEMICAL TECHNOLOGY DIVISION REPORTS

ORNL-580	Period Ending December 31, 1949
ORNL-663	Period Ending February 28, 1950
ORNL-763	Period Ending May 31, 1950
ORNL-846	Period Ending August 31, 1950
ORNL-936	Period Ending November 20, 1950
ORNL-1000	Period Ending February 20, 1951
ORNL-1061	Period Ending May 20, 1951
ORNL-1141	Period Ending August 20, 1951
ORNL-1311	Period August 20, 1951, to February 10, 1952
ORNL-1328	Period Ending May 10, 1952
ORNL-1385	Period Ending August 20, 1952
ORNL-1448	Period Ending November 22, 1952
ORNL-1494	Period Ending February 20, 1953
ORNL-1708	Period Ending March 31, 1954
ORNL-1800	Period Ending September 30, 1954
ORNL-1881	Period Ending March 31, 1955
ORNL-2000	Period Ending September 30, 1955
ORNL-2079	Period Ending March 31, 1956
ORNL-2169	Period Ending August 31, 1956
ORNL-2392	Period Ending August 31, 1957
ORNL-2576	Period Ending August 31, 1958
ORNL-2788	Period Ending August 31, 1959
ORNL-2993	Period Ending August 31, 1960
ORNL-3153	Period Ending May 31, 1961
ORNL-3314	Period Ending May 31, 1962
ORNL-3452	Period Ending May 31, 1963
ORNL-3627	Period Ending May 31, 1964
ORNL-3830	Period Ending May 31, 1965
ORNL-3945	Period Ending May 31, 1966
ORNL-4145	Period Ending May 31, 1967
ORNL-4272	Period Ending May 31, 1968
ORNL-4422	Period Ending May 31, 1969
ORNL-4572	Period Ending May 31, 1970
ORNL-4682	Period Ending March 31, 1971
ORNL-4794	Period Ending March 31, 1972
ORNL-4883	Period Ending March 31, 1973
ORNL-4966	Period Ending March 31, 1974
ORNL-5050	Period Ending March 31, 1975
ORNL-5172	Period Ending March 31, 1976
ORNL-5295	Period Ending March 31, 1977
ORNL-5383	Period Ending March 31, 1978
ORNL-5542	Period Ending March 31, 1979
ORNL-5757	Period April 1, 1979, to March 31, 1981
ORNL-5933	Period April 1, 1981, to March 31, 1983
ORNL-6153	Period April 1, 1983, to March 31, 1985
ORNL-6343	Period April 1, 1985, to March 31, 1986
ORNL-6490	Period January 1, 1987, to June 30, 1988
ORNL-6596	Period July 1, 1988, to September 30, 1989
ORNL-6669	Period October 1, 1989, to June 30, 1991

CONTENTS

ACRONYMS AND INITIALISMS

A

AB	actinide burning
ACD	Analytical Chemistry Division
ACEIEP	Advisory Committee to the Electromagnetic Isotope Enrichment Program
AFB	Air Force Base
AFNEC	Air Force Nuclear Engineering Center (Wright-Patterson Air Force Base)
AFOSR	Air Force Office of Scientific Research
AICD	Advanced Industrial Concepts Division (DOE)
ALMR	advanced liquid metal reactor
ANL	Argonne National Laboratory
ASPEN	advanced system for process engineering
ASWEC	air stripping with emissions control
ATR	advanced test reactor
AVLIS	Atomic Vapor Laser Isotope Separation

B

BAT	best available technology
BCD	base-catalyzed destruction
BDAT	best demonstrated available technology
BES	Basic Energy Sciences (DOE)
BMP	best management practices (waste management)
BNL	Brookhaven National Laboratory
BR3	Belgian reactor (40 MW)
BSR	Bulk Shielding Reactor
BWR	boiling-water reactor

C

C&TD	Computing and Telecommunications Division
CDB	Characteristics Data Base
CDS	Chemical Development Section
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CERD	Central Environmental Restoration Division
CFRP	Consolidated Fuel Reprocessing Program
CH-TRU	contact-handled transuranic (waste)
Chem Tech	Chemical Technology Division
CLW	contaminated liquid waste
CMF	cask maintenance facility

CNSI	Chem-Nuclear Systems, Inc.
CO	capsule overpack
COG	cell off-gas
COMSORS	core-melt source reducing system
CORSOR	core source term (fission product release rates)
CPFF	cost plus fixed fee
CRADA	Cooperative Research and Development Agreement
CSD	critical solvent de-ashing
CTD	Chemical Technology Division
CW	chemical weapons

D

D&D	decontamination and decommissioning
DCE	dichloroethylene
DEM	Department of Environmental Management (ORNL)
DLWR	developmental light-water reactor
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE/CE	DOE Office of Conservation and Renewables
DOE-CH	Department of Energy, Chicago Operations
DOE/DP	DOE Office of Defense Programs
DOE/EH	DOE Office of Environment, Safety, and Health
DOE/EM	DOE Office of Environmental Restoration and Waste Management
DOE/ER	DOE Office of Energy Research
DOE/IN	DOE Office of Foreign Intelligence
DOE/NE	DOE Office of Nuclear Energy
DOE-OR	Department of Energy Field Office, Oak Ridge
DOE/RW	DOE Office of Civilian Radioactive Waste Management
DOE/UE	DOE Office of Uranium Enrichment
DOT	U.S. Department of Transportation
DP	Office of Defense Programs (DOE)
DT&E	Demonstration, Testing, and Evaluation Division

E

EASC	Emergency Avoidance Solidification Campaign
EC&A	Engineering Coordination and Analysis (Section)
ECAMP	Environmental Compliance Assessment and Management Program
ECT	environmental control technology
ECUT	Energy Conversion and Utilization Technologies
EDS	Engineering Development Section
EDX	energy dispersive X-ray analysis
EFPC	East Fork Poplar Creek
EIA	Energy Information Administration (DOE)
EIS	environmental impact statement
EM	DOE Office of Environmental Restoration and Waste Management
EOC	Emergency Operations Center
EP	environmental projects
EPA	Environmental Protection Agency
EPA/OSW	EPA Office of Solid Waste
EPRI	Electric Power Research Institute
ER	Office of Energy Research (DOE)

ERP	Environmental Restoration Program
ERS	Energy Research Section
ES&H	environment, safety, and health
ESD	Environmental Sciences Division
ESF	engineering-scale facility
EURATOM	European Atomic Energy Community (operating arm of the commission of the European communities in nuclear areas)

F

FBR	fluidized-bed reactor
FDER	Facilities Development and Engineering Resources
FE	fossil energy
FEP	Fossil Energy Program (DOE)
FFA	Federal Facilities Agreement
FFTF	Fast Flux Test Facility
FPDL	Fission Product Development Laboratory
FSAR	final safety analysis report
FSU	Florida State University
FTE	full-time equivalent
FWMS	federal waste management system
FWP	field work proposal (previously referred to as FTP/As)
FUSRAP	Formerly Utilized Sites Remedial Action Program

G

GCD	greater confinement disposal (now becoming actively studied)
GDP	gaseous diffusion plant
GE	General Electric
GET	General Employee Training
GPE	general purpose equipment
GPP	general plant project
GRI	Gas Research Institute

H

HASRD	Health and Safety Research Division
HAUP	high assay upgrade
HAZWDDD	hazardous waste development, demonstration, and disposal
HAZWRAP	Hazardous Waste Remedial Actions Program
HEDL	Hanford Engineering Development Laboratory
HFIR	High Flux Isotope Reactor
HI	horizontal, irradiated fuel (fission product release tests)
HLW	high-level waste
HMIS	hazardous materials inventory system
HQ	headquarters
HRLAF	high-radiation-level analytical facility
HRLEL	high-radiation-level examination laboratory
HS	horizontal, simulant fuel
HTGR	high-temperature gas-cooled reactor
HTML	High-Temperature Materials Laboratory (M&C)

I

I&C	Instrumentation and Controls Division
IAEA	International Atomic Energy Agency
ICP	inductively coupled plasma
ICPP	Idaho Chemical Processing Plant
IDB	Integrated Data Base (for all U.S. spent fuel and radioactive wastes)
IDO	Isotopes Distribution Office
IEA	International Energy Agency
IEF	Isotope Enrichment Facility (Building 9204-3)
IET	integrated equipment test (CFRP)
IFR	integral fast reactor
IFSP	Isotopes Facilities Shutdown Program
IPDP	Isotope Production and Distribution Program
IRML	Isotope Research Materials Laboratory
ISSV	in situ soil venting
ITE	in-tank evaporation
ITS	Isotope Technology Section

K

K-25 Site	Oak Ridge Gaseous Diffusion Plant, Main Site
KAERI	Korea Atomic Energy Research Institute
KEMA	Keuring Van Electrotechnische Materialen

L

LACE	light-water reactor aerosol containment experiments
LANL	Los Alamos National Laboratory
LDB	legislative data base
LDR&D	Laboratory-Directed Research and Development
LEAP	Large Einsteinium Activation Program
LLLW	liquid low-level waste (known to be radioactive)
LLW	low-level waste
LLWDDD	low-level waste disposal, development, and demonstration
LMFBR	liquid-metal fast breeder reactor
LMR	liquid-metal reactor
LWR	light-water reactor

M

M&C	Metals and Ceramics Division
MEHC	Metallurgical Examination Hot Cells
MHTGR	modular high-temperature gas-cooled reactor
MIT	Massachusetts Institute of Technology
MOX	mixed-oxide (uranium and plutonium) fuel
MRS	monitored retrievable storage
MSO	molten salt oxidation
MSRE	molten salt reactor experiment
MVST	Melton Valley storage tank
MWIP	Mixed Waste Integrated Program
MWTP	Mixed Waste Treatment Project

N

NAS	National Academy of Sciences
NE	Office of Nuclear Energy (DOE)
NEESA	Naval Energy and Environmental Support Activity
NEPA	National Environmental Policy Act
NFS	Nuclear Fuel Services, Inc.
NMP	Nuclear Materials Production (DOE)
NOS	Naval Ordnance Station
NPH	normal paraffin hydrocarbons
NRC	National Research Council
NRC	U.S. Nuclear Regulatory Commission
NRC/NMSS	NRC Nuclear Material Safety and Safeguards
NREL	National Renewable Energy Laboratory
NRWTP	Nonradiological Wastewater Treatment Plant
NSPP	Nuclear Safety Pilot Plant

O

O&G	oil and grease
OCRWM	Office of Civilian Radioactive Waste Management (DOE)
OGSCL	Office of Oil, Gas, Shale, and Coal Liquids (DOE/FE)
ORIGEN	Oak Ridge isotope generation and depletion code
ORIGEN2	Oak Ridge isotope generation and depletion code (revised)
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
ORRI	Oak Ridge Research Institute
ORRR	Oak Ridge Research Reactor
OSHA	Occupational Safety and Health Administration
OSOR	Office of Safety and Operational Readiness (CTD)
OSR	operational safety requirements
OTD	Office of Technology Development

P

PATS	Packaging and Transportation Safety Program
PBF	power burst facility
PCB	polychlorinated biphenyl
PCE	perchloroethylene
PDU	process design unit
PGDP	Paducah Gaseous Diffusion Plant
PIUS	process inherent ultimate safety
PIUS/BWR	process inherent ultimate safety/boiling-water reactor
PNL	Pacific Northwest Laboratory
POC	performance objectives and criteria
PRIME	passive safety, resilient safety, inherent safety, malevolence resistance, and extended time for aid
PSP	plasma separation process (Isotope Enrichment)
PW	process waste
PWR	pressurized-water reactor
PWTP	Process Waste Treatment Plant

Q

QA	quality assurance
QAC	quality assurance coordinator
QAR	quality assurance representative
QAS	quality assurance specialist

R

R&D	research and development
RAMSPAC	radioactive materials shipping and packaging
RCRA	Resource Conservation and Recovery Act
RD&D	research, development, and demonstration
RDDT&E	research, development, demonstration, testing, and evaluation
RDF	Radiochemical Development Facility
REDC	Radiochemical Engineering Development Center (Buildings 7920 and 7930)
RHO	Rockwell Hanford Operations
RL	Richland Operations Office (DOE)
RMC	research materials collection
RO	reverse osmosis
RPD	Radiochemical Processing Department
RPP	Radiochemical Processing Plant
RSI	Radiation Sterilizers, Inc.
RSMS	Resource Systems Management Section
RTS	Radiochemical Technology Section

S

S&M	surveillance and maintenance
S&T	scientific and technical (personnel)
SANS	small-angle neutron scattering
SAR	safety analysis report
SARA	Superfund Amendments Reauthorization Act
SARP	safety analysis reports for packaging
SAS	statistical analysis system
SASA	Severe Accident Sequences Analyses Program
SAXS	small-angle X-ray scattering
SDDP	Sludge Detoxification Demonstration Project
SDI	Strategic Defense Initiative
SEI	Space Exploration Initiative
SEM	scanning electron microscope
SERI	Solar Energy Research Institute
SERP	Sedimentary Rock Program
SETF	Solvent Extraction Test Facility
SFMP	Surplus Facilities Management Program
SLLW	solid low-level waste
SRO	Savannah River Operations (DOE)
SRS	Savannah River Site
SSMS	spark-source mass spectrometry
STI	Space Technology Initiative
STP	sewage treatment plant
SWSA	solid waste storage area

T

TBP	tributyl phosphate
TCE	trichloroethylene
TDHE	Tennessee Department of Health and Environment
TDS	total dissolved solids
TGT	thermal gradient tube
TM	technical manuscript
TMI	Three Mile Island
TPAP	Training Program Accreditation Plan
TRENDS	transport and release of nuclides in dominant sequences
TRU	transuranic (waste)
TRUST	thorium reactor uranium storage tank
TSCA	Toxic Substances Control Act
TSF	Tower Shielding Facility
TSS	total suspended solids
TTC	Transportation Technology Center, Sandia National Laboratories
TVA	Tennessee Valley Authority
TWSO	Transuranic Waste Systems Office

U

UC	University of California
UKAEA	United Kingdom Atomic Energy Authority
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USTID	Underground Storage Tank Integrated Demonstration
UT	ultrasonic testing
UTK	University of Tennessee, Knoxville

V

VI	vertical, irradiated fuel (fission product release tests)

W

WAG	waste area group
WEP	Waste Management and Environmental Programs
WESF	Waste Encapsulation Storage Facility
WFO	Work for Others
WHC	Westinghouse Hanford Company
WHPP	Waste Handling and Packaging Plant
WIPP	Waste Isolation Pilot Plant
WMCO	Westinghouse Materials Company of Ohio
WMES	waste minimization evaluation system
WMRAD	Waste Management and Remedial Action Division
WPAFB	Wright-Patterson Air Force Base
WPAS	Work Package Proposal and Authorization System (system including FTP/As and FWP/As)

X

X-10	Oak Ridge National Laboratory, Main Site

Y

Y-12	Martin Marietta Energy Systems, Inc., Weapons Production Plant (also, location of several ORNL facilities, such as Fusion Energy and Biology divisions)

Z

ZIRCOX	zirconium oxidation model used with fission product release tests

ABSTRACT

This progress report reviews the mission of the Chemical Technology Division (Chem Tech) and presents a summary of organizational structure, programmatic sponsors, and funding levels for the period July 1, 1991, through December 31, 1992. The report also summarizes the missions and activities of organizations within Chem Tech for the reporting period. Specific projects performed within Chem Tech's energy research programs, waste and environmental programs, and radiochemical processing programs are highlighted. Special programmatic activities conducted by the division are identified and described. Other information regarding publications, patents, awards, and conferences organized by Chem Tech staff is also included.

The Chemical Technology Division is committed to maintaining research, development, and demonstration (RD&D) capabilities among the best in the world in its mission areas. The Division's goal is to be recognized by its staff, peers, and sponsors for the quality of its management, its commitment to excellence in RD&D activities, and its consistent achievement of success in all programs. The Division will strive to create an environment that will be characterized by individual and institutional integrity and the recognition and proper management of environmental, health, and safety issues at all levels in the organization.

Chem Tech Vision

1. OVERVIEW

The Chemical Technology Division (Chem Tech) has outstanding personnel capabilities and facilities in chemical engineering and chemistry, as well as significant competence in several other engineering and scientific disciplines. It has major roles in a broad range of Oak Ridge National Laboratory (ORNL) programs for which chemical processing is a critical element. These programs are designed to explore selected aspects of nuclear and nonnuclear technologies and to develop advanced processes and systems to meet national priorities. Research and development (R&D) activities include basic and applied research and engineering, engineering development and assessments, and the operation of various pilot plants and specialized facilities. Most of the research programs are funded by the U.S. Department of Energy (DOE), although some important projects are carried out for other governmental agencies, and limited support is derived from industrial sources. The organizational structure of Chem Tech is shown in Fig. 1.1.

The primary mission of Chem Tech is to perform energy RD&D of importance to DOE, other federal agencies, Energy Systems, and the private sector in areas involving chemical, radiochemical, and biochemical engineering processes and related phenomena. The Division will operate special radiochemical facilities and manage selected programs in areas in which it has special competence where these activities support the pursuit of its primary missions.

The major strategic goals of Chem Tech are as follows:

- maintain and be recognized for world-class capabilities and performance in chemical engineering R&D, including biochemical and radiochemical engineering R&D, and in supporting research in process chemistry and applied biotechnology;
- maintain and be recognized for world-class capabilities and performance in developing, demonstrating, and evaluating integrated chemical technology at the unit operation, pilot plant, and large-scale levels;
- maintain core programs and develop new RD&D production and processing programs for transuranic (TRU) elements and radioactive and stable isotopes;

- develop and implement RD&D programs of national significance in the areas of environmental remediation and waste management;
- provide leadership within ORNL for the maintenance of relevant nuclear fuel cycle RD&D capabilities; and
- develop and implement new technology RD&D programs of significance to national energy efficiency programs.

Radiochemical processing programs within the Division emphasize operation of the Radiochemical Engineering Development Center (REDC) for DOE's Office of Basic Energy Sciences (DOE/BES) for the isolation, purification, and packaging of Bk, Cf, Es, and Fm for research uses. In addition to DOE/BES activities, the REDC is also conducting a long-term program for the recovery of Pu, Am, and Cm for other DOE sponsors. Irradiated materials processed as part of this program originate from DOE's Savannah River facilities. REDC programs were conducted under increasingly formal operational requirements as a result of DOE's evolving requirements for reactor and nonreactor nuclear facilities. Chem Tech continued to conduct hot cell programs for the U.S. Nuclear Regulatory Commission (NRC) on the transport and deposition of fission products under hypothetical nuclear reactor accident conditions. Chem Tech also engaged in supporting activities for ORNL's High-Temperature Gas-Cooled Reactor Program. Support activities for the Energy Systems Atomic Vapor Laser Isotope Separations (AVLIS) Program continued on flow sheets for feed preparation and product conversion.

Chem Tech continued to manage the Isotope Production and Distribution Program (IPDP) at ORNL during this period. Activities related to both stable isotopes and radioisotopes were conducted, but the program continued to be only marginally viable for fiscal reasons throughout the period as the national DOE IPDP struggled to operate under the full-cost recovery constraints imposed by Congress in 1989. Work continued in the Isotopes Facilities Shutdown Program (IFSP) with the objective of shutting down approximately 15 outdated buildings previously used in radioisotopes processing activities at ORNL. Given the long-term nature of expected radiochemical processing activities at ORNL and across the nation, Chem Tech continued to participate in planning efforts related to the Melton Valley Initiative.

Chem Tech is involved in nearly all aspects of Energy Systems' current waste management activities as well as in planning for future waste operations that will be acceptable to state and federal regulatory bodies. Working with groups at various other DOE and Department of Defense (DOD) facilities, Chem Tech personnel are also developing and demonstrating in the field a variety of advanced waste management and environmental control technologies. The Division is involved in DOE's work on permanent federal waste repositories for commercial radioactive wastes, providing support in systems integration, project management, waste packaging, and transportation. The Division continues to maintain DOE's national data base on present and projected radioactive waste in the United States and has a significant role in the development of data bases encompassing waste generated at all five Energy Systems sites. Chem Tech also conducted a recent survey to determine the production and storage of commercially generated mixed waste and currently available commercial mixed waste treatment capabilities. Chem Tech continued technical studies related to the actinide partitioning-transmutation concept leading to a significant role in the DOE Light-Water Reactor (LWR) Actinide Recycle Program.

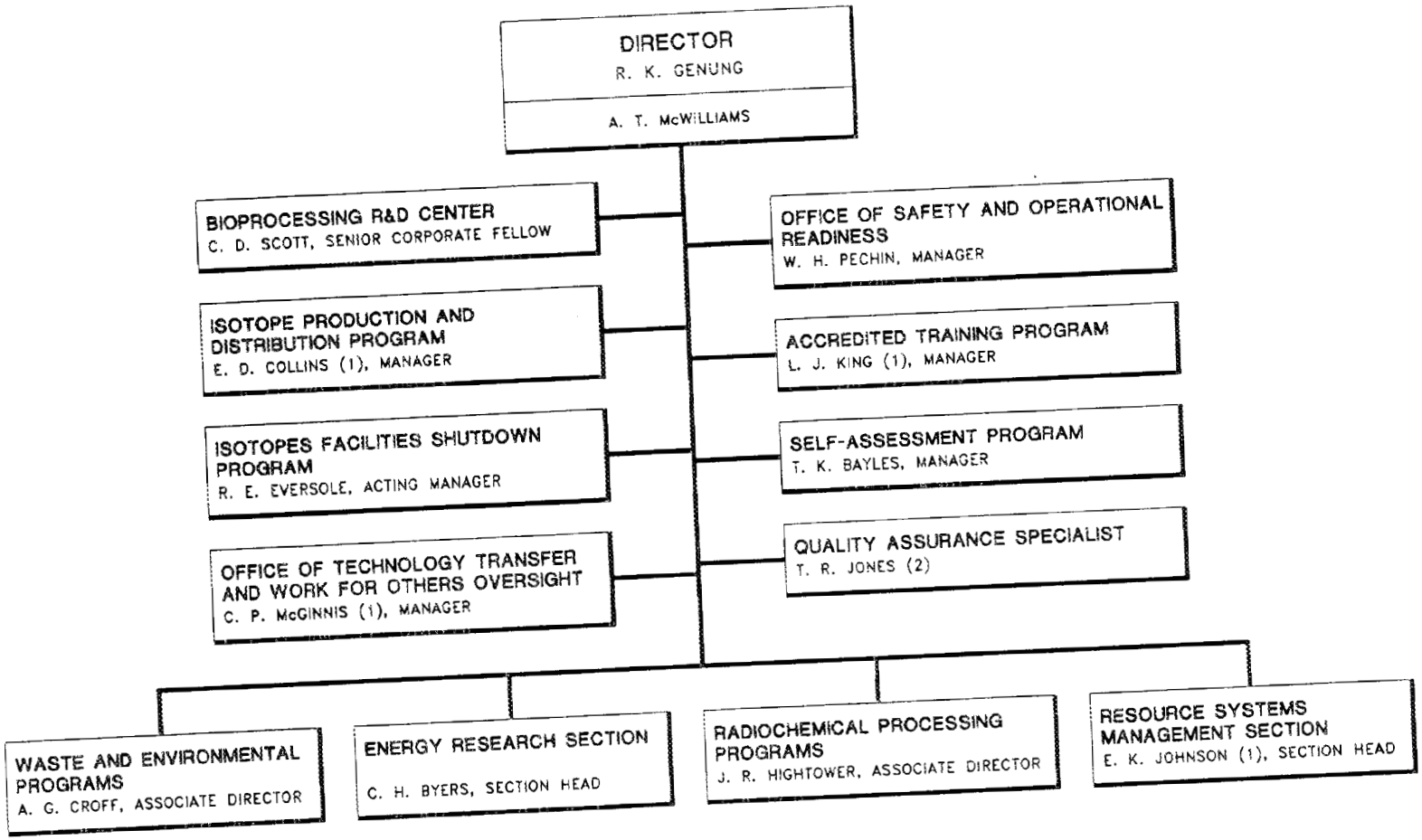
Chem Tech's basic research programs in chemical separations and bioprocessing continue to garner international respect and to attract industrial attention. Chem Tech personnel have played important roles in the establishment of the ORNL Bioprocessing Research and Development Center.

The Division staffing levels for fiscal years 1990 through 1993 are shown in Fig. 1.2. The total Chem Tech staffing level has remained relatively constant over this period, while a significant increase in the number of staff members devoted to RD&D activities has occurred—from 63% in FY 1990 to 75% in fiscal years 1992 and 1993. Over this same period, the Division budget has steadily increased, as shown in Fig. 1.3.

Chem Tech remains essentially a DOE division, with 90% of its FY 1993 funding coming from DOE sources, as shown in Fig. 1.4. The breakdown by DOE sponsor is shown in Fig. 1.5. Five DOE programs provide the majority of the Division's funding. Budget category EW includes projects funded by the Office of Technology Development and by Waste Management within DOE-EM. The funding in KC supports our basic research efforts in the Energy Research Section and the activities in the Heavy Element Program at the REDC. EX is the sponsor for the IFSP. Budget category GE provides funding for the Cf-252 Program and the U-233 Storage and Distribution Program. Funding for the Isotope Production and Distribution Program is provided via ST. Other miscellaneous DOE funding sources include coal (AA), nuclear energy R&D (AF), uranium enrichment (CD), nuclear waste fund (DB), energy conservation (ED), and environmental R&D-ES&H (HA).

ORNL DWG 93A-163

CHEMICAL TECHNOLOGY DIVISION
NOVEMBER 1992



1. DUAL CAPACITY
2. ON LOAN FROM OFFICE OF QUALITY PROGRAMS AND INSPECTIONS

Fig. 1.1. The organizational structure of the Chemical Technology Division.

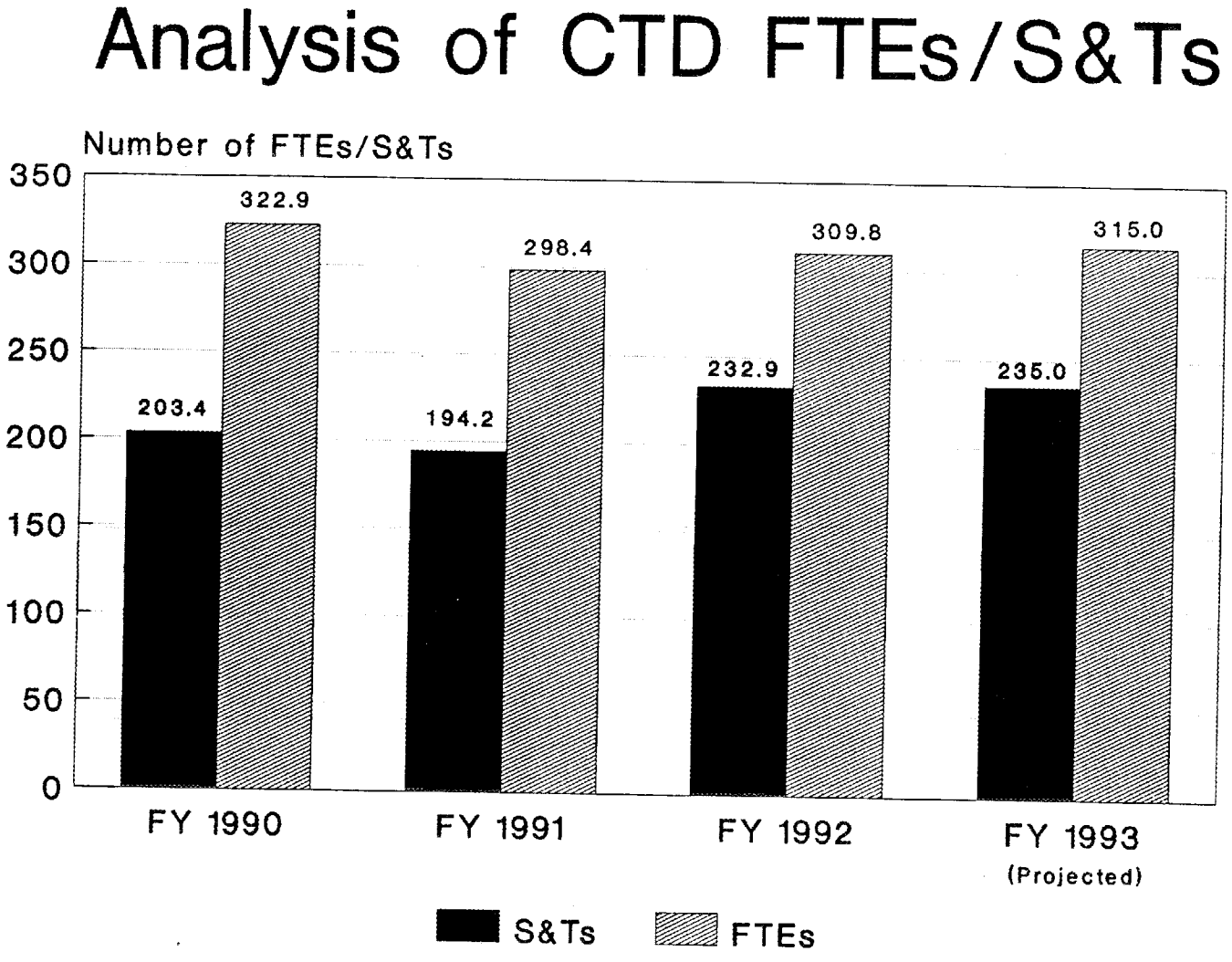


Fig. 1.2. The Division staffing levels for fiscal years 1990 through 1993.

Analysis of CTD BO/BA/CO

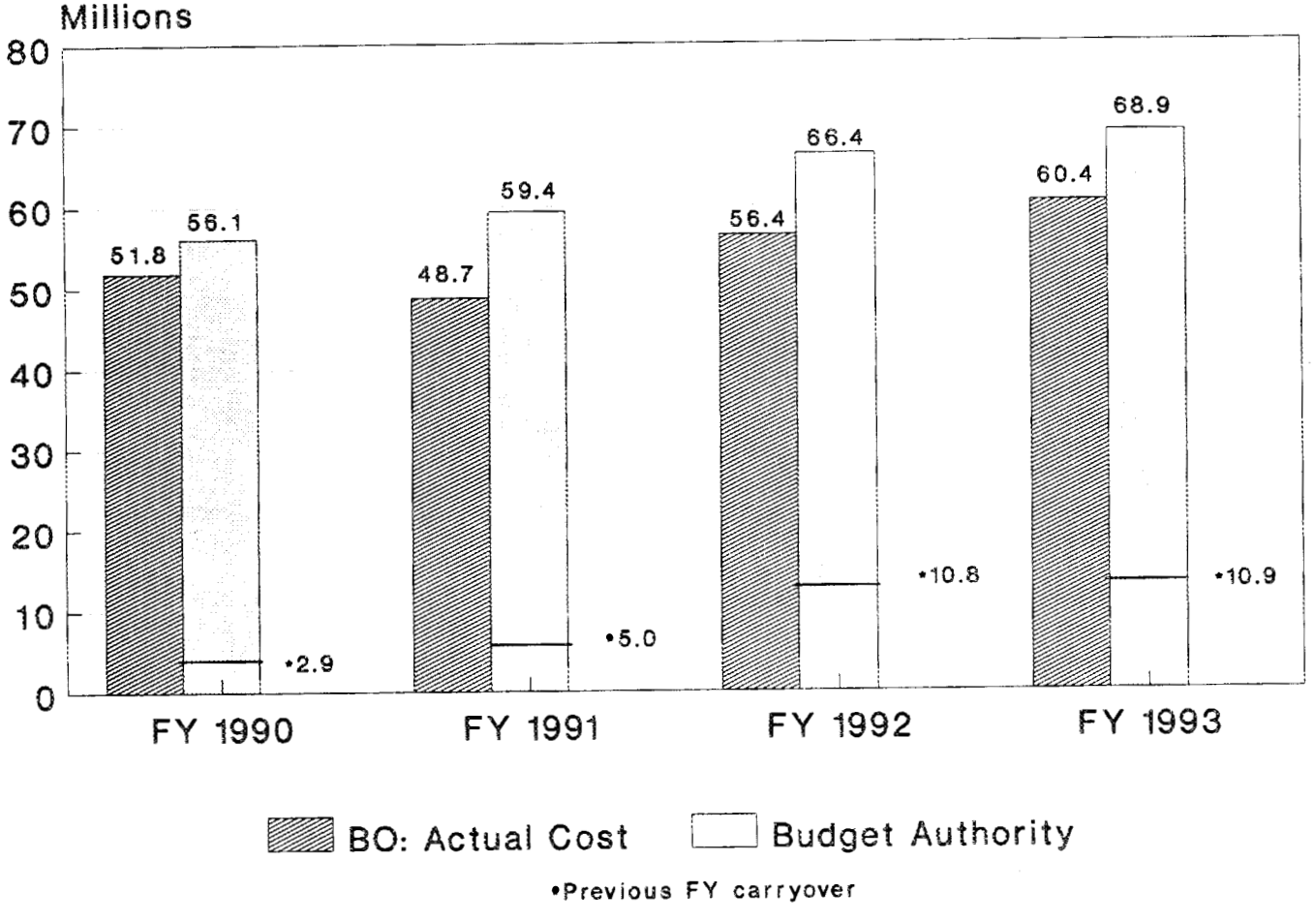
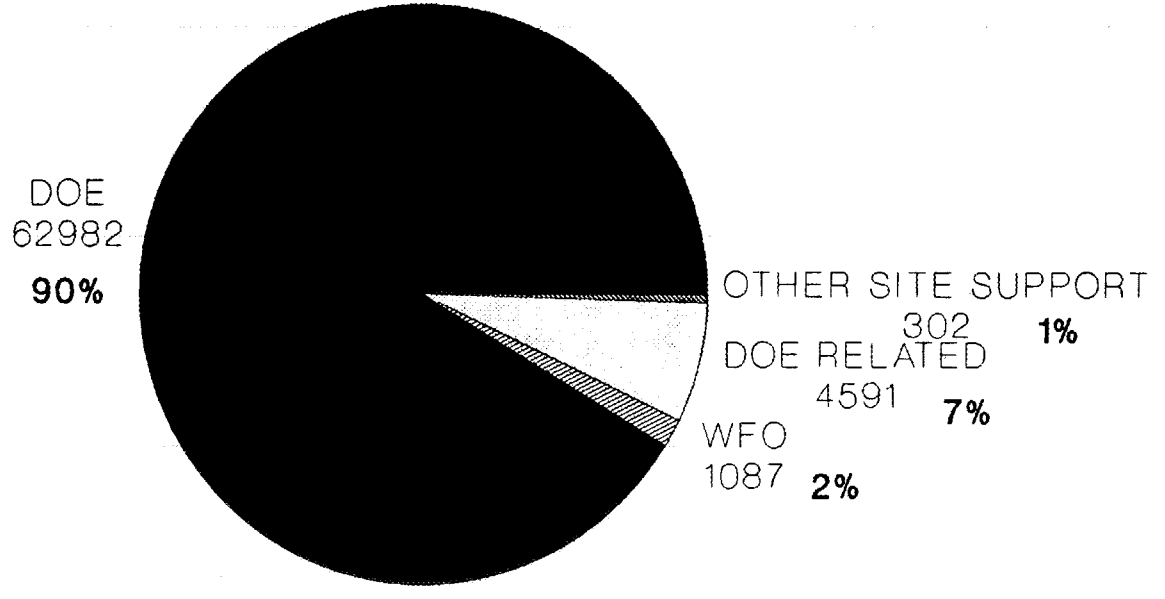


Fig. 1.3. The Division budget for fiscal years 1990 through 1993.

FY 1993 CTD TOTAL BA
BY SPONSOR

68,962

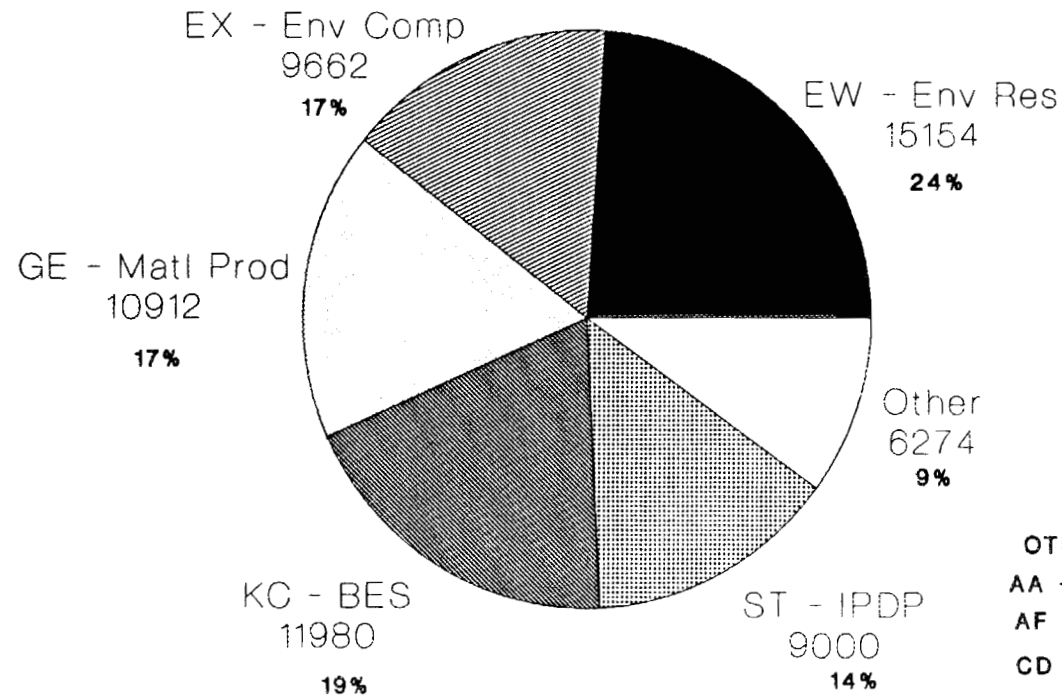


($K)

Fig. 1.4. Division sponsor support for FY 1993.

FY 1993 CTD TOTAL BA
By DOE Sponsor

62,982



($K)

OTHER:	
AA - COAL	1155
AF - NE R&D	1063
CD - UE	420
DB - NWF	1270
ED - EN CONS	1266
HA - ENV R&D	1100

Fig. 1.5. Division FY 1993 funding by DOE sponsor.

2. RADIOCHEMICAL PROCESSING PROGRAMS

The mission of the Radiochemical Processing Programs (RPP) organization in the Chemical Technology Division is to perform research, development, and demonstration in radiochemical processing, including processing of transuranium elements and other radioactive stable isotopes, related facility and program management activities, and process chemistry and radiochemical engineering related to all areas of the nuclear fuel cycle.

The organization of the RPP is shown in Fig. 2.1. All technical activities are conducted in three sections: Chemical Development, Isotope Technology, and Radiochemical Technology. The technical activities of the three sections in the RPP organization are summarized in Table 2.1. Activities in these areas include work with high-level radioactive materials and wastes; high-pressure, high-temperature operations with radioisotopes such as iodine and hazardous materials such as chlorine and fluorine; and large-scale campaigns involving processing of plutonium and transplutonium elements, maintenance of a ^{233}U repository, and decontamination of radioactively contaminated materials and facilities. Operation of the Radiochemical Engineering Development Center, a sister facility to the High-Flux Isotope Reactor, is included in this area.

The mission of the Chemical Development Section is to conduct basic and applied research and development leading to the definition of the chemical basis, constraints, and separations parameters for new chemical processing concepts needed for feed materials production, energy production, and waste management, especially in the nuclear fuel cycle. A summary of ongoing projects being conducted in the Chemical Development Section is presented in Table 2.2., while the organizational structure is shown in Fig. 2.2.

The Isotope Technology Section's mission is to develop and use reactor and separation technologies to produce radioisotopes and enriched stable isotopes and accomplish all program goals in accord with all applicable laws, DOE Orders, and regulations. Projects in the Isotope Technology Section are summarized in Table 2.3. Figure 2.3 illustrates the organizational role of the section.

The mission of the Radiochemical Technology Section is to manage and perform research, development, and demonstration of radiochemical processes for production and dispensing of radioisotopes and for radiochemical facility decontamination and decommissioning; to utilize specialized staff experience and facilities for the service function of packing and shipping all radioactive materials from ORNL; and to perform specialized engineering design functions for remotely operable experimental and radiochemical facility components. Table 2.4 lists the current research being conducted by the Radiochemical Technology Section. Its organization is shown in Fig.2.4.

Two major programs, the Isotope Production and Distribution Program and the Isotopes Facilities Shutdown Program, report directly to the Division Director, although all technical activities are carried out by members of the Isotope Technology Section and Radiochemical Technology Section within the RPP organization. These programs are summarized in Tables 2.5 and 2.6, respectively. The organizational structures are shown in Fig. 1.1. One additional project management responsibility is the Cesium Capsule Recovery Project, which reports directly to the Associate Division Director for RPP. A summary of the project is presented in Table 2.7. Its relationship to other RPP activities is shown in Fig.2.1.

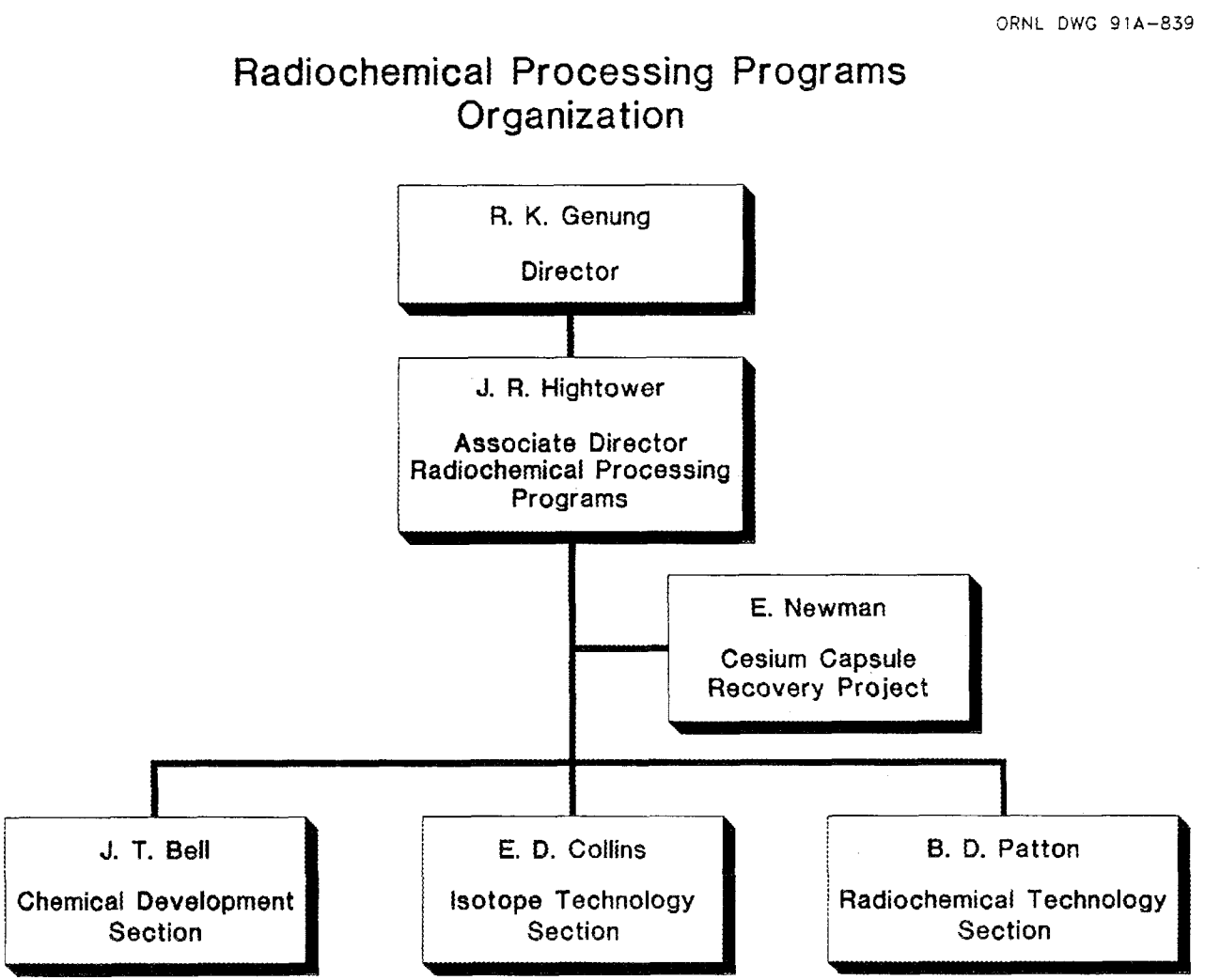


Fig. 2.1. The organizational structure of the Radiochemical Processing Programs.

Table 2.1. Radiochemical Processing Programs

Chemical Development [a] J. T. Bell Process R&D	Isotope Technology [b] E.D. Collins Large Radiochemical Projects	Radiochemical Technology [c] B. D. Patton Facilities Management and Engineering
Fission Product Transport Studies	Transuranium Elements for Research	^{85}Kr Loading and Shipping
Process Development for AVLIS Feed Material	^{252}Cf Neutron Sources	Packaging and Shipping Radioactive Materials
Chemistry of Radioactive Waste Isolation	Process Development	Process Development for AVLIS Product Material
	Enrichment of Stable Isotopes	Facility Engineering Support
High-Temperature Thermodynamics	Special Source and Target Materials	Decontamination and Decommissioning (D&D) Demonstrations
Chemical Development for Waste Treatment	Isotope Production and Distribution	Isotopes Facilities Shutdown Program
		^{233}U Storage and Distribution

[a] Buildings 4500N, 4501, 3038

[b] Buildings 7920, 7930, 9204-3

[c] Isotopes Circle; Buildings 3517, 3525, 3019

Table 2.2. Chemical Development Section Programs

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Thermodynamics and Kinetics of Energy-Related Materials (DOE/BES)	T. B. Lindemer	Measure and interpret chemical thermodynamics in applied technology ceramic systems. Presently, this project concerns the thermodynamics of the La-Ba-Cu-O system, with emphasis on the $La_{1+z}Ba_{2-z}Cu_3O_x$ superconducting phase.	300
Fuel Chemistry (NRC)	E. C. Beahm R. A. Lorenz M. F. Osborne	Continue to develop information on the release and subsequent behavior of the fission products released from light-water reactor (LWR) fuels under severe accident conditions. Hot-cell experiments with sections of spent fuel are revealing quantitative information on the radionuclides that are released from the spent fuel as it is heated in an H_2O or H_2 atmosphere to temperatures beyond fuel failure, to 2400°C. Other studies have determined the behavior of iodine and cesium in the reactor system and the containment building. This information is being used in new NRC regulatory guides. This effort has also shown that significant quantities of HCl will be produced in containments during severe accidents.	900
Inorganic Ion-Exchange Development for Waste Management (DOE/EM)	J. L. Collins D. J. Davidson B. Z. Egan	Establish treatment methods, with emphasis on developing and testing inorganic ionexchangers, for separating radionuclides from low-level liquid waste streams. Methods are developed and parameters are optimized for preparing inorganic ion exchangers in the form of microspheres, which have better physical properties than powders for use in continuous process applications. Microspheres of hydrous titanium oxide, hydrous zirconium oxide, titanium phosphate, and zirconium phosphate and composite microspheres containing sodium or potassium cobalt hexacyanoferrate embedded in hydrous titanium oxide have been prepared. These materials are evaluated for the removal of cesium, strontium, and uranium from various aqueous waste streams.	406

Table 2.2 Chemical Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Tank Waste Sludge Processing (DOE/EM)	E. C. Beahm B. Z. Egan J. L. Collins D. D. Lee R. A. Lorenz M. F. Osborne	Develop a comprehensive sludge/supernate processing flowsheet for the contents of radioactive waste stored in underground storage tanks. Several technologies are being examined for processing the sludges, and the comprehensive sludge processing flowsheet will be tested in an ORNL hot cell on sludges from the ORNL Melton Valley Storage Tanks (MVSTs). If necessary, modification of the waste to include the spectrum of wastes at other sites is planned for subsequent development. Comprehensive flowsheet testing is necessary to (1) establish the best set of processes to achieve the desired objectives, (2) select the preferred flowsheet, (3) verify that the recommended technologies are compatible, (4) provide a realistic assessment of the performance of the individual processes, and (5) generate operating results upon which a pilot plant can be designed. A companion program will develop thermodynamic models that will support the sludge dissolution process. Established computer routines will be used with thermochemical equilibria data to predict the distribution of various chemical species. Experimental measurements and analyses will be used to validate the model.	1650
Pyrophoric Processing (DOE/EM)	E. C. Beahm G. W. Parker	Develop new materials and processes by high-temperature methods. A lead borate material designed to be used in a Core-Melt Source Reducing System (COMSORS) was tested and found to perform well under conditions that are anticipated for a core melt during a severe nuclear reactor accident. In addition, a large-scale ashing facility has been fabricated to sample the ash and volatile materials from Y-12 burnable waste. This is part of a project plan to convert all clean burnable materials from Y-12 into supplemental fuel for the ORNL steam plant.	100

Table 2.2 Chemical Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Molten Salt Oxidation (MSO) for Hazardous Organic Liquid Wastes (DOE/EM)	B. Z. Egan P. A. Haas J. C. Mailen M. F. Osborne	Demonstrate the use of the MSO technology for the destruction of the hazardous components of certain mixed wastes. Rockwell International has developed the technology and has built and operated MSO systems. Chem Tech will participate in acceptance testing of a Rockwell MSO system for mixed waste treatment by conducting a demonstration operation in Oak Ridge with real Oak Ridge wastes.	700
AVLIS Feed Conversion Development (DOE/UE)	P. A. Haas D. D. Lee J. C. Mailen	Develop the preparation of UCl_4 from the reaction of uranium oxides from ores with carbon or CO and chlorine. The preferred concept for preparation of uranium metal for feed to an AVLIS uranium enrichment process is to use UCl_4 with recycle of chlorine from electrolytic cells. The chemical flowsheet conditions for a good utilization of chlorine and a collection of condensed uranium chlorides as product were demonstrated.	These studies were completed by mid FY 92.
Waste Form Development for LWR Actinide Recycle Program (DOE/NE)	M. Petek L. M. Toth	Conduct key experiments related to some of the pyroprocess waste forms of the proposed actinide recycle program, which would allow formation of solidified radioactive wastes directly from a contaminated molten salt stream, circumventing an aqueous solution step. The salt is to be removed and placed in a solidified waste form. Various natural and synthetic aluminosilicate minerals (zeolites, micas) are considered as the potential scavengers for these radioisotopes, which can be further thermally and/or chemically processed into a long-term immobilized waste form. The salt-mineral reaction products are being identified by X-ray powder diffraction. Alternative routes for the fluoride-containing melt where the fluoride has a destructive effect on the alumosilicates are being sought, such as sparging with a reactive gas ($SiCl_4$). The aim of the process is to recycle the molten salt stream, the sparging gases, and the hydrogen fluoride back into the process.	500

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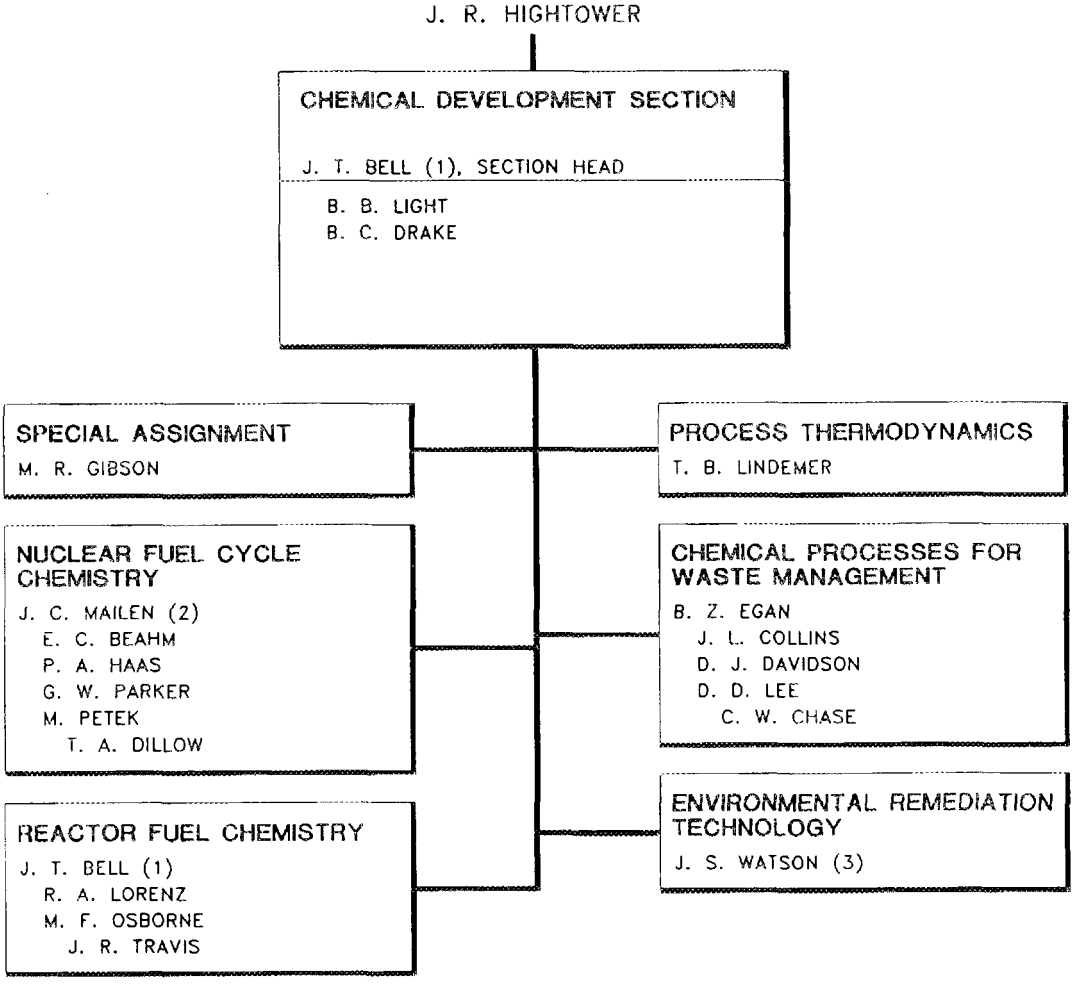


1. DUAL CAPACITY
2. SECTION QUALITY ASSURANCE COORDINATOR
3. TECHNICAL SUPPORT TO ENERGY SYSTEMS' CENTRAL ENVIRONMENTAL RESTORATION DIVISION

Fig. 2.2. The organizational structure of the Chemical Development Section.

Table 2.3. Isotope Technology Section Programs

Project and Sponsor	Principal Investigators		Objectives	Funding Estimates ($K)
Radiochemical Engineering Development Center (REDC) Facility Management and Regulatory Compliance (DOE/ER 58%; DOE/DP 42%)	C. W. Alexander R. T. Barnett J. E. Bigelow G. D. Campbell F. R. Chattin D. M. Galbraith G. F. Galloway J. C. Glover D. K. Jenkins M. E. Littleton	L. J. King J. B. Knauer D. H. Newman D. B. Owsley C. E. Roberts R. E. Schreiber R. J. Vedder P. W. Watts A. E. Wayland R. M. Wham	Provide safety; training; radiological control; quality assurance; documentation; occurrence reporting; corrective actions; and facility surveillance, maintenance, and modifications for the REDC.	7500
Isotope Enrichment Facility (IEF) Management and Regulatory Compliance (DOE/NE)	W. S. Aaron L. K. Bertram C. L. Fitzgerald J. C. Glover	D. R. Hines C. A. Sampson, Jr. J. G. Tracy C. C. Waggoner, Jr.	Provide safety; training; radiological control; quality assurance; documentation; occurrence reporting; corrective actions; and facility surveillance, maintenance, and modifications for the IEF.	1200
Mark 42 Accelerated Transportation/Segmentation (DOE/DP)	C. W. Alexander P. A. Balo R. J. Vedder A. E. Wayland		Design and install a dry storage facility for Mark 42 targets in REDC 7920, fabricate stainless steel shipping cans for the target segments, and provide transportation for the targets from Savannah River Site to Pacific Northwest Lab and from PNL to ORNL.	1100
REDC Liquid Waste Treatment Improvements (DOE/EM)	D. E. Benker W. D. Bond R. W. Brewer R. R. Brunson R. M. Wham	F. R. Chattin L. K. Felker R. G. Stacy D. F. Williams	Develop and implement improved methods of on-site treatment and solidification of REDC liquid waste solutions.	780

Table 2.3 Isotope Technology Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
High-Activity-Level Demonstration of TRUEX Process (DOE/EM)	D. E. Benker R. W. Brewer R. R. Brunson F. R. Chattin L. K. Felker R. G. Stacy R. M. Wham	Demonstrate high-activity-level application of the TRUEX flowsheet and obtain multistage solvent extraction data for verification of process models.	475
Transuranium Element Processing (DOE/ER) and Mark 42 Processing (DOE/DP)	C. W. Alexander, J. K. Arthur, P. D. Bailey, D. E. Benker, A. D. Boatman, R. W. Brewer, R. R. Brunson, F. R. Chattin, E. C. Clark, T. A. Dyer, C. W. Evans, L. K. Felker, B. L. Goodman, V. J. Guy, G. L. Johnson, J. B. Knauer, R. R. McMahon, M. M. Osborne, J. D. Pendleton, C. E. Porter, F. D. Riley, S. E. Shell, B. A. Smith, R. G. Stacy, T. L. Turner, R. M. Wham, J. T. Wiggins, R. H. Wiles, D. F. Williams, G. E. Woodall	Develop and use radiochemical processes for the recovery of transuranium elements and specific radionuclides from irradiated materials.	5000
^{252}Cf Industrial Sales/Loan Program (DOE/DP)	J. B. Knauer R. R. Laxson M. M. Osborne G. D. Owen C. M. Simmons R. M. Wham	Prepare Cf_2O_3 and palladium-californium cermet or alloy for sale or loan to domestic commercial users and fabricate and loan ^{252}Cf neutron sources to universities and government agencies.	900

Table 2.3 Isotope Technology Section Programs (continued)

Project and Sponsor	Principal Investigators		Objectives	Funding Estimates ($K)
Stable Isotope Enrichment (DOE/NE)	W. S. Aaron L. K. Bertram C. L. Fitzgerald J. R. Gibson J. C. Glover D. R. Hines L. E. McBride G. F. Montcalm	C. M. Myatt R. P. Norris J. H. Paehler B. P. Phillips C. A. Sampson, Jr. J. G. Tracy C. C. Waggoner, Jr.	Develop processes for preparation of enriched isotopes, and use these processes to supply domestic and foreign users.	1100
Radioisotope Production (DOE/NE)	C. W. Alexander J. E. Bigelow J. B. Knauer C. L. Ottinger S. E. Shell	C. M. Simmons J. T. Wiggins D. F. Williams R. H. Wiles	Prepare targets for irradiation and process irradiated targets to recover and purify specific radioisotopes.	250
Separations and Conversion Technology (DOE/ER and DOE/NE)	W. S. Aaron P. A. Balo W. D. Bond J. B. Knauer L. E. McBride	C. E. Porter C. A. Sampson, Jr. J. T. Wiggins D. F. Williams L. A. Zevenbergen	Prepare special chemical and physical forms of stable and radioisotopes and chemical compounds for a variety of experimental and productive uses.	1000
Isotope Product Distribution (DOE/NE)	B. A. Benton R. L. Cline T. A. Danner J. B. Knauer C. L. Ottinger J. G. Tracy		Distribute isotope products to the technical and business communities.	500

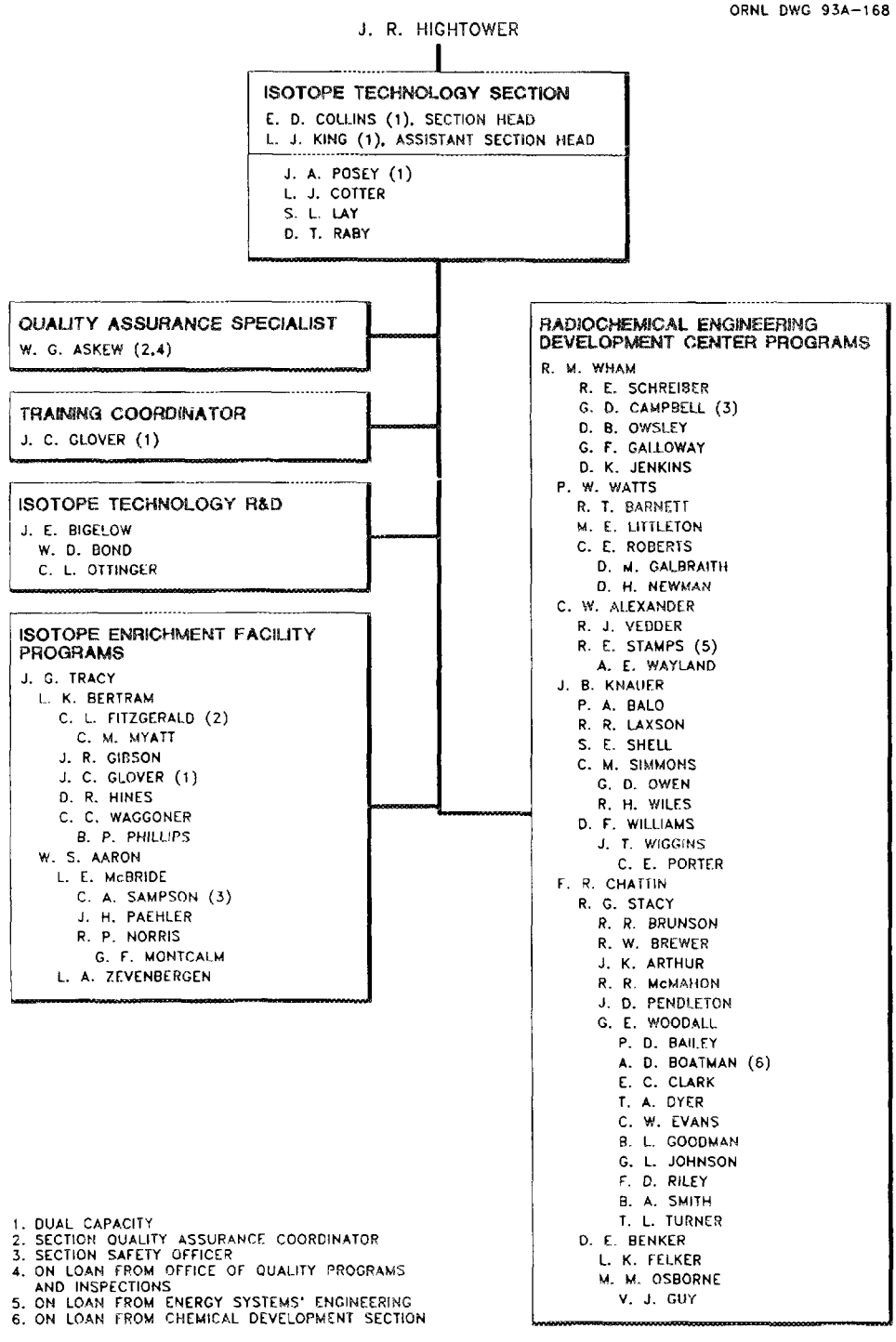


Fig. 2.3. The organizational structure of the Isotope Technology Section.

Table 2.4. Radiochemical Technology Section Programs

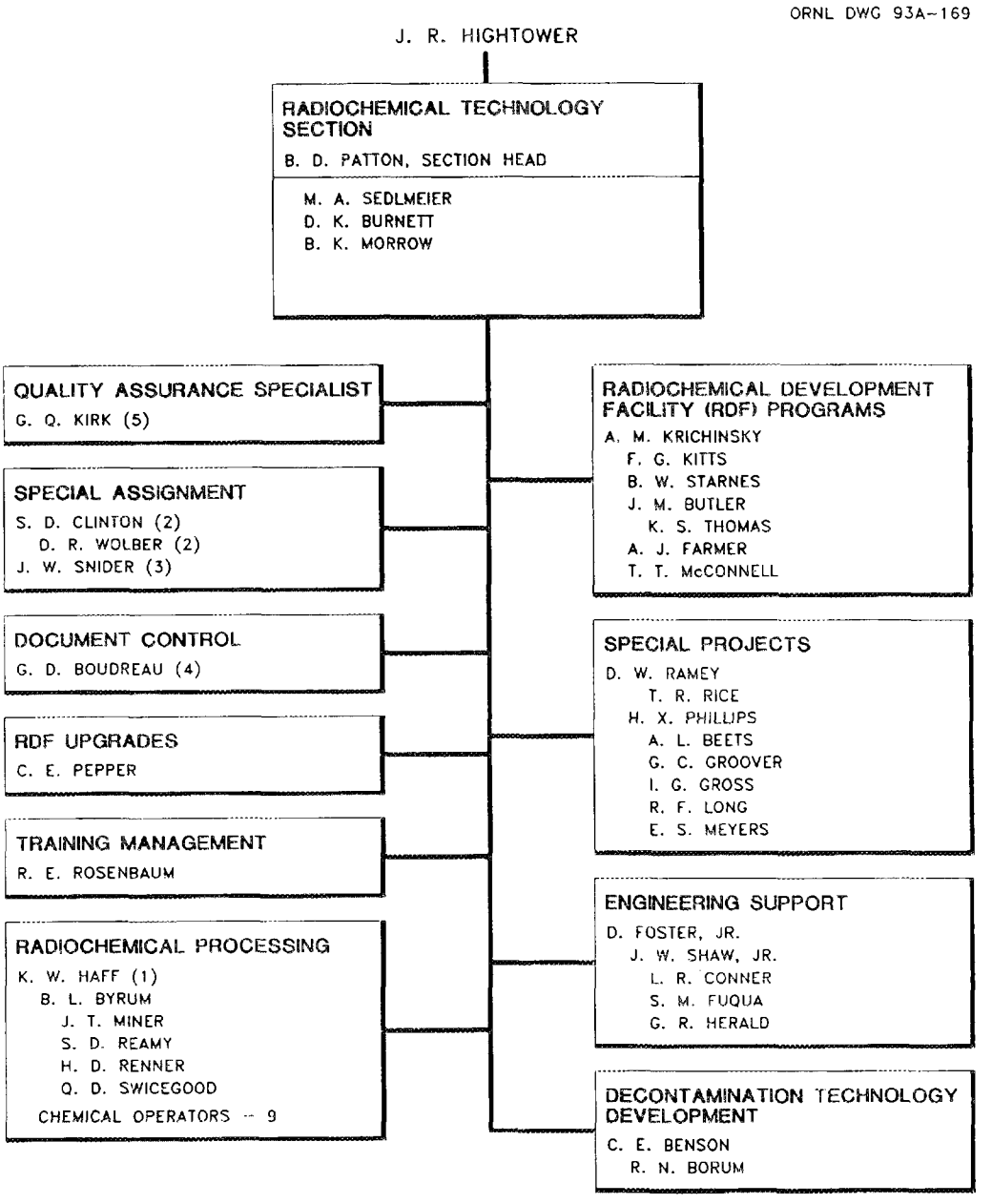
Project	Principal Investigators	Objectives	Funding Estimates ($K)
Radioisotope Production (DOE/NE)	D. W. Ramey J. R. Gibson H. X. Phillips	Provide radioisotopes and associated special services that are not available through private industry.	200
Isotopes Facilities Shutdown Program (DOE/EM)	K. W. Haff D. W. Ramey J. R. Gibson H. X. Phillips B. L. Byrum	Provide necessary technical and manpower support for shutdown activities (inventory movement, decontamination, waste removal, and surveillance) of surplus isotopes facilities.	3500
Radioactive Material Shipping and Packaging (RAMSPAC) (User Chargeback)	K. W. Haff S. D. Reamy	Provide support to all ORNL programs in shipping and packaging of radioactive materials that are sent from ORNL to off-site customers and research associates.	600
^{233}U Program (DOE/DP)	A. M. Krichinsky J. M. Butler A. J. Farmer B. W. Starnes T. T. McConnell	Evaluate, review, and upgrade equipment, facilities, management activities, and procedures for ^{233}U storage and distribution to satisfy current DOE requirements for environment, health, and safety compliance. ^{233}U storage and distribution involves maintenance of ^{233}U processing and support systems in long-term, safe standby condition in addition to the activities associated with the storage and distribution of ^{233}U.	2500
^{229}Th Recovery (Work for Others)	C. E. Pepper A. M. Krichinsky B. W. Starnes J. M. Butler	Recover ^{229}Th from thorium residuals for use in biological tracer studies.	150

Table 2.4 Radiochemical Technology Section Program (continued)

Project	Principal Investigators	Objectives	Funding Estimates ($K)
AVLIS Support (DOE/UE)	A. M. Krichinsky B. W. Starnes J. M. Butler A. J. Farmer T. T. McConnell	Provide kilogram quantities of UO_3 product for AVLIS enriched fuel fabrication evaluation.	300
Nuclear Fuel Service (NFS) Scrap Storage (DOE/EM)	C. E. Pepper A. M. Krichinsky B. W. Starnes J. M. Butler A. J. Farmer	Accept and safely store plutonium scrap for NFS decommissioning activities.	900
FFA Compliance Testing (DOE/EM)	C. E. Pepper	Design, build, and test a "large-scale" model of a doubly contained underground LLLW piping system. This system would incorporate calibrated "leaks" used to assess the ability of new leak detection/location technologies.	1500
Hot Cells Revitalization Program (DOE/ER)	D. Foster, Jr. C. E. Benson R. G. Grubb	Upgrade the facilities in Buildings 3525 and 3025 through expense-funded upgrades and GPE and GPP projects.	600
Decontamination Technology Development (DOE/ER)	R. G. Grubb C. E. Benson R. N. Borum R. Hall	Develop and demonstrate technologies for effective decontamination and decommissioning of facilities in the DOE complexes.	300
Microwave Concrete Decontamination (DOE/EM)	D. Foster, Jr. R. G. Grubb	Develop a microwave healing process to remove radiologically contaminated surface layers from concrete.	400

Table 2.4. Radiochemical Technology Section Program (continued)

Project	Principal Investigators	Objectives	Funding Estimates ($K)
Engineering Support Services (DOE/EM)	L. P. Pugh L. R. Conner D. Foster, Jr. S. M. Fuqua R. Hall J. W. Shaw, Jr. G. R. Herald	Supply engineering support services related to mechanical design, procedure development, and configuration management for the Radiochemical Technology Section, the Chemical Technology Division, and ORNL, as required.	700



1. SECTION SAFETY OFFICER
2. TECHNICAL SUPPORT TO ENERGY SYSTEMS' AVLIS SUPPORT
3. TECHNICAL SUPPORT TO ENERGY SYSTEMS' MIXED WASTE TREATMENT PROGRAM
4. ON LOAN FROM INFORMATION SERVICES DIVISION
5. ON LOAN FROM OFFICE OF QUALITY PROGRAMS AND INSPECTIONS

Fig. 2.4. The organizational structure of the Radiochemical Technology Section.

Table 2.5. Isotope Production and Distribution Program

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates (K)
Isotope Production and Distribution Program (IPDP)	E. D. Collins	Provide isotopes and related services for use in industrial, medical, educational, and research applications. The Programs's mission also includes development of new methods and equipment to produce, recover, and purify isotope products. The Oak Ridge mission within the DOE IPDP is to supply enriched stable isotopes, selected radioisotopes, and related technical services that can be made available using the DOE facilities and capabilities managed by the DOE Field Office, Oak Ridge (OR) and managed by Martin Marietta Energy Systems, Inc. These facilities and capabilities include the Isotope Enrichment Facility (Calutrons) located at the Y-12 Plant, the High Flux Isotope Reactor (HFIR), and the various radiochemical processing facilities [such as the REDC, and the special capabilities of the Isotope Research Materials Laboratory (IRML)]. Other capabilities [such as the Plasma Separation Process (PSP)] may be brought on-line as new markets are identified and developed.	7500

Table 2.6. Isotopes Facilities Shutdown Program

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Isotopes Facilities Shutdown Program (DOE/EM)	R. E. Eversole B. D. Patton	Formally shut down 16 former isotope production and distribution facilities. This effort includes the necessary immediate surveillance and maintenance (S&M) of their present condition while, simultaneously, preparing the facilities for turnover to DOE's D&D Program. The facilities must be emptied of all hazardous materials, cleaned up of all transferrable contamination, placed in a secure state, and equipped with appropriate monitoring systems for long-term S&M by the D&D Program before eventual decommissioning.	FY 1991 - 9,100 FY 1992 - 9,600 FY 1994 - 17,3000 FY 1995 - 22,800 FY 1996 - 10,200

Table 2.7. Cesium Capsule Recovery Program

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
RSI Leased Cesium Recovery	E. Newman	Identify and remove a leaking DOE leased, ^{137}Cs radiation source capsule from a storage pool at the Radiation Sterilizers, Inc. (RSI), facility in Decatur, GA; return all other sources to the Waste Encapsulation and Storage Facility (WESF) in Hanford, WA; and decontaminate and remediate the RSI site to achieve free release of the facility for unrestricted use. This project will be completed in January 1993. The efforts to complete the remediation were intensified in FY 1992, and the site decontamination was accomplished by September 1992. Following the decontamination, two confirmatory surveys were initiated: the first by the decontamination subcontractor and the second by the State of Georgia. These detailed surveys were completed in November, and the results of the surveys together with the recommendation that the facility be released for unrestricted use were presented to the Division of Natural Resources, Georgia. The State of Georgia will return control of the facility to RSI for unrestricted use on January 6, 1993. This action will complete the commitment made by DOE to provide support for the remediation of the site.	2510

3. WASTE MANAGEMENT AND ENVIRONMENTAL PROGRAMS

The mission of the Chemical Technology Division's Waste Management and Environmental Programs (WEP) is to perform research, development, and demonstration (RD&D) work of importance to DOE and other federal agencies in areas involving waste management and environmental control technology, studies and evaluations, and project/program management.

The organization of WEP is shown in Fig. 3.1. Although virtually all of WEP's technical activity occurs in its two component sections, there are important activities performed by managers reporting to the WEP Associate Director. These activities are summarized in Table 3.1 (WEP program summaries).

The Engineering Coordination and Analysis (EC&A) Section has as its primary missions process design; engineering coordination; technology and economic assessments; systems analyses; technical support; and computer applications such as large data bases, transportation system and process modeling, and artificial intelligence and expert systems techniques. The section is composed of scientists and engineers whose collective experience in all areas of division work provides the basis for expert technical assistance to the division, the Laboratory, the Oak Ridge Complex, and other organizations. A summary of current EC&A research is presented in Table 3.2, while Fig. 3.2 illustrates its organizational structure.

The primary missions of the Engineering Development Section are research, development, demonstration, testing, and evaluation of innovative processes for mitigation of problems associated with waste and the environment. Of prime importance is the application of chemical engineering principles toward the solution of these problems. The scope of work includes addressing a broad spectrum of wastes (e.g., solid, liquid, and gaseous; hazardous, radioactive, and mixed) with a broad spectrum of potential processes (e.g., physical/chemical, biological, solidification/immobilization). The section is composed of engineers, scientists, and engineering technicians whose collective experience enables the section to pursue work ranging from basic research to applied development and to provide expert technical assistance to other areas of the division as well as to other organizations within and outside of Martin Marietta Energy Systems. Projects being conducted by the section are summarized in Table 3.3. A section organization chart is presented in Fig. 3.3.

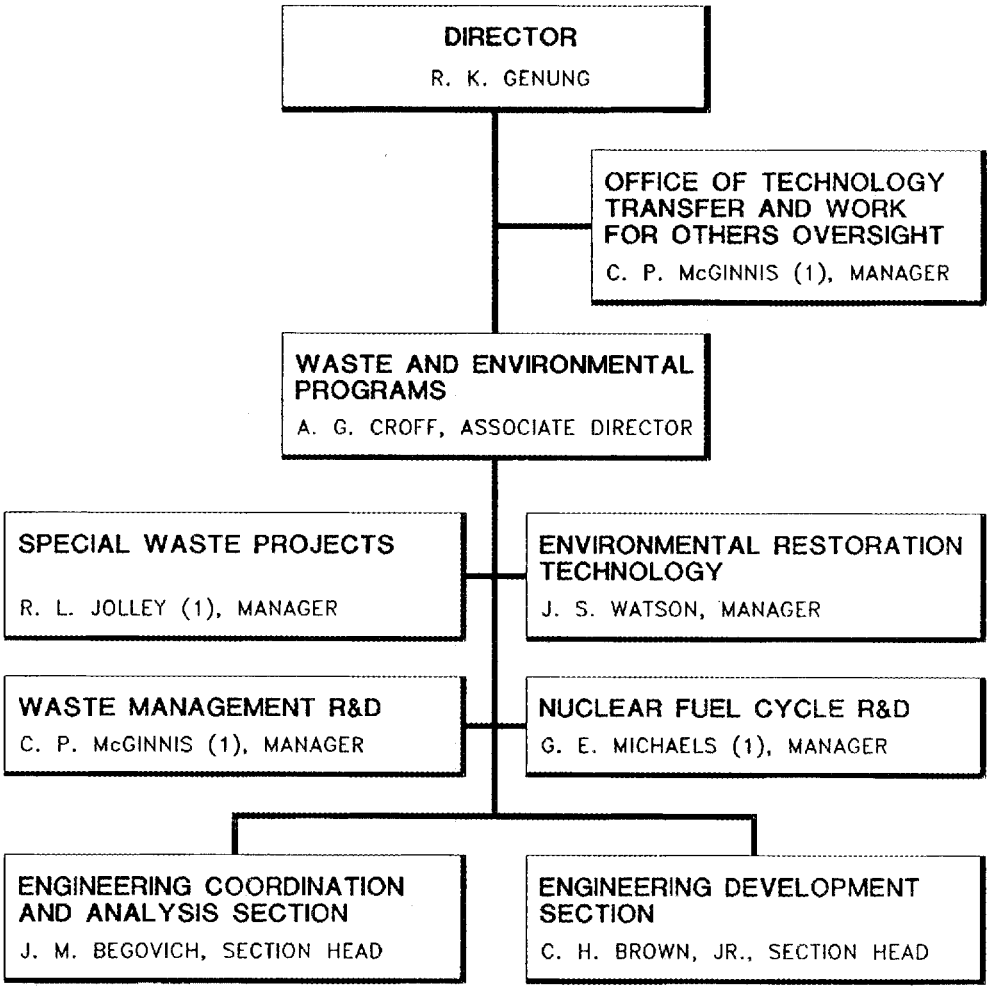
During this report period, the Office of Civilian Radioactive Waste Management (DOE/RW) and the Office of Environmental Restoration and Waste Management (DOE/EM) were the major (nearly exclusive) sponsors of WEP work. DOE/RW funding arrives in a relatively straightforward manner through DOE and the Oak Ridge Field Office (DOE-OR), although future support in this area is expected to be obtained via the DOE/RW Management and Operating Contractor in the Work for Others program:

- directly from the DOE/EM Office of Technology Development;
- from DOE/EM organizations responsible for environmental restoration and waste management through Energy Systems' central organizations having responsibility in these two areas;
- from ORNL's Office of Waste Management and Remedial Actions, which is responsible for waste management at the X-10 site; and
- from DOE/EM through waste management and environmental restoration organizations at other Energy Systems and DOE sites.

Although the future is uncertain, we expect slow declines in DOE/RW funding as the new integration contractor exerts itself. Funding from all branches of DOE/EM is expected to grow slowly for the next few years and then stabilize. Eventually, declines are to be expected in DOE/EM funding. We are making concerted efforts to diversify funding agencies by increasing our work for DOE/CE (Conservation and Renewables), DOD, and NASA. We also expect technology transfer, in general, and Cooperative Research and Development Agreements (CRADAs) to be important components of all programs.

ORNL DWG 91A-835

WEP ORGANIZATION CHART



	EXEMPT	NONEXEMPT	TOTAL
EC&A	42	8	50
EDS	22	16	38
WEP	5	3	8
TOTAL	69	27	96

1. DUAL CAPACITY

Fig. 3.1. The organizational structure of the Waste and Environmental Programs.

Table 3.1. Waste Management and Environmental Programs

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Hazardous Waste Technology Program DOE/EM and Work for Others (WFO) Waste Management R&D Program Management (DOE/EM & WFO)	C. P. McGinnis	Provide the program management for all waste management R&D tasks sponsored by DOE/EM (Leo Duffy) or WFO sponsors. Provide Chemical Technology liaisons with DOE/CE and DOE/DP initiatives. Serve as CTD representative on WFO committees. Serve as the CTD clearinghouse for CRADAs. The primary activity is the identification and initiation of new tasks. Other major aspects of the job include project control (schedule and budget), reporting, and technical coordination.	200
Environmental Restoration Technology Environmental Restoration R&D Technical Support (DOE/EM)	J. S. Watson	Contribute expert technical advice and support to Energy Systems' Central Environmental Restoration Division (CERD). Specifically, CERD technology needs are identified and assessed. Promising technologies are then sought and R&D stimulated if technologies are not available.	250

Table 3.1 Waste Management and Environmental Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Guidance Manual for Conducting TechnologyDemonstration Activities (DOE/EM)	R. L. Jolley M. I. Morris S. P. N. Singh	Prepare guidance manual to assist Energy Systems' staff in conducting waste management or environmental restoration technology demonstrations. The document (*Guidance Manual for Conducting Technology Demonstration Activities*, ORNL/TM-11848) was prepared in checklist style to facilitate its use. The guidance manual presents an integrated, stepwise process for accomplishment of the many regulatory, management, and operational action items required for successful accomplishment of technology demonstrations.	50

Table 3.2. Engineering Coordination and Analysis Programs

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Advanced Technology and Assessments			
LWR Actinide Recycle Program (DOE/NE)	G. E. Michaels L. M. Toth M. Petek S. B. Ludwig T. D. Welch W. D. Bond E. Newman	Provide technical support to DOE/NE and Argonne National Laboratory for the development of a pyrochemical process for reprocessing light-water reactor (LWR) fuel. This task includes (1) developing a high-level waste form technology for fission product-bearing molten salts, (2) developing a mechanical process for decladding LWR, and (3) evaluating options for disposition of reprocessed uranium streams and developing supporting technologies.	1000
Nuclear Fuel Cycle Externalities (DOE/EP)	G. E. Michaels S. B. Ludwig W. J. Reich	Manage and provide technology analyses for an evaluation of the total "social costs" or externalities of nuclear power including effects of the nuclear fuel cycle on public health and on ecosystems. This study is part of a larger comparative evaluation of the social costs of all major electricity production technologies.	200
Support to National Security Programs Office (DOE/IN)	E. Newman J. W. Roddy C. W. Forsberg W. J. Reich R. E. Norman*	Provide technical support to the Martin Marietta Energy Systems, Inc., National Security Programs Office. This work supports technology assessments and export control assessments.	800
ORIGEN2 Upgrade (DOE/RW)	S. B. Ludwig	Continue enhancement work and initiate verification and validation of ORIGEN2. ORIGEN2 is essential for predicting radionuclide characteristics of spent fuel and HLW. OCRWM intends to use ORIGEN2 to support the design and licensing-related activities of the repository, as well as to develop the Characteristics Data Base.	140
Core-Melt Source Reduction System (COMSORS) (DOE/NE)	C. W. Forsberg E. C. Beahm G. W. Parker	Develop new chemistry-based core catcher concept for DOE/EPRI/GE advanced LWRs.	10

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
High-Level Waste Tank Advisory Panel (DOE/EM)	C. W. Forsberg E. D. Collins T. S. Kress*	Support DOE in resolution of HLW tank safety issues.	200
Acceptability of Nuclear Power (ORNL)	C. W. Forsberg	Identify long-term requirements to make nuclear power acceptable on a very large scale.	100
Temperature-Initiated Passive Cooling System (DOE/NE)	C. W. Forsberg J. C. Conklin*	Develop new containment cooling system for a modular high-temperature gas-cooled reactor (MHTGR).	50
Strategic and Contingency Support (DOE/RW)	C. W. Forsberg E. Peelle*	Support DOE repository planning studies. Identify wastes other than spent fuel and vitrified waste that will require repository disposal and evaluate performance issues.	50
Transportation Risk Assessment (DOE/EM)	W. J. Reich S. B. Ludwig	Perform comprehensive assessments of transportation risks from the shipment of radioactive and hazardous materials and wastes for DOE. The RADTRAN 4 computer code, developed and maintained by Sandia National Laboratories for DOE, is the primary tool used to evaluate radiological consequences of incident-free transportation, as well as the radiological risks from vehicular accidents during transportation.	250
Modeling and Integrated Data Analysis			
Aerosol Models for VICTORIA (NRC)	I. W. Osborne-Lee	Develop and encode aerosol models for the VICTORIA code and assist with the validation of the code. This work is in accordance with the VICTORIA code development and assessment plan. The efforts are consistent with the code structure provided by Sandia National Laboratories and the aerosol and oxidation models provided by the United Kingdom and Atomic Energy of Canada, Ltd. (AECL).	120

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
On-site Transportation Analysis Tools (DOE/EM)	I. W. Osborne-Lee	Develop easy-to-use, accepted methodologies for evaluating and documenting the safety of on-site transportation activities. This work will result in an approach and tools with which to assess the risk associated with hazardous shipments at DOE sites. This work will provide DOE and DOE facilities with a straightforward and consistent means of assessing on-site transportation performance in accordance with the upcoming DOE Order 5480.X.	280
Expert System for Radioactive Material Transportation (DOE/EM)	J. J. Ferrada	Develop a prototype expert system that provides straightforward and consistent application of hazardous materials transportation regulations. The interactive system is designed to give users access to information that previously could only be obtained from an expert in radioactive materials shipping.	300
Performance System Analysis for the Mixed Waste Integrated Program (DOE/EM)	J. J. Ferrada	Support the decision making process for the DOE/EM-50 Mixed Waste Integrated Program (MWIP) and the EM-Mixed Low-Level Waste Program. This activity consists of two tasks. The first is to compare the performance of alternative technologies to the baseline technology developed by the Mixed Waste Treatment Project (MWPT). The baseline technology (i.e., commercially available technologies) and waste management strategies will be evaluated systematically by using the ASPEN PLUS simulation program. Alternatives to the baseline technology will be analyzed by using a user friendly program (FLOW) that is in the prototype stage of development. This program will be capable of communicating information to the ASPEN PLUS program. FLOW will calculate rough order-of-magnitude mass and energy balances to assess the performance of the alternative technologies as compared to the baseline process. The second task focuses on identifying key requirements for pilot-scale testing and multidecision criteria for the selection methodology.	200

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Advanced Waste Minimization Methodology-Waste Minimization Evaluation Model (WMES) (DOE/EM)	B. R. Rodgers J. J. Ferrada	Development of a prototype of an advanced waste minimization evaluation system (WMES). The framework for the methodology is within the windowing environment of a PC-based expert system that will lead the user through a waste minimization process tailored for their specific circumstances by the expert knowledge embodied in the shell. The operation on PC machines makes it available to most waste generators. In addition, it can easily be made portable to other platforms, if necessary.	100
Safety and Regulatory Technology			
ES&H Packaging and Transportation Safety Program (DOE/EH)	M. J. Welch L. S. Dickerson R. M. Gove L. B. Shappert	Provide technical and program management support to DOE/EH transportation and packaging safety activities, including conducting the EH oversight assessment program, providing technical reviews, developing guidance documents, and assisting in the implementation of EH regulatory and standards programs.	1100
Safety Analysis Reports for the Gaseous Diffusion Plants (DOE/NE)	J. L. Kasten R. J. Andermann, Jr.	Provide preliminary analysis to support the safety analysis for the different facilities at the Paducah, KY, and Portsmouth, OH, Gaseous Diffusion Plants. Work includes preliminary hazards analysis, hazards and operability analysis, event tree analysis, and fault tree analysis.	540
Technical Assistance to DOE/EM	S. M. Gibson	Provide technical support and liaison between the Office of Technology Development (OTD)/HQ Demonstration, Testing, and Evaluation (DT&E) Division and ORNL.	180
NEPA Coordination (DOE/EM)	M. L. Saint-Louis	Provide NEPA coordination support to ORNL Waste Management and Remedial Action Division (WMRAD). Activities include the initiation, preparation, and review of appropriate NEPA documents with other ORNL divisions. In addition, a WMRAD NEPA compliance strategy will be continued, along with tracking of WMRAD NEPA projects.	120

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Waste Characterization (DOE/EM)	M. B. Sears	Characterize the liquid wastes and sludges in the liquid low-level waste tanks. Provide data on the Group 6 waste tanks to comply with requirements of the Federal Facilities Compliance Agreement and support transfer of these tanks to the Environmental Restoration Program.	80
Safety Documentation Review, Upgrade, and Preparation (DOE/ER)	W. J. Armento M. B. Sears	Provide support to other Chem Tech sections, primarily for the REDC and isotopes facilities, for assessment and revision of existing safety documentation and for preparation of new documentation. Preliminary hazards screening, event tree analysis, and qualitative evaluations of existing documentation and planning of future Phases II and III efforts are required for at least 18 facilities. Phase I included the Safety Analysis Report Update Program with hazards screening for nine facilities. Revised and approved Safety Analysis Reports and Operating Safety Requirements for operating facilities, as required, are the final objectives.	450
Integrated Data Base Program (DOE/EM, DOE/RW)	J. A. Klein S. N. Storch R. C. Ashline H. W. Godbee C. R. Myers* R. L. Pearson T. C. Wright* R. Salmon	Maintain the Integrated Data Base (IDB), the official DOE data base for spent fuel and radioactive waste inventories and projections. The IDB Program is jointly sponsored by DOE's Office of Environmental Restoration and Waste Management (EM) and the Office of Civilian Radioactive Waste Management (OCRWM). The goal of the IDB is to create and maintain a reliable, consistent baseline of quality data and information to be used for national program management activities. As the official data base for DOE, the IDB is readily available to the DOE community and to DOE-sponsored contractors.	1500

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Internal Surveillance for Nuclear Criticality Safety at ORNL Building 3019 (DOE/NE)	R. C. Ashline	Identify and examine pertinent nuclear safety review documents relating to the storage of fissile materials in Building 3019 to determine that ORNL is in compliance with DOE Orders and related ANSI/ANS Standards. The goal of this program is to demonstrate that fissile materials handled in the "Penthouse" of Building 3019 will be subcritical under both normal and credible abnormal conditions.	125
Accident Analysis of Paducah GDP High Assay Upgrade (HAUP) (DOE/NE)	R. C. Ashline	Identify and analyze hazards associated with modifying the Paducah Gaseous Diffusion Plant (GDP) facility to operate at a ^{235}U assay of 5 wt %; analyze and evaluate associated risks; and describe and analyze the measures taken to eliminate, control, or mitigate identified hazards.	20
Pond Waste Management Project Work Instruction Procedures (DOE/EM)	R. L. Pearson	Write documented step-by-step instructions that detail the actions required of MMES personnel to accomplish all tasks making up the Pond Waste Management Project at K-25.	100
SWSA-6 Performance Assessment (DOE/EM)	H. W. Godbee C. W. Nestor* L. M. Tharp*	Estimate the level of release of radionuclides from the waste disposal units in the Solid Waste Storage Area (SWSA)-6. DOE Order 5820.2A requires the preparation of site-specific performance assessments of all low-level radioactive sites accepting such wastes after September 28, 1988.	120
Radiolytic Gas Generation in Pu/PuO_2 Scrap (DOE/EM)	H. W. Godbee T. C. Wright*	Measure and explain the generation of gases (e.g., H_2O, O_2, He, Rn) in stored Pu/PuO_2 scrap at ORNL. Wastes containing radioactivity are capable of generating gases due to the radiolytic decomposition of waste constituents.	20

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Characteristics Data Base (DOE/RW)	K. J. Notz W. J. Reich R. Salmon R. S. Moore* T. D. Welch	Provide the detailed technical characteristics (physical, chemical, radiological, and thermal); inventories; and projected quantities of LWR spent fuel, high-level waste (HLW), non-LWR spent fuel, and other radioactive wastes that may require long-term isolation. This information is used as input to Waste System Analysis, Systems Operations and Logistics modeling, and other systems-type analysis as well as other OCRWM branches responsible for storage, transportation, and isolation.	650
Systems and Analysis Support (DOE/EM)	A. L. Rivera	Provide technical support to waste management programs using a total systems approach. Programmatic activities for application of the total systems approach include technology assessments, needs assessments, sensitivity/uncertainty analysis, and strategic planning and analysis. The technical goal of this program is to formulate waste management decision frameworks and to develop the supporting information using specialized computerized data bases, models, and software.	300
National Profile on Commercially Generated Low-Level Radioactive Mixed Waste (NRC/NMSS, EPA/OSW)	J. A. Klein J. E. Mrochek R. L. Jolley I. W. Osborne-Lee	Compile a national profile on the volumes, characteristics, and treatability of commercially generated mixed waste that will assist state and compact officials, federal agencies, and private developers in the planning and development of mixed waste treatment, storage, and disposal facilities. In order for the NRC to effectively fulfill its statutory responsibilities under the Atomic Energy Act of 1954 regarding the safe handling, storage, and disposal of low-level radioactive waste, accurate baseline information must be available. In addition, the Resource Conservation and Recovery Act (RCRA) mandates that the EPA ensure proper treatment, storage, disposal, and recycling of hazardous as well as radioactive mixed waste.	600

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Transportation Technology			
Systems Integration (DOE/RW)	R. B. Pope D. S. Joy	Develop data and capabilities required by multiple components of the Federal Waste Management System (FWMS). This includes (1) characterization and analysis of interfaces between power reactors and the FWMS; (2) development of methods to handle special wastes that must be accepted by FWMS; and (3) system integration studies including modeling of system logistics.	900
OCRWM Transportation Operations Project (DOE/RW)	R. B. Pope J. E. Ratledge L. B. Shappert M. W. Wankerl	Support development of an operational transportation system that fulfills OCRWM requirements. Capabilities to support the transport of spent nuclear fuel and other wastes to a Monitored Retrievable Storage facility and repository are to be developed as needed.	2500
Routing and Logistics (DOE/RW and EM)	D. S. Joy P. E. Johnson*	Provide analysis of routing options for highway, rail, and barge shipments, including population consideration. Analyses will be performed using the most up-to-date geographical information available (TIGER).	250
Package Drop Testing (Y-12, industry)	L. B. Shappert W. D. Box	Provide, through the Drop Test Facility, the capability to drop test full-scale transport packages with complete instrumentation for data collection and retrieval.	150
SARP Review (Central Management Organization)	B. W. Welles	Provide technical support to the Energy Systems Transportation Safety Manager in the independent review and confirmatory analysis of Safety Analysis Reports for Packagings (SARPs).	150
Uranium Enrichment Safety Program Support (DOE/NE)	F. M. Kovac	Provide technical and program management support to DOE/NE related to its health and safety management program.	300
Specification Package Evaluation (NRC)	J. E. Ratledge R. R. Rawl	Review design, testing, analysis, and historical use data to determine how well the Department of Transportation (DOT) specification package designs for radioactive materials meet current regulatory requirements.	180

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Transportation Operations Support (DOE/EM)	R. R. Rawl R. B. Pope J. J. Ferrada V. M. Green M. W. Wankerl J. E. Ratledge L. B. Shappert R. M. Gove K. S. Boes R. M. Walker*	Provide transportation technical support to DOE/EM in the performance of its transportation operations. Specific technical areas include expert systems, regulatory compliance, transportation systems development, shipment tracking, operations automation, and package development.	2900
High Flux Isotope Reactor (HFIR) Spent Fuel Management Support (DOE/ER, DOE/NE)	J. M. Begovich V. M. Green L. B. Shappert J. E. Ratledge	Provide support to the Research Reactors Division in investigating management alternatives for its HFIR spent fuel. If a management alternative cannot be identified and implemented before the HFIR storage pool becomes full (in February 1994 to February 1995, depending on the success of certain planned actions), HFIR will be shut down.	80
Demonstration and Technology Support			
Electropolishing Cell Walls and Decontamination of Concrete (DOE/EM)	W. D. Box	Decontaminate surfaces by (1) electropolishing to remove radioactivity from metal surfaces and (2) using a number of different mechanical and chemical methods.	60
Robins Air Force Base Geotechnical Studies (DOD)	T. F. Lomenick J. T. Shor S. P. N. Singh	Assist the Hazardous Waste Remedial Actions Program (HAZWRAP) by providing technical consultations and directions to the many remedial activities ongoing at the U.S. Air Force's Robins Air Force Base.	300
Groundwater Treatment Demonstrations (DOE/EM)	S. P. N. Singh T. F. Lomenick	Demonstrate innovative treatment processes that can be used to treat mixed waste-contaminated groundwater (i.e., groundwater contaminated with radioactive, toxic, and hazardous compounds) that is known to be present at most DOE industrial sites.	780

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Workshop on Radioactive, Hazardous, and/or Mixed Waste Sludge Management (DOE/EM)	T. F. Lomenick	Plan, conduct, and manage a 3-d workshop on the management of low-level radioactive, hazardous, and/or mixed waste sludges generated at DOE-owned facilities.	50
Project Management and Technical Support (PORTS ER, DOE/EM, DOD)	M. I. Morris	Provide project management and technical support to the Engineering Development Section (EDS) on several demonstration projects including Demonstration of Cometabolic Techniques, Portsmouth Remediation Technology Demonstration for the X-231B Oil Biodegradation Plot, Plasma Arc, Base-Catalyzed Destruction (BCD) Process, and Kwajalein Soil Remediation Demonstration.	200
Control of Metal Emissions from Mixed Waste Incinerators (DOE/EM)	J. T. Shor	Develop a fundamental model to simulate metal species formation in a mixed waste incinerator to support the K-25 Site Toxic Substances Control Act (TSCA) Incinerator to meet the regulatory limits on metal emissions for the Incinerator.	180
Technical Support to the K-25 Site Technical Division (K-25 WM, DOE/EM)	J. T. Shor	Provide technical support to the K-25 Technical Division on addressing miscellaneous effluent/emissions concerns related to the K-25 TSCA Incinerator.	80
Technical Support to the ORNL Energy Division (DOD and DOE/EM)	J. T. Shor	Provide technical support for preparation of Environmental Impact Statements (EISs) for the Chemical Weapons Demilitarization Program and for the Rocky Flats Plant's Residue Elimination Project.	100
Safety Analysis Evaluation for the Paducah Gaseous Diffusion Plant (PGDP) and K-25 Site Emergency Operations Centers (EOCs)	J. T. Shor	Examine the potential impact of various accident scenarios of the plants on the operations status of their EOC.	30

Table 3.2 Engineering Coordination and Analysis Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
K-25 Site Toxic Substances Control Act (TSCA) Incinerator Technical Support (K-25 WM)	S. P. N. Singh A. L. Rivera J. T. Shor T. C. Wright	Provide the technical support requested by the TSCA Operations Office in the planning, management, or operations of the Incinerator. At present, this includes (1) ensuring compliance of the Incinerator with the new National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations on radionuclides; and (2) developing a computerized management information system and a current burn plan for the operation of the Incinerator.	340
Removal of Toxic Metals from Contaminated Scrap (DOE/EM)	S. P. N. Singh	Demonstrate the application and efficacy of innovative processes for removing hazardous and toxic compounds from contaminated equipment generated in the course of decommissioning activities at the Department of Energy-Defense Programs (DOE-DP) sites.	75
Development and Application of Inch-worm Robot and Micro Camera (DOE/EM)	W. D. Box	Develop an "inch-worm" robot for inspection; sampling; and retrieval of materials in pipelines, ductwork, and other closed systems.	100
Environmental Compliance Assessment and Management Program (ECAMP) Assessments of U. S. Air Force Bases (DOD)	S. P. N. Singh	Conduct ECAMP assessments of several U. S. Air Force bases in the United States.	50
K-25 Site Technology Logic Diagram Development (DOE/EM)	S. P. N. Singh A. L. Rivera K. S. Boes J. J. Ferrada	Enumerate and evaluate potential technological options for the management of all wastes from decontamination and decommissioning, remedial actions, and waste management operations at the K-25 Site.	200

*Not Chemical Technology Division personnel.

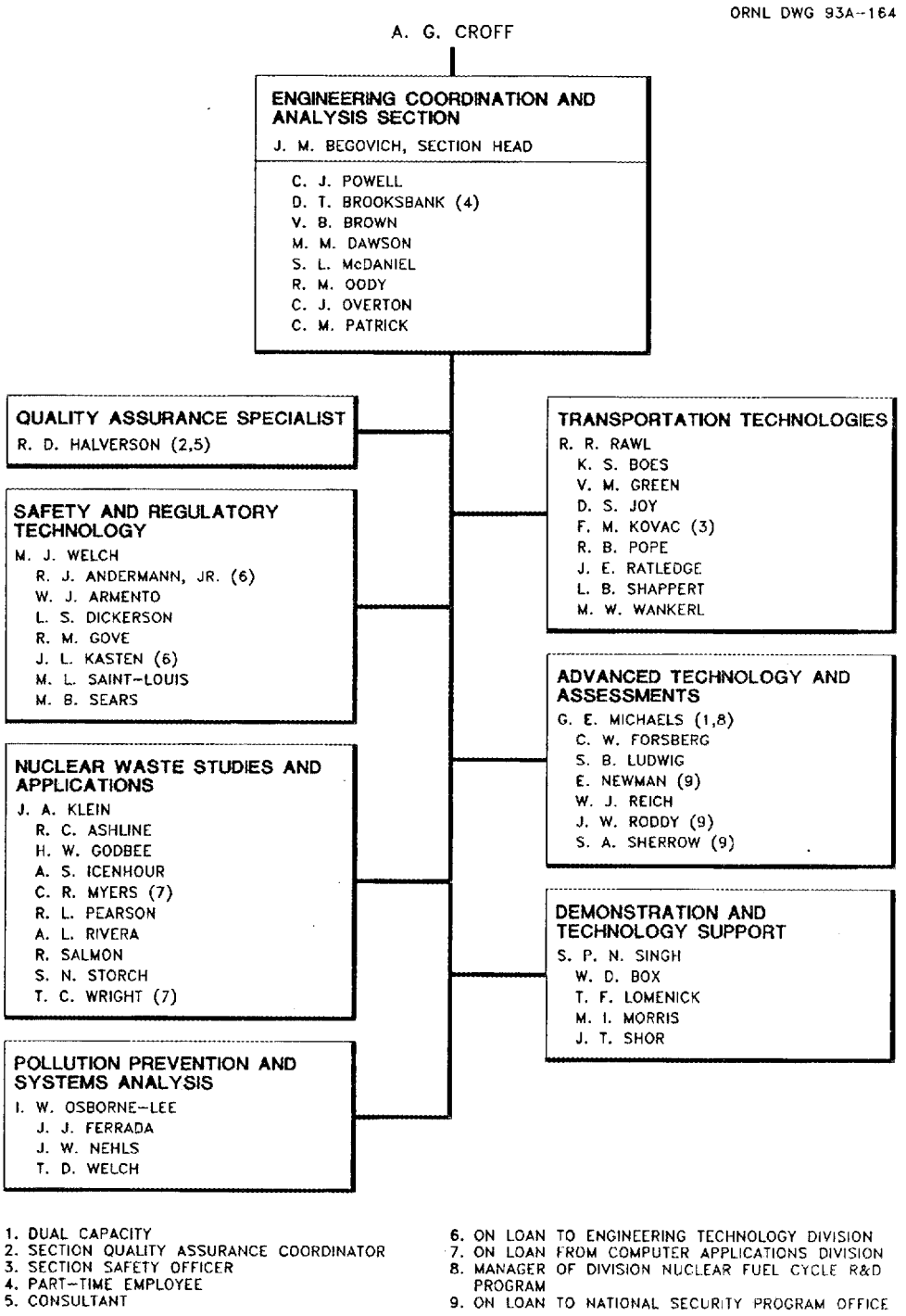


Fig. 3.2. The organizational structure of the Engineering Coordination and Analysis Section.

Table 3.3. Engineering Development Section Programs

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Pond Waste Management Project (ER/K-25)	J. B. Berry	Establish criteria and implement remediation of 78,000 drums of mixed waste sludge at the K-25 Site.	673
Mixed Waste Integrated Program (DOE/OTD)	J. B. Berry	Plan and manage a national RDDT&E program qualifying new and emerging technologies on a systems basis for waste treatment and disposal of low-level mixed waste, in coordination with the office of Environmental Restoration and Waste Management, according to Waste Management's needs and schedule. Activities include developing needs specifications in key areas (e.g., front-end handling, chemical/physical treatment, waste destruction/stabilization, off-gas treatment, and final forms processing and testing); demonstrating high-temperature plasma as an integrated method of destroying waste constituents and forming a stable glass form; and coordinating Office of Technology Development activities on the mixed low-level waste.	5523
Stack and Vent Survey (ER/K-25)	E. L. Youngblood	Manage data collection and data base compilation for gaseous emissions and stack locations for the K-25 Site.	200
Chemical Extraction of Uranium from Soil (Fernald ID/OTD)	A. J. Mattus	Support an integrated demonstration and pilot plant design at Fernald. Using various chemical extractants such as carbonates, uranium was selectively leached from Fernald soils to achieve approximately 50 ppm total uranium or lower.	375
Chemical Extraction of Uranium from Mixed Waste Soils (Y-12/Development)	A. J. Mattus	Convert mixed wastes to hazardous wastes to facilitate disposal options. Using various chemical extractants, including sodium or ammonium carbonates as well as mineral acids, leaching experiments were performed to remove as much uranium as possible. This work included the precipitation of uranium and the minimization of secondary side stream volumes and new mixed waste by-products.	210

Table 3.3 Engineering Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Nitrate to Ammonia and Ceramic (NAC) (Hanford USTID/OTD)	A. J. Mattus	Develop a new process using the active metal aluminum to decompose nitrate in alkaline solution to ammonia while forming alumina, which can serve as its own waste form. The alumina product from the reactor is mixed with silica, calcined, and pressed and sintered into a nitrate-free ceramic. Volume reductions of between 55 to 75% are obtained compared to the starting volume of the liquid waste. The process may be implemented at Hanford and possibly at ORNL in Melton Valley.	1100
Support of MVST Grouting Operations (ORNL/Waste Operations)	A. J. Mattus	Support the grouting operations of the Melton Valley Storage Tanks (MVSTs). Prior to every grouting campaign at the Melton Valley site, we use actual hot waste from the storage tanks to prepare waste forms for regulatory testing to confirm that the grout formulation is still performing up to expected regulatory norms. Material prepared in glove boxes is tested utilizing NRC and EPA waste form performance tests such as leaching and physical properties.	150
Sanitary Landfill Analysis (WM/Y-12)	J. F. Walker	Evaluate sanitary waste generation at the ORR and make recommendations for waste minimization.	105
Process Development	J. B. Berry	Complete construction of engineering development pilot plant facilities to support technology development for aqueous sodium nitrate waste streams. Prepare operating procedures for the fuel recycle process.	140
Bioremediation of PCB Contamination	T. L. Donaldson B. S. Evans K. T. Klasson	Develop and demonstrate technologies for bioremediation of PCB-contaminated soils and sludges. Microbial cultures from PCB-contaminated sites are being evaluated for biodegradation capabilities and will be further tested in slurry bioreactors. Field studies will be conducted at a contaminated site on the ORR.	300
Fluid Dynamics Demonstration (OTD/USTID)	T. D. Hylton E. L. Youngblood	Evaluate a surrogate of the slurry waste in the single-shell waste storage tanks at Hanford to determine its rheological behavioral characteristics.	300

Table 3.3 Engineering Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Bioremediation of TCE-Contaminated Groundwater (DOE/OTD)	T. L. Donaldson H. L. Jennings A. J. Lucero	Compare the performance of two different cometabolic biotreatment systems at a site at K-25. The site is a seepage flow that contains trichloroethylene (TCE), perchloroethylene (PCE), benzene, chlorinated ethanes, and other volatile organics. Bioreactors supplied by Tyndall Air Force Base are being used to demonstrate a methane-utilizing process and a toluene-utilizing process over a multiyear period.	480
Destruction of PCBs in Mixed Wastes (DOE/OTD)	T. L. Donaldson K. T. Klasson	Evaluate BCD of chlorinated organics for treatment of DOE mixed wastes. Laboratory studies have been done using a surrogate waste containing PCBs, and other surrogate radionuclides have been examined and the destruction of PCBs verified. Other chemical dechlorination methods are also being assessed.	225
Bioremediation Demonstration on Kwajalein Island (DOD/HAZWRAP)	T. L. Donaldson A. J. Lucero A. B. Walker J. F. Walker, Jr.	Demonstrate bioremediation technology at a small site on Kwajalein Island (Republic of the Marshall Islands, Pacific), which is contaminated with fuel oils and possibly other industrial chemicals because of U.S. military activities on the island over many years. The remoteness of the island and the coral atoll geology create unique opportunities and problems.	1000
Biodegradation of PCBs at Electric Power Substations (EPRI/TVA)	S. L. Corder B. S. Evans C. A. Haviland K. T. Klasson	Investigate means to enhance biodegradation via anaerobic dechlorination, chemical treatments, and surfactants to enhance bioavailability. This is a joint program with the University of Tennessee and the Tennessee Valley Authority.	50
Soil Washing for Uranium Removal (DOE/OTD)	M. R. Ally J. H. Wilson	Assist in flowsheet design and evaluation for pilot-scale test of soil washing at the Fernald Plant for removal of uranium. Equipment constructed by IT Corporation will be tested.	180
Secondary Waste Treatment for Soil Washing for Uranium Removal (DOE/OTD)	M. R. Ally J. H. Wilson	Conduct laboratory tests of unit operations for cleanup of secondary waste streams produced by soil washing for uranium removal and develop flowsheet options for subsequent integrated testing.	360

Table 3.3 Engineering Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Software for Prediction of Thermodynamic Properties (MMES/OTA)	M. R. Ally	Develop user-friendly software for application of improved thermodynamic algorithms for prediction of thermodynamic properties to enhance commercialization.	20
Phase Change Materials (DOE/CE)	M. R. Ally C. A. Haviland	Perform calculations for various salt hydrates to identify potentially useful phase change materials for use in automobile engines and exhaust systems to improve ignition characteristics and reduce pollution.	40
PCB Remediation Demonstration at Kwajalein Atoll (DOD/HAZWRAP)	T. L. Donaldson K. T. Klasson E. L. Youngblood	Demonstrate a technology for remediation of the PCB-contaminated equipment and destruction of the PCBs at Kwajalein Atoll in order to avoid shipment of PCBs off the islands. Kwajalein Atoll (Republic of the Marshall Islands, Pacific) has old PCB-contaminated electrical transformers and PCB-contaminated cooling oil at the radar installation on Roi-Namur Island. The use of EPA's BCD technology will be evaluated and will be demonstrated if applicable.	100
Hanford Grout Technology Program (Westinghouse Hanford Co.)	R. D. Spence E. W. McDaniel C. L. Francis D. R. Trotter	Develop a grout formulation for 101-AW wastes and improve the capabilities of the Grout Treatment Facility. A mixture experiment will be designed and implemented for 101-AW. The resulting surface response models will be used to recommend grout formulations for 101-AW. These recommended grout formulations will be tested and reported to WHC.	1300
Operable Unit I Stabilization Development and Treatability Studies Program - Fernald (Westinghouse Environmental Management Company of Ohio)	T. M. Gilliam S. C. Osborne I. L. Morgan	Provide Westinghouse Materials Co. of Ohio with technical support for the implementation of grouting technology as a remediation option to Operable Unit I. Emphasis this fiscal year will be placed on characterization of waste samples from pit No. 5, laboratory preparation necessary to perform a formulation development effort using these waste samples, and formulation development necessary to produce an acceptable waste form for wastes contained in pit No. 5.	500

Table 3.3 Engineering Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Waste Operations Support (DOE/EM)	T. E. Kent J. D. Hewitt M. M. Roe	Provide engineering and process support for the ORNL radioactive liquid waste treatment facilities by focusing on analysis of methods to minimize waste generation, startup of new facilities, and solutions to plant operational problems.	300
Process Wastewater Treatment Plant (PWTP) Upgrade (DOE/EM)	T. E. Kent J. J. Perona S. A. Richardson P. A. Taylor	Develop processes for improved treatment of process wastewaters generated at ORNL. Work will focus on design of centralized treatment flowsheets to minimize secondary waste generation and improve effluent water quality.	950
Waste Generator Certification Program (DOE/EM)	J. R. Parrott	Develop and implement certification/training programs for ORNL liquid waste generators. This effort includes the development of waste acceptance criteria for the treatment plants and coordination of generator/waste management interactions.	100
LLLW Evaporation (DOE/EM)	J. J. Perona J. D. Hewitt D. R. McTaggart	Implement and evaluate the performance of the in situ and external evaporation of low-level liquid waste (LLLW) being stored at ORNL for future disposal.	150
LLLW Treatment (DOE/EM)	T. E. Kent W. D. Arnold M. W. Burgess D. R. McTaggart J. J. Perona	Develop processes for near-term and long-term treatment of LLLW generated at ORNL. Work will include R&D for both legacy waste and newly generated waste and will focus on both source treatment and design of centralized treatment flow sheets to minimize the secondary waste generated for disposal.	450
Programmatic Planning for ORNL Liquid and Gaseous Wastes (DOE/EM)	S. M. Robinson S. M. DePaoli T. E. Kent J. R. Parrott	Develop and implement long-range strategic plans for the management of ORNL liquid and gaseous wastes. This effort includes definition of treatment plant upgrades required to meet regulations and performance of studies required to implement strategy, such as systems analyses and R&D.	600
Environmental Restoration Program (ERP) Waste Management Plan (DOE/EM)	C. M. Kendrick	Evaluate ORNL Environmental Restoration's long-term waste management needs and incorporate them into ORNL Waste Management's strategic plans.	150

Table 3.3 Engineering Development Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Federal Facilities Agreement (FFA) Program Management (DOE/EM)	S. M. Robinson	Provide programmatic management for projects performed for development and implementation of source treatment and/or alternative collection methods required by the FFA.	1750
Waste Area Group 6 Treatability Studies (DOE/EM)	C. M. Kendrick T. E. Kent S. A. Richardson P. A. Taylor	Design, construct, and operate a pilot plant facility to demonstrate treatability of mixed wastewaters to be generated during the remediation of Waste Area Group 6 (WAG 6). Evaluate solid/liquid separation equipment for use on WAG 6 wastewaters.	500
Inactive LLLW Tanks Data Management (DOE/EM)	S. M. DePaoli T. D. Hylton E. L. Youngblood	Develop a data base and evaluate instrumentation required for surveillance and maintenance of inactive LLLW tanks to meet FFA requirements.	65
Sludge Mixing/Mobilization (DOE/EM)	E. L. Youngblood J. J. Perona	Evaluate methods for mixing, mobilizing, and sluicing sludge from ORNL 50,000-gal horizontal LLLW tanks which are unique to the DOE system.	300
P&E Division Operations Support (ORNL Overhead)	P. A. Taylor	Provide technical support to P&E Division focusing on the Coal Yard Runoff Treatment Facility, the Sewage Treatment Plant, and cooling water systems.	30
ORR/BSR LLLW Upgrade (DOE/EM)	P. A. Taylor	Develop methods to eliminate LLLW generation at the Oak Ridge Research Reactor and the Bulk Shielding Reactor.	30

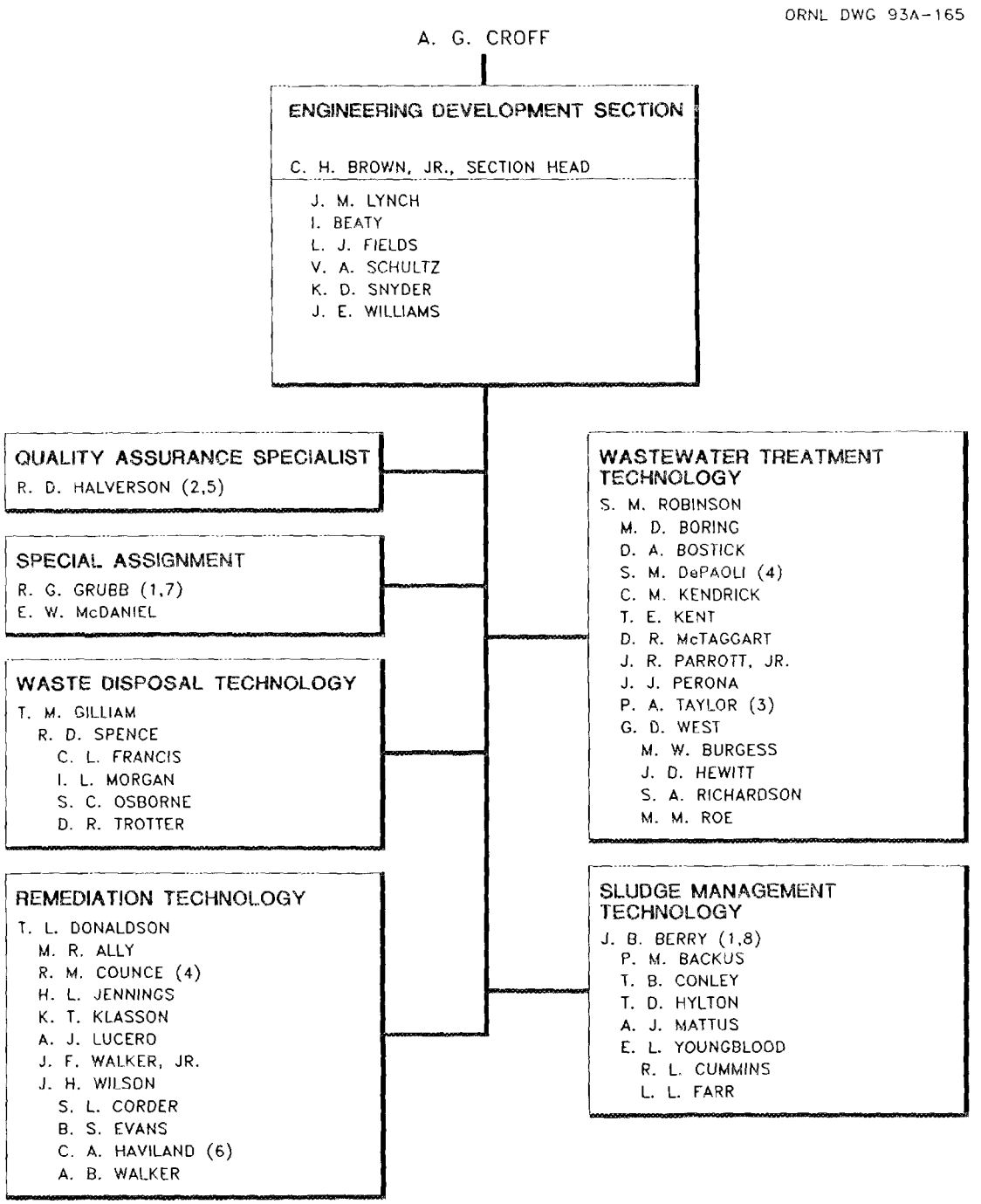


Fig. 3.3. The organizational structure of the Engineering Development Section.

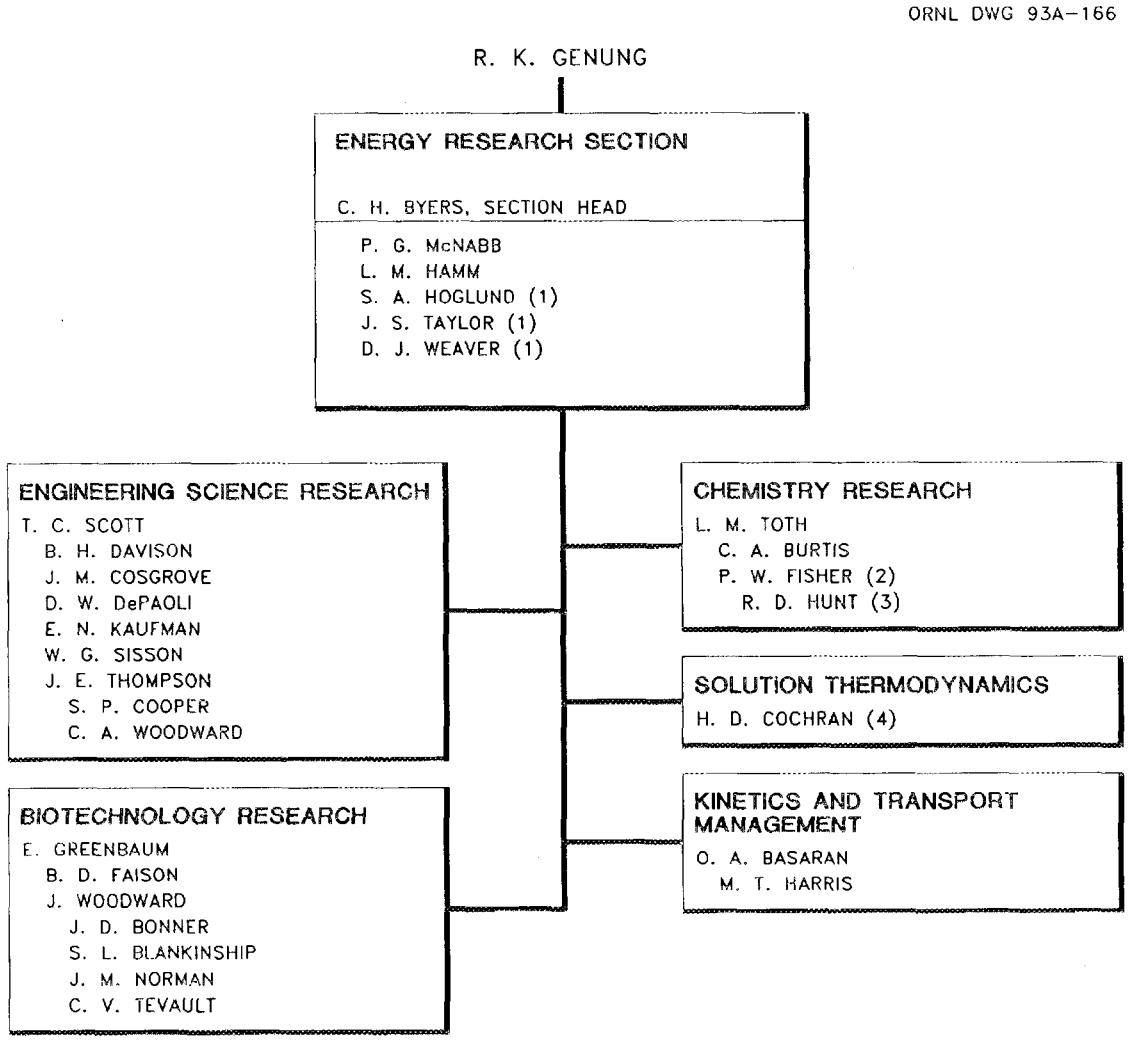
4. ENERGY RESEARCH SECTION

The Energy Research Section (ERS) conducts basic research in chemical engineering, applied chemistry, bioengineering, and biotechnology, with an emphasis on energy-driven technologies. In chemical engineering, research interests include multiphase separation; supercritical extraction and the equilibrium theory of supercritical mixtures; and controlled production of ceramic precursors, including theories of particle nucleation and growth, as well as homogeneous precipitation experimentation.

Chemistry research focuses on the study of the solution behavior of actinide compounds. In particular, the complexing behavior of $UOCl_2$ and the hydrolysis of UF_6 are currently of interest.

In biotechnology and bioengineering, a wide variety of interests are represented, including biophotolysis, advanced bioreactor research, enzyme hydrolysis, biosorption technologies, biological coal liquefaction, chemicals from biomass, and clinical chemistry.

The organizational structure of the ERS is presented in Fig. 4.1. Table 4.1 summarizes the variety of research currently being undertaken by the section.



1. PART-TIME EMPLOYEE
2. ON LOAN TO FUSION ENERGY DIVISION
3. SECTION SAFETY OFFICER
4. SECTION QUALITY ASSURANCE COORDINATOR

Fig. 4.1. The organizational structure of the Energy Research Section.

Table 4.1. Energy Research Section Programs

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Interactions of Solvents, Solutes, and Surfaces: Adsorption and Supercritical Extraction (DOE/BES)	H. D. Cochran	Conduct experimental and theoretical studies of the effects of molecular interactions between dissolved solutes in supercritical solvents and between adsorbed solutes on surfaces.	367
Multicomponent Separations by Continuous Chromatography (DOE/BES)	C. H. Byers	Optimize continuous chromatography to maximize its energy-saving potential and assist in its technology transfer to industry.	50
Nucleation, Growth, and Transport Phenomena in Homogeneous Precipitation (DOE/BES)	C. H. Byers M. T. Harris O. A. Basaran	Conduct fundamental studies of homogeneous nucleation and growth in systems of ultrafine particles used to prepare a new generation of ceramics.	285
Synthesis of Ultrafine Metal Oxide Particles in External Fields (DOE/BES)	M. T. Harris	Study the decomposition and precipitation kinetics of aqueous metal nitrate solutions when they are subjected to microwave heating. Investigate the formation of fibrils during the electrohomogeneous precipitation of metal alkoxide solutions.	45
Chemical and Physical Principles in Multiphase Separations (DOE/BES)	C. H. Byers T. C. Scott O. A. Basaran D. W. DePaoli W. G. Sisson C. Tsouris J. Q. Feng* X. Zhang*	Focus primarily on improving mass transfer in liquid-liquid solvent extraction by altering and controlling droplet-continuum hydrodynamics; exploring transport fundamentals in vapor-liquid contacting operations; and investigating high-intensity, high-gradient magnetic fields for separation of macromolecules.	576
A New Method for Measuring the Dynamic Surface Tension of Complex-Mixture Liquid Drops (CRADA/BES)	O. A. Basaran M. T. Harris X. Zhang*	Develop and apply a new technique that can measure the dynamic surface tension at the interface between a growing drop and an ambient fluid in 1-10 ms.	125
Supercomputer Analysis of Multidrop Oscillations (DOE/BES)	O. A. Basaran J. Q. Feng*	Develop theories and algorithms to study the interactions between two or more drops in electric and/or flow fields.	50
The Electric Dispersion Reactor (DOE/BES)	C. H. Byers T. C. Scott M. T. Harris	Develop electrical dispersion concepts for use in a liquid-liquid reactor for production of precursor ceramic powders.	262

Table 4.1 Energy Research Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Chemistry of Actinides and Fission Products (DOE/BES)	L. M. Toth R. D. Hunt	Conduct low-temperature photochemical, molten salt, and spectroscopic fundamental studies related to separation phenomenology. Work will focus on the characterization of hydrolytic and coordination species that influence the chemistry of these elements.	445
BES Bioprocessing for Energy Applications (DOE/BES)	T. C. Scott J. M. Cosgrove	Investigate the fundamentals of biosorbent and biocatalytic systems and their use in contactors and bioreactors.	50
Advanced Bioprocessing Concepts (DOE/CE)	C. D. Scott B. H. Davison T. C. Scott E. N. Kaufman	Explore advanced bioreactor concepts, such as efficient immobilized biocatalysts and simultaneous separations.	600
Bioconversion of Coal (DOE)	B. D. Faison C. D. Scott	Investigate the solubilization of coal by microorganisms and enzymes.	220
Molecular-Based Study of Fluids Using Parallel Supercomputers (ORNL/LDR&D)	H. D. Cochran	Develop, test, and demonstrate computer programs for molecular dynamics simulations using interaction site models on the Intel Paragon massively parallel supercomputer.	50
CRADA with Rohm and Haas	T. C. Scott M. T. Harris	Conduct cooperative research with Rohm and Haas on the use of electric fields in separations and materials processing.	125
Fundamentals of Coal Bioprocessing (Advanced Energy Projects/BES)	T. C. Scott E. N. Kaufman C. D. Scott B. D. Faison	Investigate the use of biocatalysts for the processing of coal for the production of fuels and chemicals.	528
Bioprocessing of Plant Materials (DOE/FE)	T. C. Scott J. M. Cosgrove	Study enhanced enzyme production and the interaction of enzymes with biphasic liquid systems.	200
Alternative Feedstocks Program (DOE/CE)	B. H. Davison T. C. Scott C. D. Scott	Conduct thermochemical and bioprocessing studies of renewable resources for the production of fuels and chemicals.	230

Table 4.1 Energy Research Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Chemical Kinetics of Enzyme-Catalyzed Reactions (DOE/BES)	E. Greenbaum J. Woodward J. W. Lee K. A. Affholter C. V. Tevault	Explore quantum processes and enzyme catalysis involving photosynthetic production of renewable energy.	556
Technology for Bioelectronic Components (WPAFB/AFOSR)	E. Greenbaum J. W. Lee I. Lee	Develop biological optoelectronic energy transducers.	100
Photobiological Reactors (DOE/CE)	E. Greenbaum C. V. Tevault S. L. Blankinship	Develop photobiological reactors for photosynthetic conversion and CO_2 recycling.	150
Renewable Hydrogen Production for Fossil Fuel Processing (DOE/FE)	E. Greenbaum S. L. Blankinship	Achieve renewable hydrogen production by microalgal water splitting.	100
One-Step Photoconversion of Biomass to Volatile Hydrocarbons (ORNL Seed Money)	E. Greenbaum C. V. Tevault C. Y. Ma	Produce value-added chemicals by photoconversion of lignocellulosic materials.	111
Photosynthetic Chemical Detector (DOE/ITC)	E. Greenbaum R. Collins S. L. Blankinship	Detect environmental pollutants by an increase in quantum yield of fluorescence.	90
Biocatalytic Design by Chemical Modification (DOE/BES)	J. Woodward B. R. Evans	Modify cellulase so as to enhance its catalytic activity.	250
Investigation of Cellulose/Cellulase Interaction (NREL)	J. Woodward	Determine the mechanisms of enzymatic cellulose degradation.	100
Synergy Between Cellulase Enzyme Components (NREL)	J. Woodward L. A. Hamilton	Describe the synergistic action between the components of cellulase.	100
Separation of Noninked Cellulose Fibers in Newsprint (ORNL/LDR&D)	J. Woodward	Develop an environmentally friendly method for the separation of noninked cellulose fibers from inked cellulose fibers in newsprint.	35

Table 4.1 Energy Research Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Fundamentals of Microbial Coal Processing (DOE/FE)	B. D. Faison J. M. Norman	Explore biochemical and physiological mechanisms affecting interactions between microorganisms and coal or coal-derived materials; develop novel processes for coal conversion and heteroatom removal.	100
Biosorption for Treatment of Y-12 Process Effluents (Oak Ridge Y-12 Plant)	B. D. Faison J. D. Bonner G. F. Bloomingburg*	Develop and demonstrate a biosorbent-based process for removal of uranium and nickel from waste streams generated at the Oak Ridge Y-12 Plant.	200
Biosorption for Restoration of Uranium Mining Sites (DOE/OTD)	B. D. Faison J. D. Bonner G. F. Bloomingburg* H. I. Adler*	Develop and demonstrate a biosorbent-based process for removal of uranium, radium, iron, and sulfur from surface and groundwater at a former uranium mining site in eastern Germany.	300
Biosorption for Treatment of Waste Streams from Molten Salt Oxidation Processes (DOE/ER)	B. D. Faison J. D. Bonner G. F. Bloomingburg* H. I. Adler*	Develop and demonstrate a biosorbent-based process for removal of uranium, strontium, and cesium from spent molten salt streams generated during treatment of mixed wastes.	180
Evaluation of Biosensor Technology for Monitoring of Microbial Processes in the Subsurface (ORNL/LDR&D)	B. D. Faison J. M. Norman A. V. Palumbo* R. S. Burlage*	Evaluate the feasibility of using a genetically engineered microorganism as an in situ monitor for degradation of toluene and trichloroethylene in subsurface environments.	55 *(internal funding)*

*Not Chemical Technology Division personnel.

5. OFFICE OF SAFETY AND OPERATIONAL READINESS

The Office of Safety and Operational Readiness (OSOR) is the focus of ES&H activities for the division. Its relationship to the organizational structure of Chem Tech is shown in Fig. 5.1. This organization includes the Division Safety and Radiation Control Officer, Environmental Protection Officer, Hazards Communication Officer, and Hazardous Materials Coordinator.

The OSOR provides technical advice to other organizations in the division on ES&H affairs, prepares implementing procedures, and acts as the Division Director's representative in audits and inspections of division activities. Further, the OSOR coordinates the preparation of safety documentation and tracks corrective actions relative to division activities and facilities. In the latter activity, the OSOR works closely with the division quality assurance specialists to ensure that corrective actions are properly completed and documented before they are closed. The current ES&H activities conducted by OSOR are described in Table 5.1.

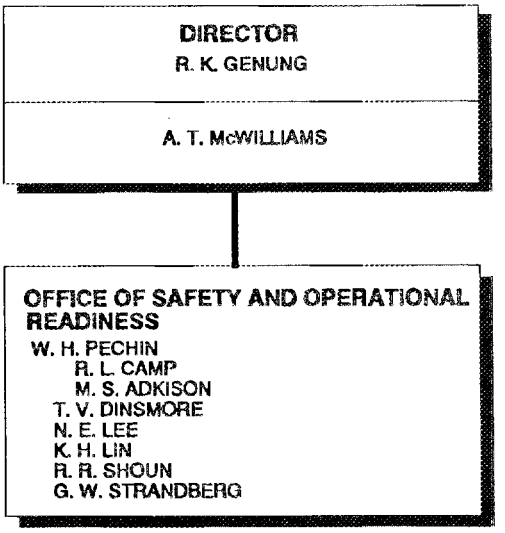


Fig. 5.1. The organizational structure of the Office of Safety and Operational Readiness.

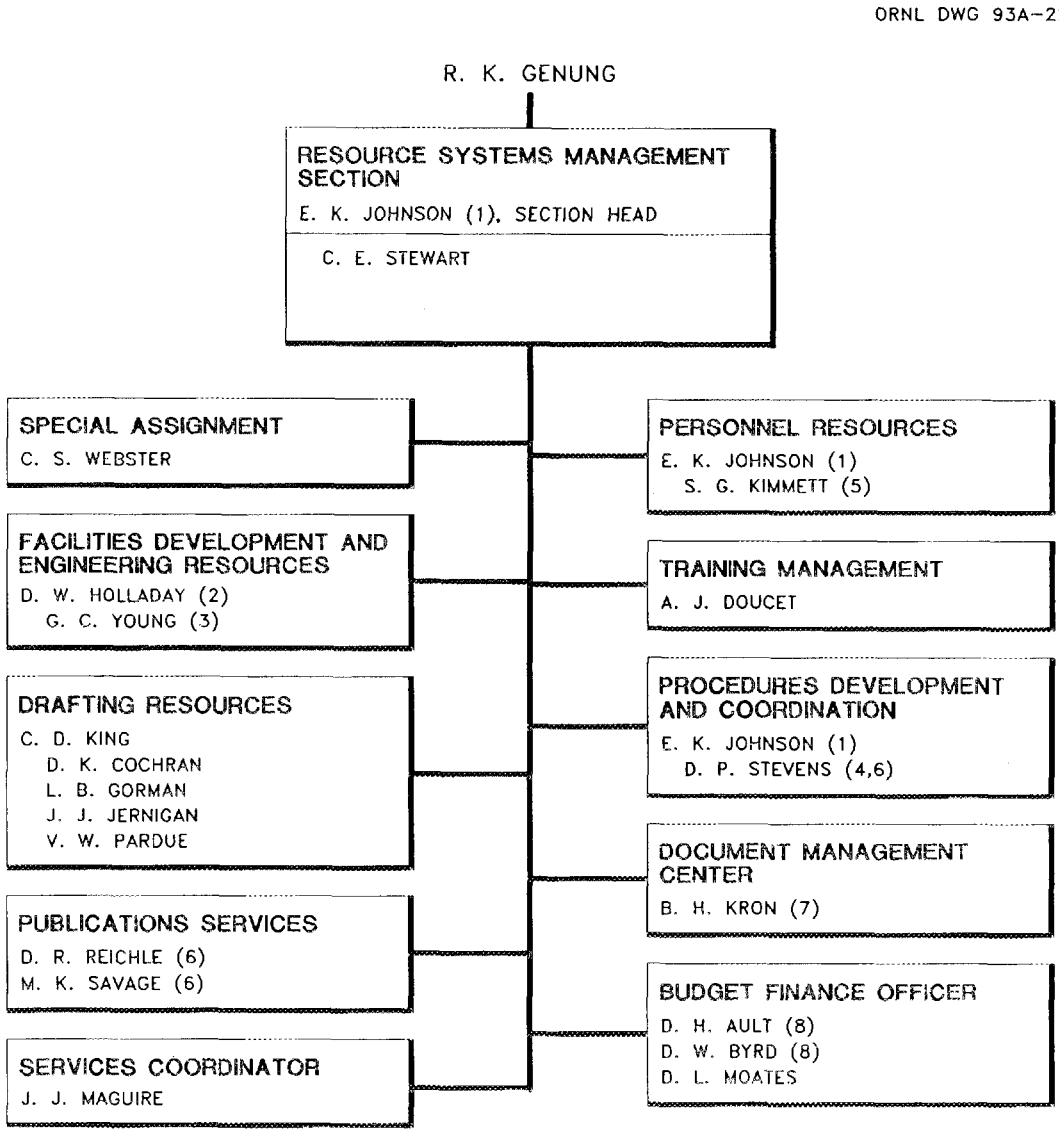
Table 5.1. Office of Safety and Operational Readiness Programs

Project and Sponsor*	Principal Investigators	Objectives
Safety Analysis Report Update Program	K. H. Lin	Update the Safety Analyses Reports (SARs) and Operational Safety Requirements (OSRs) for all applicable division facilities in accordance with the ORNL SAR Update Program.
Procedure Preparations and Review	W. H. Pechin	Prepare implementing procedures for division ES&H activities. Review and comment on new Energy Systems and ORNL procedures in the ES&H area.
Implementation of Conduct of Operations	W. H. Pechin	Prepare a matrix reflecting current division practices and needs in Conduct of Operations. Assist the sections in implementation.
Realignment of Contamination Zones	R. R. Shoun	Review and remap all contamination zones in the division to conform to new DOE requirements.
Identification of Confined Spaces	R. R. Shoun	Tour each facility with the Industrial Hygiene representative to identify and properly mark those areas that require special entry requirements as confined spaces.
Resource Conservation & Recovery Act (RCRA)	N. E. Lee	Tour each satellite and 90-d accumulation area with an Environmental Compliance representative to ensure all areas are properly marked and maintained.
Toxic Substances Control Act (TSCA)	N. E. Lee	Survey and inventory all PCB-containing equipment in division facilities.
Development and Maintenance of a Tracking System	T. V. Dinsmore	Develop and maintain a system to record, track the status of, and report on all commitments to corrective action.
Chemical Inventory	G. W. Strandberg	Prepare an inventory of chemicals in each laboratory of the division.
Chemical Hygiene Plan	G. W. Strandberg	Prepare a document in accordance with Occupational Safety and Health Administration (OSHA) requirements to communicate the hazards and necessary precautions for working with chemicals.
Implementation of Hazardous Materials Inventory System (HMIS)	G. W. Strandberg	Implement the HMIS in Chem Tech.

*The CTD OSOR is an overhead function budgeted at approximately $700K per year.

6. RESOURCE SYSTEMS MANAGEMENT SECTION

The Resource Systems Management Section (RSMS) provides support of the division research, development, and demonstration objectives and activities and performs a broad range of administrative and service functions. Figure 6.1 depicts the organizational structure of the section. The primary responsibilities involve interpreting, advising, and coordinating proper application of company policy and procedures while maintaining efficient work flow; expediting required forms; and fostering effective working relationships in employment and performance and promotion planning, computer security coordination, capital facility development, editorial support, drafting resources, procurement and special services, finance and budget resources, training management, and document management. The diverse support activities of RSMS are summarized in Table 6.1.



1. DUAL CAPACITY
2. SECTION QUALITY ASSURANCE COORDINATOR
3. SECTION SAFETY OFFICER
4. PART-TIME EMPLOYEE
5. AFFIRMATIVE ACTION REPRESENTATIVE
6. ON LOAN FROM PUBLICATIONS DIVISION
7. ON LOAN FROM INFORMATION SERVICES DIVISION
8. ON LOAN FROM FINANCE AND MATERIALS DIVISION

Fig. 6.1. The organizational structure of the Resource Systems Management Section.

Table 6.1. Resource Systems Management Section Programs

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Facility Development and Engineering Resources	D. W. Holladay G. C. Young	Process all expense and capital projects that directly impact Chem Tech facilities and for which Chem Tech utilizes the expertise of Martin Marietta Energy Systems, Inc. (Energy Systems) Engineering. In general, it is the responsibility of the Chem Tech Engineering Project Coordinator to oversee all of these capital and expense projects in such a manner that (1) design and construction building projects are conducted according to DOE design criteria, quality assurance, and specifications; (2) the design, operational capabilities, and functional requirements of the facilities are contributive to the programmatic missions of the division; and (3) all activities are in compliance with health, safety, total quality management, environmental standards and regulations, and management of hazardous, radioactive, mixed, and other categories of wastes. In addition to project management responsibilities, the Facilities Development and Engineering Resources (FDER) group provides conceptual and developmental design expertise in two main areas: conceptual design and input to Titles I and II design are provided for a wide range of engineering disciplines used in the conduct of capitol projects; chemical engineering process design expertise (fluid dynamics and separations processes) is provided for various types of projects planned by Chem Tech (e.g., planning projects on treatment of process and radiochemical wastes and transportation of LLLW and process wastes to treatment facilities).	130

Table 6.1 Resource Systems Management Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Publications Services (Reports Office)	D. R. Reichle M. K. Savage	Process (edit, proofread, clear, and prepare for publication or distribution) the various manuscripts submitted by the Chem Tech research staff members and management so as to help them (1) meet all commitments with DOE, NRC, and other funders; and (2) disseminate research information in a timely manner through oral presentation at selected scientific meetings and publication in appropriate journals. As secondary objectives, the Reports Office routinely (1) provides editorial and proofreading support to the Chem Tech Drafting Resources group, (2) offers guidance/advice to authors and secretaries on report preparation and correspondence, and (3) maintains liaison with all departments and service areas of the Publications Division. Concurrent with these activities, the Reports Office staff members constantly strive to upgrade their skills by keeping abreast of all new developments (i.e., policies and instrumentation) in the technical publications field.	100
Drafting Resources	C. D. King D. K. Cochran L. B. Gorman J. J. Jernigan V. W. Pardue	Provide graphic and drafting needs to Chem Tech research personnel while maintaining quality standards and minimizing costs to customers.	292
Services Coordinator	J. J. Maguire	Review and process requisitions and assist Chem Tech staff members in the preparation, follow-up, and expediting of requisitions; prepare and distribute the vehicle report to sections with access to company vehicles; assist in the preparation and distribution of the Property Transfer Records for the division; accumulate data to update the Space Allocation Report; assist in the preparation of the Precious Metals Intralaboratory Transfers; and prepare and initiate all telecommunications service requests. Assist in the inventory and classification of in-use personal computers.	74

Table 6.1 Resource Systems Management Section Programs (continued)

Project and Sponsor	Principal Investigators	Objectives	Funding Estimates ($K)
Training Management	A. J. Doucet	Ensure that (1) Chem Tech employees are appropriately trained in the conduct of all activities, (2) the training is conducted efficiently and effectively, and (3) the training is directly related to the needs of the job and fundamental to safe and compliant operation.	75
Personnel Resources Management	S. G. Kimmett	Coordinate employment of new personnel and performance review of existing staff and plan for development and promotion of current staff.	90
Budget and Finance	D. H. Ault D. W. Byrd D. L. Moates	Provide a liaison between the Chem Tech managers and the various MMES and ORNL Finance and Budget organizations in the budget development, monitoring, and forecasting of projected and actual expenditures.	124
Policy/Procedures Management	D. P. Stevens	Coordinate a process for developing, reviewing, approving, and controlling the Chemical Technology Division procedures in a manner consistent with the requirements specified in the Martin Marietta Energy Systems, Inc., Policy and Procedures Manual.	30
Document Management	B. H. Kron	Provide Chem Tech with an effective, customized information management program to integrate Martin Marietta Corporation, Energy Systems, and DOE records management requirements.	50

7. ADMINISTRATIVE SUMMARY

Publications and Presentations

T. J. Abraham

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C. W. Alexander

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M. R. Ally

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R. J. Andermann

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R. C. Ashline

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O. A. Basaran

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E. C. Beahm

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J. M. Begovich

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J. T. Bell

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C. E. Benson

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S. L. Blankinship

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E. L. Youngblood

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Awards, Honors, and Recognitions

Aaron, W. S.

1992 — Energy Systems President's Waste Minimization Award for Continuous Improvements in the Cooling Oil System at the Isotope Enrichment Facility

Abraham, T. J.

1992 — Energy Systems Technical Achievement Award

Banic, G. F.

1992 — Energy Systems President's Waste Minimization Award for Continuous Improvements in the Cooling Oil System at the Isotope Enrichment Facility

Basaran, O. A.

1992 — Election to the National Fluid Mechanics Committee of the AIChE

1992 — Election to the NASA Panel on Drops and Colloids

Begovich, J. M.

1991 — Program Subcommittee Chairman, National Management Association

Benker, D. E.

1992 — Energy Systems President's Waste Minimization Award for Continuous Improvements in Reduction of Liquid Low Level Wastes from the REDC

1992 — DOE Waste Minimization Award for Off-Gas Caustic-Scrubber Evaluation

Bertram, L. K.

1992 Energy Systems President's Waste Minimization Award for Continuous Improvements in the Cooling Oil System at the Isotope Enrichment Facility

Bond, W. D.

1992 U.S. Patent No. 5,062,993: "Process for Fabricating Doped Zinc Oxide Microsphere Gel"

1992 DOE Waste Minimization Award for Off-Gas Caustic-Scrubber Evaluation

1992 Energy Systems President's Waste Minimization Award for Continuous Improvements in Reduction of Liquid Low Level Wastes form the REDC

Box, W. D.

1992 Inventor of the Year Award for Robotics for Inchworm Robot, International Inventor Forum

1992 Recognition by International Hall of Fame Inventors Clubs of America Inc., for the "Inch Worm," an air-powered robot that can inspect pipes by traveling through them

Brewer, R. W.

1992 DOE Waste Minimization Award for Off-Gas Caustic-Scrubber Evaluation

1992 Energy Systems President's Waste Minimization Award for Continuous Improvements in Reduction of Liquid Low Level Wastes form the REDC

Burtis, C. A.

1992 Alvin Dubin Award from the National Academy of Clinical Biochemistry for contributions to the field of clinical chemistry

1992 Recognition by in International Hall of Fame Inventors Clubs of America, Inc., for the "Blood Rotro," a new tool for analyzing samples of whole blood

Campbell, D. O.

1991 Recipient of the 1991 Seaborg Separations Award

Cochran, D. K.

1991 Technical Communication Award of Excellence in Design Graphics from the East Tennessee Chapter/Society for Technical Communication, "Chemical Engineering Application of Artificial Intelligence"

1991 Technical Communication Award of Merit in Design Graphics from the East Tennessee Chapter/Society for Technical Communication, "Update on the Nondestructive Examination of the RSI/WESF Cesium Capsules"

Cochran, H. D.

1992 Energy Systems R&D Accomplishment Award

1992 Energy Systems Technical Achievement Award for Development of a Fundamental Theoretical Understanding of Solutions in Supercritical Fluids and for Useful Models

Chattin, F. R.

1992 DOE Waste Minimization Award for Off-Gas Caustic-Scrubber Evaluation

1992 Energy Systems President's Award for Continuous Improvements in Reduction of Liquid Low Level Wastes form the REDC

Collins, J. L., Osborne, M. F., Travis, J. R., Arnold, Jr., W. D.

1991 President's Award for Performance Improvement for Method of Removing Radionuclides from Liquid Waste

Croff, A. G.

1991 Technical Communication Award of Merit in Periodic Activity Reports from the East Tennessee Chapter/Society for Technical Communication, *Chemical Technology Division Progress Report for the Period July 1, 1988, to September 30, 1989*

1991 Appointment as member of the National Council on Radiation Protection and Measurement's Standing Scientific Committee 87 on Radioactive and Mixed Waste

1991 Appointment to a National Research Council/National Academy of Sciences Panel on Separation Technology and Transmutation Systems

1992 Chairman, the Nuclear Development Committee of the Organization of Economic Cooperation and Development's Nuclear Energy Agency

Davison, B. H.

1991 Technical Communication Award of Distinction for Scholarly and Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Gas Holdup in Three-Phase Immobilized-Cell Bioreactors"

1991 Technical Communication Award of Merit for Scholarly and Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Use of Immobilized Microbial Membrane Fragments to Remove Oxygen and Favor the Acetone-Butanol Fermentation"

1992 Energy Systems R&D Accomplishment Award

Donaldson, T. L./J. H. Wilson

1992 Patent filed July 29, 1992, "Method and Apparatus for Destroying Organic Contaminants in Aqueous Liquids"

Eversole, R. E.

1991 Energy Systems President's Award for Performance Improvement for Scope Reduction for Seismic Reinforcements of Building 3517

Faison, B. D.

1992 Energy Systems Publication Award

Felker, L. K.

1992 DOE Waste Minimization Award for Off-Gas Caustic-Scrubber Evaluation

1992 Energy Systems President's Award for Continuous Improvements in Reduction of Liquid Low Level Wastes form the REDC

Ferrada, J. J.

1991 Technical Communication Award of Excellence in Design Graphics from the East Tennessee Chapter/Society for Technical Communication, "Chemical Engineering Application of Artificial Intelligence"

1991 Technical Communication Award of Excellence in Technical Reports from the East Tennessee Chapter/Society for Technical Communication, "Sampling and Analysis of Radioactive Liquid Wastes and Sludge in the Melton Valley and Evaporator Facility Storage and Storage Tanks at ORNL"

Fisher, P. W.

1992 Energy Systems R&D Accomplishment Award

Forsberg, C. W.

1991–92 Assistant Chairman, DOE High Level Waste Tank Advisory Panel

Genung, R. K.

1991 Program Chairman, National Management Association

Gilliam, T. M.

1991 Member, Senior Advisory and Review Panel for the U.S. EPS Stabilization/Solidification Technical Resources Document

Green, V. M.

1991 DOE-EM Certificate of Appreciation in Recognition of Outstanding Contribution to the Transportation Assessment and Integration (TRAIN) Project

Greenbaum, E.

1992 Associate Editor, *Biophysical Journal*

Harris, M. T.

1991-92	Executive Committee, the Inventor's Forum
1991-92	Secretary, the Inventor's Forum
1991	Best poster paper award in Ceramics and Superconductors Area of AIChE's Materials Engineering and Sciences Division at the AIChE 1991 Annual Meeting for "Modeling the Formation and Growth of Stober-Silica Spheres"

Hightower, J. R.

1991	Vice-Chairman and Chairman-Elect, Nuclear Engineering Division of AIChE
1991	Program Subcommittee Chairman, National Management Association

Jolley, R. L.

1991	Technical Communication Award of Excellence in the Books Category from the East Tennessee Chapter/Society for Technical Communication, *Water Chlorination: Chemistry, Environmental Impact and Health Effects,* Vol. 6

Kendrick, C. M.

1991	Energy Systems President's "Be the Best" Award for Initiative in Starting Recycling Programs at ORNL

Kovac, F. M.

1991	Energy Systems President's Award for Performance Improvement for Participation in the Improvement of Energy Systems Transportation and Packaging Project

Mattus, A. J.

1992	Patent filed May 12, 1992, "A Process for Decomposing Aqueous Nitrate Wastes"
1992	Patent filed July 12, 1992, "A Submergible Torch for Treating Waste Solutions and Method Thereof"
1992	Laboratory Director's Award for R&D Accomplishment

McDaniel, E. W.

1991	Reappointment to Third Three-Year Term to Editorial Advisory Board of *Nuclear Technology*, Journal of American Nuclear Society
1991	Recipient of Plaque in Recognition of Waste Management Contributions at 10th Annual Incineration Conference

McGinnis, C. P.

1991-92	Program Subcommittee Chairman, National Management Association

Michaels, G. E.

1992 Technical Communication Award of Achievement in Scholarly/Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Measurement of Excess Heat and Apparent Coincident Increases in the Neutron and Gamma-Ray Count Rates During the Electrolysis of Heavy Water"

Milton, H. T.

1992 Energy Systems Presidents's Award for Continuous Improvements in the Cooling Oil System at the Isotope Enrichment Facility

Morris, M. I.

1991 IT Corporation Award for Outstanding Paper, "Physical/Chemical Treatment of Mixed Waste Solids"

Newman, E.

1992 Technical Communication Award of Achievement for Scholarly/Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Measurement of Excess Heat and Apparent Coincident Increases in the Neutron and Gamma-Ray Count Rates During the Electrolysis of Heavy Water"

Osborne-Lee I. W.

1991-92 Certificate of Recognition from the Council of the American Institute of Chemical Engineers for Service to the Profession as Chair of the Minority Affairs Committee

1991-92 Chairman, Minority Affairs Committee, American Institute of Chemical Engineers

1991 Technical Communication Award of Excellence in Design Graphics from the East Tennessee Chapter/Society for Technical Communication, "Chemical Engineering Application of Artificial Intelligence"

1992 "Outstanding Scientific Achievement Award" from the East Tennessee Chapter of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE)

Osborne, M. F., Travis, J. R., Collins, J. L., Arnold, Jr., W. D.

1991 President's Award for Performance Improvement for Method of Removing Radionuclides from Liquid Waste

Rawl, R. R.

1991 Energy Systems President's Award for Performance Improvement for Participating in the Improvement of Energy Systems' Transportation and Packaging Project

Rivera, A. L.

1992 Energy Systems Technical Achievement Award for Creating Multisite Waste Management and Environmental Restoration Program Strategic Plans, or "Roadmaps," for DOE Facilities

Robinson, S. M.

1992 Energy Systems Operations Support Award

Rodgers, B. R.

1992 First Vice-Chairman, Fuels and Petrochemicals Division, American Institute of Chemical Engineers

Scott, T. C.

1992 Advanced Technology Award from Inventors Club of America for Work on the Emulsion-Phase Contactor

Sears, M. B.

1991 Technical Communication Award of Excellence for Technical Reports from the East Tennessee Chapter/Society for Technical Communications, *Sampling and Analysis of Radioactive Liquid Wastes and Sludges in the Melton Valley and Evaporator Facility Storage Tanks at ORNL*, K. H. King (editor), J. L. Botts, R. N. Ceo, J. J. Ferrada, W. H. Griest, J. M. Keller, R. L. Schenley

Scheitlin, F. M. (retired)

1991 Society for Technical Communication Award of Distinction in the category of Scholarly/Professional Articles, "Gas Holdup in Three Phase Immobilized-Cell Bioreactors," B. H. Davison and J. E. Thompson

1991 Society for Technical Communication Award of Merit in the category of Scholarly/Professional Articles, "Microbial Solubilization of a Preoxidized Subbituminous Coal," B. D. Faison and C. A. Woodward

Sedlmeier, M. A.

1992 Energy Systems Award for Administrative and Office Support

Shappert, L. B.

1992 Recognition award, the first ever presented, from the Japanese sponsors of PATRAM '92 for continuous support of, and involvement with, all PATRAM conferences since the first one was held in Albuquerque, New Mexico, in 1965.

Sisson, W. G.

1992 Energy Systems Technical Achievement Award

Stacy, R. G.

1992 DOE Waste Minimization Award for Off-Gas Caustic-Scrubber Evaluation

1992 Energy Systems President's Award for Continuous Improvements in Reduction of Liquid Low Level Wastes from the REDC

Stewart, M. G. (retired)

1991 Technical Communication Award of Excellence for Technical Reports from the East Tennessee Chapter/Society for Technical Communication, *Sampling and Analysis of Radioactive Liquid Wastes and Sludges in the Melton Valley and Evaporator Facility Storage Tanks at ORNL*, by M. B. Sears et al.

1991 Technical Communication Award of Merit for Periodic Activity Reports from the East Tennessee Chapter/Society for Technical Communication, *Chemical Technology Division Progress Report for the Period July 1, 1988 to September 30, 1989,* by Chemical Technology Division Staff

Thompson, J. E.

1991 Technical Communications Award of Distinction for Scholarly/Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Gas Holdup in Three-Phase Immobilized-Cell Bioreactors"

1991 Technical Communication Award of Distinction for Scholarly and Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Solute Diffusion in Biocatalyst Gel Beads Containing Biocatalysts and Other Additives"

1991 Chairman-Elect and founding member of the local section of the National Conference of Chemical Technicians Affiliates, a technical organization affiliated with the American Chemical Society

1992 Energy Systems R&D Accomplishment Award

Tracy, J. G.

1992 Energy Systems President's Award for Continuous Improvements in the Cooling Oil System at the Isotope Enrichment Facility

Travis, J. R., Collins, J. L., Osborne M. F., Arnold, Jr., W. D.

1991 President's Award for Performance Improvement for Method of Removing Radionuclides from Liquid Waste

Walker, A. B.

1992 Energy Systems Technical Support Award

Watson, J. S.

1991 Member Editorial Board *Separations Technology*

1991 Member Editorial Board *Toxic and Hazardous Materials*

1991 First Vice-Chairman, American Institute of Chemical Engineers, Separations Development

1991 Vice-Chairman, AIChE Research Committee

1991 Associate Editor, *Separation Science and Technology for Energy Applications*

Welles, B. W.

1991	President's Award for Performance Improvement for Participating in the Improvement of Energy Systems' Transportation and Packaging Project

Wham, R.M.

1992	Inventor's Club of America 1992 Advanced Technology Award for Development of the Emulsion Phase Contactor
1991	Director, AIChE, Knoxville/Oak Ridge Section

Wilson, J. H./T. L. Donaldson

1992	Patent filed July 29, 1992, "Method and Apparatus for Destroying Organic Contaminants in Aqueous Liquids"

Woodward, J.

1991	Technical Communication Award of Merit for Scholarly/Professional Articles from the East Tennessee Chapter/Society for Technical Communication, "Comparison of the Hydrolytic Activity and Fluorescence of Native, Guanidine Hydrochloride-Treated and Renatured Cellobiohydrolase I from *Tricoderma reesei*"
1991	Chairman-Elect for 1992 and Chairman for 1993, Division of Biochemical Technology, American Chemical Society

Conferences and Workshops

Basaran, O. A.	
1993	Co-chair and Co-organizer of session on "Fundamental Research in Fluid Mechanics: Interfacial Flows, " AIChE 1993 Annual Meeting, November 7-12, 1993, St. Louis, Missouri
Bell, J. T.	
1993	General Chairman in organizing the 8th Symposium on Separation Science and Technology for Energy Applications, Gatlinburg, Tennessee
Berry, J. B.	
1992	Block Chair (for four sessions on Mixed Waste) of the AIChE 1992 Summer National Meeting, Minneapolis, Minnesota, August 9-12, 1992
	Session Chair for two sessions -- "Strategies for Management of Mixed Wastes" and "Mixed Waste Disposal -- A Regulatory Dilemma"
Bond, W. D.	
1991–93	Member of Advisory Board, Annual Actinide Separations and Production Workshop
Brown, C. H.	
1987–92	Member, Program Committee, Water Pollution Control Federation
Burtis, C. A.	
1991	Organizer and Chair of Symposium on Evaluation of Analytical Systems at the XIV Congress National de Quimica Clinica, Durango, Mexico

1991	Co-chair of Symposium on Analytical Instrumentation at the 5th Asian-Pacific Congress of Clinical Biochemists, Kobe, Japan
1992	Organizer and participant in Workshop on Preanalytical Errors, presented at the XV Congress National de Quimica Clinica, Queretaro, Mexico
1992	Organizer of a Symposium on New Technical Developments for the Clinical Laboratory, which was presented at the 44th National Meeting of the American Association for Clinical Chemistry, Chicago, Illinois
1993	Organizer and Co-chair of 25th Annual Oak Ridge Conference on Advanced Analytical Techniques for the Clinical Laboratory, Knoxville/Oak Ridge, Tennessee
1993	Organizer and participant in Workshop on Preanalytical Errors, presented at the XVI Congress National de Quimica Clinica and XI Congreso Latinoamericano DE Bioquimica Clinica, Acapulco, Mexico

Cochran, H. D.

1991	Chairman, Symposium on Supercritical Fluids 1: Fundamental Properties, Annual Meeting of the AIChE, Los Angeles, California

Croff, A. G.

1991	Organizer and Co-chair of Plenary Session on Integrated Systems, 1991 International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada (April 1991)
1991	Chair for session on "Interim Storage," 1991 International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada (April 1991)
1992	Third International Conference on High-Level Radioactive Waste Management: Lead Organizer for all integrated systems technical sessions, Organizer and Chair of integrated systems plenary session, Organizer of technical session on partitioning and transmutation
1992	Deputy Program Chairman and Program Chairman Elect of the fourth and fifth International Conference on High-Level Radioactive Waste Management, respectively

Davison, B. H.

1991	Organizer and Chair of discussion group for 14th Symposium on Biotechnology for Fuels and Chemicals, Colorado Springs, Colorado
1992	Organizer and Facilitator for DOE Alternative Feedstocks Program Technical Workshop, Argonne National Laboratory, Chicago, Illinois
1993	Co-organizer and Session Chair for Symposium on Bioremediation and Bioprocessing, 205th American Chemical Society National Meeting

DePaoli, D. W.

1991	Session Chairman for session on "Application of Chemical Engineering Concepts and Fundamentals to Waste Treatment and Soil Decontamination," AIChE Summer National Meeting, Pittsburgh, Pennsylvania
1992	Session Chairman, for session on "Advances in Soil Venting," AIChE Summer National Meeting, Minneapolis, Minnesota
1992	Session Co-chair, for session on "Use of External Fields to Enhance Separations," 1992 National AIChE Meeting/Separations Conference, Miami Beach, Florida

Donaldson, T. L.

1992	Co-Chairman for two sessions, "Case Studies of Bioremediation at Federal Facilities" and "Fundamental Advances in Bioremediation of Hazardous Chemical and Nuclear Wastes," AIChE National Meeting, Minneapolis, Minnesota, August 1992

Eversole, R. E.

1993	Registration Chair, Fifth Topical Meeting on Robotics and Remote Handling, Sponsored by the Robotics and Remote Systems Division of the American Nuclear Society

Faison, B. D.

1991	Session Chair, Annual Meeting, American Society for Microbiology, May 1991
1991	Session Chair, Annual Meeting, Society for Industrial Microbiology, August 1991

Ferrada, J. J.

1991	Co-chairman and Organizer of session on "Applications of Artificial Intelligence in Waste Management," AIChE 1991 Summer National Meeting, Pittsburgh, Pennsylvania

Forsberg, C. W.

1993	Chairman for Acceptability of Nuclear Power Workshop, Gatlinburg, Tennessee

Gilliam, T.M.

1991	Organizer of symposium, "Chemistry and Microstructure of Solidified Waste Forms," Environmental Division of the American Chemical Society, National ACS Meetings, New York
1991	Program and Technical Chairman, for ASTM 2nd International Symposium on Stabilization/Solidification of Hazardous, Radioactive, and Mixed Wastes
1993	Organizer and Chairman, ASTM Third Symposium on Stabilization/Solidification of Hazardous, Radioactive, and Mixed Wastes, Williamsburg, Virginia

Green, V. M.

1991 Session Presenter, "Regulatory Impacts," Transportation and Packaging Workshop, Germantown, Maryland

1991 Session Presenter, "Regulatory Impacts," DOE Transportation Assessment and Integration Workshop, St. Louis, Missouri

Greenbaum, E.

1991 Organizer of symposia for the Division of Biological Physics, American Physical Society meeting, Cincinnati, Ohio:
Antenna Function in Photosynthesis
Molecular Communication in Biological Systems
Neuromagnetism: From the Microscopic to the Macroscopic
Physical Techniques to Image Metabolism
The Biomechanics of Sensory Systems

1991 Organizer and Chairman of two sessions on biomolecular electronics, Third International Symposium on Molecular and Biomolecular Electronics, New York, New York

1991 Chairman of the symposium program for the Division of Biological Physics

1991 Member, Organizing Committee, Thirteenth Symposium on Biotechnology for Fuels and Chemicals, Colorado Springs, Colorado

1992 Member, Organizing Committee, Fourteenth Symposium on Biotechnology for Fuels and Chemicals, Gatlinburg, Tennessee

1993 Chairman, Symposium on Electrochemistry of Cells and Organelles, Joint Meeting of the Electrochemical Society and the Electrochemical Society of Japan, Honolulu, Hawaii; Co-chair with Professor T. Matsunaga, Tokyo University of Agriculture and Technology, Tokyo, Japan

Grubb, R. G.

1992 Co-organizer, DOE-EM D&D Workshop in Charleston, South Carolina

1993 Co-organizer, DOE-EM Workshop on D&D Technology

Harris, M. T.

1993 Co-chair and Co-organizer of session on "Sol/Gel Synthesis of Advanced Oxide Ceramics," AIChE 1993 Annual Meeting, November 7-12, 1993, St. Louis, Missouri

Kendrick, C. M.

1993 Session Chair, DOE Pollution Prevention and Integrated Technologies Workshop, Santa Fe, New Mexico, March 1993

Kovac, F. M.

1991	Session Chairman, Second International Conference on Uranium Hexafluoride Handling Around the World
1991	Chairman and Participant in executive committee activities, Annual Meeting of the Transportation Technical Working Group for the Institute of Nuclear Material Management (INMM) in executive committee activities; Organizer, INMM Transportation Technical Working Group Workshop, to be held in 1992

McDaniel, E. W.

1991	Session Organizer and Chairman for Mixed Waste Sessions of 1991 Joint International Waste Management Conference, Seoul, Korea
1991	Chairman, 1991 International Incineration Conference, Knoxville, Tennessee
1992	General Chairman, 1992 International Incineration Conference, Albuquerque, New Mexico
1992	Session Organizer and Chairman, "Status on International Waste Management Programs," Waste Management '92 Symposia, Tucson, Arizona
1993	Session Organizer and Chairman, "Status of International Waste Management Programs," Waste Management '93, Tucson, Arizona
1993	General Chairman, 1993 International Incineration Conference, Knoxville, Tennessee

McGinnis, C. P.

1991	Co-organizer, DOE-EM D&D Workshop in Knoxville, Tennessee
1991	Session Chairman and Organizer of technical session, "Treatment of Radioactive and Mixed Wastes," National AIChE Summer National Meeting, Pittsburgh, Pennsylvania
1991	Session Chairman, Mixed Waste Session, HAZMAT South, Atlanta, Georgia
1991	Organizer, Waste Minimization Subconference, Summer AIChE National Meeting, Minneapolis; Featured Luncheon Speaker, AIChE luncheon meeting for this project; Publisher of minutes of the eight sessions
1991	Session Chairman, Waste Management at DOE Facilities, HAZMAT South

Michaels, G. E.

1991	Organizer and Chairman, Pyroprocessing Waste Form Information Exchange Meeting, Oak Ridge, Tennessee

1992	Co-chairman of session on "Partitioning and Transmutation-I," 1991 International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada
1993	Co-chairman of session on Processing Chemistry for Transmutation System

Osborne-Lee, I. W.

1991	Co-organizer, two sessions on "Artificial Intelligence in Chemical Engineering," AIChE Spring National Meeting, Houston, Texas
1991	Co-organizer, East Tennessee Chapter of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) "New Technologies and Developments in Materials," WATTec, Knoxville, Tennessee
1992	Co-organizer and Chair, "Trace Detection: Mechanisms and Applications in Environmentally Significant Samples," for the East Tennessee Chapter of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE), WATTec, Knoxville, Tennessee
1992	Co-organizer and Co-chair, two sessions on "Applications of Artificial Intelligence in Chemical Engineering," AIChE Spring National Meeting, New Orleans, Louisiana
1993	Organizer and Co-chair, "New Technology and the Environment - Educating for the Future," East Tennessee Chapter NOBCChE, WATTec, Knoxville, Tennessee
1993	Co-organizer, two sessions on "Artificial Intelligence in Chemical Engineering," AIChE Spring National Meeting, Houston, Texas

Perona, J. J.

1992	Session Co-chair, "New Uses of Separations for Waste Minimization," American Institute of Chemical Engineers Summer National Meeting, Miami, Florida
1992	Session Co-chair, "Advanced Separation Processes: Wastewater Treatment," American Institute of Chemical Engineers Summer National Meeting, Minneapolis, Minnesota
1993	Session Co-chair, "Separations Technology in Nuclear Waste Processing," American Institute of Chemical Engineers Summer National Meeting, Seattle, Washington

Rodgers, B. R.

1991	Co-organizer, two sessions on "Applications of Artificial Intelligence in Chemical Engineering," AIChE Spring National Meeting, Houston, Texas

1991	Co-organizer, "Applications of Artificial Intelligence in Chemical Engineering," AIChE Summer National Meeting, San Diego, California
Scott, T. C.	
1991	Session Co-chair, "Electrokinetic Methods in Downstream Processing," 1991 National AIChE meeting Los Angeles, California
1991-92	Coordinator, Area 2g of the Separations Division, AIChE, "Other Methods of Separations"
1992	Session Chair, "Use of External Fields to Enhance Separations," 1992 National AIChE Meeting/Separations Conference, Miami Beach, Florida
Shappert, L. B.	
1991	Organizer, Cask Accident Recovery Workshop, Oak Ridge, Tennessee
Spence, R. D.	
1991	Organizer, Symposium on Chemistry and Microstructure of Solidified Waste Forms, Environmental Division of the American Chemical Society, National ACS Meetings, New York
Taylor, P. A.	
1992	Organizer and Chairman, session on Mixed Waste Treatment at Summer National AIChE Meeting, Minneapolis, Minnesota
Toth, L. M.	
1991	Session Co-chairman, Seventh Symposium on Separation Science and Technology, Knoxville, Tennessee
1993	Session Co-chairman, Eight Symposium on Separation Science and Technology, Gatlinburg, Tennessee
Watson, J. S.	
1991	Co-chairman, 7th Symposium on Separation Science and Technology for Energy Applications, Knoxville, Tennessee
1993	Technical Chairman, 8th Symposium on Separation Science and Technology for Energy Applications, Gatlinburg, Tennessee
Welch, M. J.	
1991	Organizer, American National Standard Institute's N-14 Committee, Packaging and Transportation of Radioactive Materials Annual Meeting, U.S. Department of Transportation, Washington, DC
1992	Organizer, American National Standard Institute's N-14 Committee, Packaging and Transportation of Radioactive Materials Annual Meeting, U.S. Nuclear Regulatory Commission, Washington, DC

Wham, R. M.

1991	Co-chairman and Organizer, "Chemical Technology in the Nuclear Industry," AIChE 1991 Summer National Meeting, Pittsburgh, Pennsylvania
1992	Co-chairman and Organizer, "Extraction Flowsheets for Radioactive Materials," AIChE 1992 Summer National Meeting, Minnesota, Minnesota

Williams, D. F.

1992	Co-chairman, "Extraction Flowsheets for Radioactive Materials," AIChE 1992 Summer National Meeting, Minneapolis, Minnesota

Wilson, J. H.

1991	Co-chairman, "Application of Chemical Engineering Concepts and Fundamentals to Waste Treatment and Soil Decontamination," 1991 Summer National AIChE Meeting, Pittsburgh, Pennsylvania
1992	Co-chairman, "Application of Engineering Concepts and Fundamentals to Environmental Problems," 1992 Summer National AIChE Meeting, Minneapolis, Minnesota

Woodward, J.

1991	Co-chairman and Organizer, technical programs of Division of Biochemical Technology, American Chemical Society, 4th Chemical Congress of North America, New York
1991	Co-chairman, Thirteenth Symposium on Biotechnology for Fuels and Chemicals, Colorado Springs, Colorado

Patents

ORNL Chemical Technology Division

INFORMATION DISCLOSURES SUBMITTED

July 1, 1991 - December 31, 1992

ES Date	ESID Number	Employee(s)	Title
09/10/91	1032-X	G.W. Strandberg	Hydrogenation of Microbially Solubilized Coal
09/10/91	1033-X	G.W. Strandberg	Rotating Biological Contactor
12/12/91	1097-X	P.A. Haas J.C. Mailen	Protection of Structural Materials from High Temperature Oxidation
12/16/91	1101-X	J.T. Bell	Cartridge System for In-Tank Removal of Contaminants
12/17/91	1102-X	G.W. Parker J.C. Mailen	Non-Aqueous Purification of U-Nb Scrap
1/17/92	1114-X	M.T. Harris O.A. Basaran T. G. Kollie* F. J. Weaver*	Synthesis of Model Particles for Powder Evacuated Panels
02/06/92	1125-X	W. G. Sisson O. A. Basaran M. T. Harris	Improved Nozzle for Electric Dispersion
02/06/92	1125-X	D.W. Holladay	CO_2 Laser Decontamination of Radioactive Surfaces
02/14/92	1134-X	M.T. Harris O.A. Basaran E. R. Brunson W.G. Sisson	Electro-Homogeneous Precipitation
05/15/92	1175-X	C.W. Forsberg	Temperature Initiated Passive Cooling System
07/17/92	1188-X	C.W. Forsberg E.C. Beahm G.W. Parker	Reactor Accident Meltdown Limit and Control System
09/21/92	1206-X	P.W. Fisher C.W. Foster*	Pellet Cryoblasting Paint Removal System

ORNL Chemical Technology Division

INFORMATION DISCLOSURES SUBMITTED (continued)

July 1, 1991 - December 31, 1992

ES Date	ESID Number	Employee(s)	Title
09/24/92	1207-X	P.W. Fisher C.W. Foster*	Method of Freezing Pellets of Frozen Argon and CO_2
11/04/92	1225-X	E. Greenbaum	Method of Improving the Yields of Hydrogen Production by Microalgal Water Splitting
12/07/92	1243-X	J. Woodward	Method for Separating Non-Inked Cellulose Fibers in Newsprint
01/08/93	1252-X	E.N. Kaufman	In-Situ Particle Characterization Through Fluorescence Visualization of Continuous Phase

*Not Chemical Technology Division personnel.

ORNL Chemical Technology Division

PATENTS AWARDED

July 1, 1991 - December 31, 1992

Date	Employee(s)	Patent Number	Patent Title
11/05/91	W.D. Bond W.D. Arnold* R.J. Lauf*	5,062,993	Method of Preparing Doped Zinc Microspheres
12/31/91	C.W. Forsberg	5,076,999	Continuous Decay Heat Removal System for Water Cooled Nuclear Reactor
01/21/92	J.S. Watson	5,082,541	Continuous Electrophoresis
03/24/92	C.W. Forsberg	5,098,645	Method for Reprocessing Spent Nuclear Fuel
06/16/92	M.T. Harris T.C. Scott C.H. Byers	5,122,360	Method for Preparing Oxide Powders
12/22/92	C.A. Burtis	5,173,262	Multifunctional Blood Rotor

*Not Chemical Technology Division personnel.

ORNL Chemical Technology Division

PATENT APPLICATIONS FILED

July 1, 1991 - December 31, 1992

ESID Number	U.S. Filing Date	Applicant(s)	Patent Title
767-X	05/08/91	H.D. Cochran	Isotope Separations in Dilute Supercritical Solutions
690-X-1	11/21/91	C.D. Scott	Bi-Particle Counter-Current Fluidized Bed Bioreactor
903-X	01/03/92	R.D. Spence I. L. Morgan	Low Temperature Ashing of Hazardous Plastic Waste (Filed by U.S.A.F.)
343X-1	02/06/92	M.T. Harris T.C. Scott C.H. Byers	Method for Preparing Metal Oxide Powders
1126-X	02/06/92	J. Woodward	Gel Sphere Entrapped Cellobiase Biocatalyst
925-X	04/30/92	E. Greenbaum J. MacInnis*	Device for Measuring Photosythesis in Groundwater
33X-2	05/05/92	C.A. Burtis W. F. Johnson*	Multifunctional Blood Rotor
887-X	05/12/92	A.J. Mattus	Process for Treating Nitrate Waste Using Aluminum
773-X	05/15/92	C.D. Scott B.D. Faison B.H. Davison J. Woodward	Process for Converting Waste Paper Products into Fuels & Chemicals
824-X	07/24/92	C.D. Scott B.H. Davison J.N. Peterson*	Continuous Fluidized Bed Contactor with Recycle of Bioadsorbent
901-X	07/28/92	T.L. Donaldson J.H. Wilson	Method for Destroying Organic Contaminants in Groundwater

ORNL Chemical Technology Division

PATENT APPLICATIONS FILED (continued)

July 1, 1991 - December 31, 1992

ESID Number	U.S. Filing Date	Applicant(s)	Patent Title
730-X	08/03/92	A.J. Mattus	Method for Decomposing Aqueous Nitates
832-X-1	09/15/92	C.D. Scott B.H. Davison	Bioreactor with Coupled External Particulate Attritor
986-X 994-X	09/23/92	D. Box	Inchworm Robot - A Robotic Vehicle
1158-X	12/11/92	E. Greenbaum	Conversion of Organic Solids to Hydrocarbons

*Not Chemical Technology Division personnel.

Advisory Committee

CHEMICAL TECHNOLOGY DIVISION ADVISORY COMMITTEE

Member	Affiliation	Term Begins	Term Ends
Mr. Edwin J. Bassler	Vice President, Stone & Webster Technology Corporation 245 Summer Street Boston, Massachusetts 02107 Phone: (617) 589-1099 Fax: (617) 589-2156	1993	1996
Mr. William R. Martin	Office of Technology Transfer Martin Marietta Energy Systems, Inc. 701 Scarboro Road, MS-8242 Oak Ridge, Tennessee 37831 Phone: (615) 576-8369 Fax: (615) 576-5436	1993	1994
Dr. Rita R. Colwell	President, Maryland Biotechnology Institute University of Maryland 4321 Hartwick Road, Suite 500 College Park, Maryland 20740 Phone: (301) 403-0501 Fax: (301) 454-8123	1993	1996
Dr. Darleane C. Hoffman	Nuclear Science Division 70A-3307 Lawrence Berkeley Laboratory Berkeley, California 94720 Phone: (510) 486-4000 Fax: (510) 486-6707	1993	1994
Dr. Martin J. Steindler	Argonne National Laboratory 9700 South Cass Avenue Argonne, Illinois 60439-4837 Phone: (708) 252-4314 Fax: (708) 252-5528	1988	1993
Dr. Darsh T. Wasan	Provost and Vice President and Professor of Chemical Engineering, Illinois Institute of Technology Research and Technology PH Room 228 Chicago, Illinois 60616-3793 Phone: (312) 567-3003 Fax: (312) 567-3003	1993	1996

May 1993

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